The 2008 State New Economy Index

Benchmarking Economic Transformation In the States

The Information Technology & Innovation Foundation

ITIF

KAUFFMAN

The Foundation of Entrepreneurship

About The Information Technology and Innovation Foundation

The Information Technology and Innovation Foundation (ITIF) is a nonprofit, non-partisan public policy think tank committed to articulating and advancing a pro-productivity and pro-innovation public policy agenda internationally, in Washington and the states. Recognizing the vital role of technology in ensuring American prosperity, ITIF focuses on innovation, productivity, and digital economy issues.

Our mission is to help policy makers better understand the nature of the new innovation economy and the types of public policies needed to drive innovation, productivity, and broad-based prosperity for all Americans.

ITIF publishes policy reports, holds forums and policy debates, advises elected officials and their staff, and is an active resource for the media. It develops new and creative policy proposals to advance innovation and analyzes existing policy issues through the lens of advancing innovation and productivity.

About the Kauffman Foundation

The Ewing Marion Kauffman Foundation is a private nonpartisan foundation that works to harness the power of entrepreneurship and innovation to grow economies and improve human welfare. Through its research and other initiatives, the Kauffman Foundation aims to open young people's eyes to the possibility of entrepreneurship, promote entrepreneurship education, raise awareness of entrepreneurship-friendly policies, and find alternative pathways for the commercialization of new knowledge and technologies. It also works to prepare students to be innovators, entrepreneurs and skilled workers in the 21st century economy through initiatives designed to improve learning in math, engineering, science and technology. Founded by late entrepreneur and philanthropist Ewing Marion Kauffman, the Foundation is based in Kansas City, Mo. and has approximately $2 billion in assets.

For further information, to view this report online, or to learn more about the Kauffman Foundation or ITIF, visit us online at:

Ewing Marion KAUFFMAN Foundation

www.kauffman.org

4801 Rockhill Road
Kansas City, MO 64110

Phone: (816) 932-1000

The Information Technology & Innovation Foundation ITIF

www.innovationpolicy.org

1250 I Street, NW • Suite 200
Washington, D.C. 20005

mail@itif.org
Phone: (202) 449-1351
Fax: (202) 638-4922

ITIF appreciates the financial assistance received from the Ewing Marion Kauffman Foundation for this project. The contents and views of this publication are solely the responsibility of the Information Technology and Innovation Foundation.

THE 2008 STATE NEW ECONOMY INDEX

Benchmarking Economic Transformation in the States

Robert D. Atkinson and Scott Andes

The Information Technology
and Innovation Foundation

November 2008

INTRODUCTION: **3**
Box 1: What is the New Economy? 3
THE NEXT BIG ECONOMIC CHALLENGES AND OPPORTUNITIES 4
NEW ECONOMIC OPPORTUNTIES AND CHALLENGES, NEW ECONOMIC STRATEGIES 6
THE INDICATORS **7**
OVERVIEW AND METHODOLOGY 7
Box 2: Data Need to Better Assess State Economic Structure 8
OVERALL SCORES 10
SUMMARY OF RESULTS 16
KNOWLEDGE JOBS 18
Information Technology Jobs 19
Managerial, Professional, and Technical Jobs 20
Workforce Education 21
Immigration of Knowledge Workers 22
U.S. Migration of Knowledge Workers 23
Manufacturing Value-Added 24
High-Wage Traded Services 25
GLOBALIZATION 26
Export Focus of Manufacturing and Services 27
Foreign Direct Investment 28
ECONOMIC DYNAMISM 29
"Gazelle" Jobs 30
Job Churning 31
Fastest-Growing Firms 32
Initial Public Offerings 33
Entrepreneurial Activity 34
Inventor Patents 35
THE DIGITAL ECONOMY 36
Online Population 37
Internet Domain Names 38
Technology in Schools 39
E-Government 40
Online Agriculture 41
Broadband Telecommunications 42
Health IT 43
INNOVATION CAPACITY 44
High-Tech Jobs 45
Scientists and Engineers 46
Patents 47
Industry Investment in R&D 48
Non-Industry Investment in R&D 49
Movement Toward a Green Economy 50
Venture Capital 51
ECONOMIC DEVELOPMENT STRATEGIES FOR THE NEW ECONOMY **52**
FOUR COMPETING ECONOMIC DEVELOPMENT DOCTRINES 52
Table 1: Economic Development Doctrines and State Economic Development Policy 55
CRAFT ROBUST TECHNOLOGY- AND ENTREPRENEURSHIP-BASED ECONOMIC DEVELOPMENT POLICIES 56
Box 3: Green Tech: The Next Big Thing? 56
Box 4: Open Innovation and State Economic Development 58
Box 5: Fostering Immigrant Entrepreneurship 60
DON'T FORGET INSTITUTIONAL INNOVATION 61
CONCLUSION 65
DATA SOURCES **66**
APPENDIX: Weighting Methodology. **70**
ENDNOTES **71**
ABOUT THE AUTHORS **82**

It is not the strongest of the species that survive,
nor the most intelligent,
but the ones most responsive to change.

— Charles Darwin

In the midst of economic slowdowns, it's often hard to think beyond the near term. But, just as the most effective companies take advantage of slowdowns to better position themselves for subsequent periods of strong economic growth, so, too, should states. For the current slowdown, caused in large part by higher energy prices and excesses in the housing market that have spurred turmoil in the financial services industry, will not last forever. In fact, given the experiences of past New Economy slowdowns (the early 1990s and at the turn of this century), the slowdown could be less severe than many past slowdowns. As a result, the more important economic question states should be focused on is whether their economies are well positioned for robust growth and innovation over the next decade.

Being well positioned means that state economies need to be firmly grounded in the New Economy. These New Economy factors have become a fundamental capacity that states need to have to find success and navigate the shoals of economic change. This report uses twenty-nine indicators to assess that capacity and, in particular, to measure the differences in the extent to which state economies are structured and operate according to the tenets of the New Economy. In other words, it examines the degree to which state economies are

BOX 1: WHAT IS THE NEW ECONOMY?

While some use the term "New Economy" to refer to a brief period at the end of the 1990s, in fact, the real New Economy was not just a fad. Rather, it refers to a set of qualitative and quantitative changes that, in the last two decades, have transformed the structure, functioning, and rules of the U.S. economy. The New Economy is a global, entrepreneurial, and knowledge-based economy in which the keys to success lie in the extent to which knowledge, technology, and innovation are embedded in products and services.

Today's economy is *knowledge-dependent.* Of course, managers and "knowledge workers" always have been part of the economy, but, by the 1990s, they had become the largest occupational category. Managerial and professional jobs increased as a share of total employment from 22 percent in 1979, to 28.4 percent in 1995, and to 34.8 percent in 2003. In contrast, around one in fourteen workers is employed as a production worker in manufacturing and, even there, knowledge and continual skills enhancement is becoming more important.

Today's economy is *global.* While it is true that some firms have long had global links, today's globalization is pervasive, as more nations join the global marketplace, as more goods and services are traded, and as more of the production process is interconnected in a global supply web. Since 1980, global trade has grown 2.5 times faster than global GDP. World exports are now at $12.5 trillion, nearly 20 percent of world GDP.

Today's economy is *entrepreneurial.* And, while it is true that entrepreneurial growth, market dynamism, economic "churning," and competition have been features of the American economy since the colonial days, after the 1990s the center of gravity seemed to shift to entrepreneurial activity, while, at the same time, the underlying operation of the economy accelerated to a new speed while becoming more customized and innovative. For example, in the 60 years after 1917, it took an average of thirty years to replace half of the 100 largest public companies. Between 1977 and 1998 it took an average of twelve years. Moreover, from 1980 to 2001, all of the net U.S. job growth was from firms less than five years old, while older firms actually lost jobs.

Today's economy is rooted in *information technologies.* While it also is true that information technologies have played a role in the economy since the invention of the telegraph, something happened in the 1990s when semiconductors, computers, software, and telecommunications became cheap enough, fast enough, and networked enough to become so ubiquitous as to power a surge in productivity growth. Indeed, information technology is now the key technology driving the economy, not just in the IT industry itself—which continues to see high-wage job growth—but also in the use of IT in virtually all sectors to boost productivity, quality, and innovation.

Today's economy is *driven by innovation***—**the development and adoption of new products, processes, and business models. Nations, states, regions, firms, even individuals compete on their ability to accumulate, aggregate, and apply their assets to create value in new ways for increasingly diverse customers all over the world. For example, as R&D is the key fuel of the engine of New Economy growth, it is not surprising that business-funded R&D has increased from 1.19 percent of GDP in 1980 to 1.8 percent in 2005. Moreover, the number of patents issued has increased by more than 160 percent since 1984, with more than 173,771 issued in 2006.

knowledge-based, globalized, entrepreneurial, IT-driven, and innovation-based. With these indicators as a frame of reference, the report then outlines a state-level public policy framework aimed at helping states master forthcoming challenges and take advantage of opportunities. The report builds off three earlier reports (*The 1999 State New Economy Index*, *The 2002 State New Economy Index*, and *The 2007 State New Economy Index*).

THE NEXT BIG ECONOMIC CHALLENGES AND OPPORTUNITIES

The U.S. economy and, by extension, state economies, face at least five key challenges over the course of the next decade. How well they meet these challenges and turn them into opportunities largely will determine whether the national and state economies will be growing and robust in the next decade or stagnant.

Achieve the Promise of the Digital Revolution: First, and most importantly, can the U.S. economy continue to take full advantage of the promises offered by the IT revolution, or will the pace of change slow as a number of existing institutions and sectors (e.g., government, health care) transition to a digital economy at a snail's pace? In the new global economy, information technology is the major driver of both economic growth and improved quality of life. In our 2007 report, *Digital Prosperity: Understanding the Economic Benefits of the Information Technology Revolution*, ITIF documented how, since the mid-1990s, IT has been the principal driver of increased economic growth.[6]

As productivity growth kept up through the early 2000s and even increased, evidence mounted that the IT revolution was behind this unanticipated economic boom. Indeed, economists generally agree that it is the IT revolution that is transforming virtually all industries and is driving increased productivity.[7] IT was, in fact, responsible for all of the labor productivity growth increase from 1995 to 2002.[8] By automating a large share of functions involving the routine processing of information, including face-to-face, phone, and paper transactions, the digital economy promises to continue to be the major engine of productivity.

Moreover, it appears likely that the "IT engine" is not likely to run out of gas anytime soon. The core technologies (memory, processors, storage, sensors, displays, and communication) continue to get better, faster, cheaper, and easier to use, enabling new applications to be introduced on a regular basis.[9] The adoption of digital technologies continues to grow. The number of households subscribing to broadband increased from 35.3 million in 2004 to 65 million in 2007, and is projected to increase to 90 million by 2010, or 71 percent of households.[10] Finally, sectors like health care, education, transportation, government, real estate, and others are at the early stages of digital transformation, and, if they transform, productivity promises to continue to grow.

But we have seen just the beginning of that revolution. In the 1960s, if someone were asked to name the technology at the forefront of improving society, he might have responded, as Mr. McGuire did in the movie *The Graduate*, "plastics." And indeed, in the old economy, breakthroughs in materials technologies let organizations more easily manipulate "atoms" to create new materials that dramatically improved the quality of life for billions of people around the globe. In short, the "materials revolution" drove both economic growth and dramatic improvements in the quality of our lives in the old economy.

Today, however, the materials revolution largely has achieved its promise, and relatively few innovations rely on materials technologies. Certainly, many advances in the IT revolution depend on hardware innovations made possible by continued advancement in materials technology. However, these improvements are not manifest in the physical nature of these devices but, rather, in their functional performance. Thus, the value found in newly-designed microprocessors has less to do with physical properties such as size, weight, and durability and more to do with functional properties, such as the number of instructions processed per second. It is now the "digital information revolution" that drives innovation and enables billions of people to live better lives. Indeed, for the foreseeable future, the most promising advances will relate to the ability to use information more effectively. The materials revolution produced lifesaving vaccines, but the digital information revolution is enabling the creation of a rapid learning network to enable our global health care system to quickly find out what treatments work best and which don't. The materials revolution produced the automobile and the highway system, but the digital information revolution is creating intelligent transportation systems and is letting us "digitally travel" through telecommuting and teleconferencing. The materials revolution produced the telephone, but the digital information revolution is allowing ubiquitous communication from a wide range of devices and places.[11]

This next wave of the information technology revolution not only will transform states, it will lead to significant new

economic opportunities as IT companies seek out new business opportunities to create this new digital world. The key for states, therefore, is two-fold: Will they see their own economies and societies transformed by IT and will they be able to also gain the business opportunities in IT industries related to doing so?

Ride the Next Wave of Innovation: Second, while the digital engine of growth has the potential to power growth in the near and mid-term future, the critical question is, what comes after? Can states spur and take advantage of the next innovation wave—technologies such as robotics, clean energy, biotechnology, and nanotechnology—or will the next wave of technology-powered growth not emerge in time to prevent a transitory slowdown after the digital revolution eventually runs its course?[12]

If past transformations provide a roadmap, the productivity gains from today's IT-driven economy should continue for at least another decade, but they won't last forever. Most organizations will adopt IT and the digital economy will simply be the economy. Moreover, the pace of innovation in the IT sector eventually may hit a wall. Indeed, many experts suggest that by around 2015 the breakneck rate of progress in computer chip technology that has become known as Moore's law will come to an end, at least until the next fundamentally new micro-processor technology is developed.

In Isaac Asimov's *Foundation* series, the secret foundation's mission is to reduce the length of a galactic dark age by accelerating the reemergence of a new Empire; in that case, based on microminiature technologies. Although the United States will not face a 1,000-year galactic dark age, it might face a ten- to twenty-year period of slow growth, precisely at the time when it will need that growth more than ever: when baby boomers go from being producers to consumers. This suggests that both the nation and states need to think about what kind of technology system will power growth fifteen to twenty years from now and to consider what steps, if any, might accelerate its development. In the 1960s, no one predicted the slowdown that was to come just a decade later. If they had, perhaps they could have stepped up efforts to accelerate the IT revolution.[13]

Which technologies will form the core of the next wave is not yet clear, but it seems likely that one will be based on nanoscale advances, whether in pharmaceuticals, materials, manufacturing, or energy. Another could relate to the key need to boost productivity in human-service functions. Boosting productivity in human-service occupations is difficult, but technology can play some role. For example, as Asimov has speculated, robots could play an important role in the next economy, perhaps by helping care for the elderly at home.[14] And, of course, the technologies involved in producing a low-carbon economy are likely to be critical.

Harvard University economist Frederic Scherer has noted that: "There is a centuries' old tradition of gazing with wonder at recent technological achievements, surveying the difficulties that seem to thwart further improvements, and concluding that the most important inventions have been made and that it will be much more difficult to achieve comparable rates of advance. Such views have always been wrong in the past, and there is no reason to believe that they will be any more valid in the foreseeable future."[15] Such pessimism is especially misplaced now, given that we are in the middle of a technology-driven surge in productivity and can expect perhaps as many as two decades of robust growth until the current techno-economic system is fully utilized. Noted innovation economist Joseph Schumpeter got it right when he stated, "There is no reason to expect slackening of the rate of output through exhaustion of technological possibilities." But there may be a reason to expect a gap between the full utilization of one technology system and emergence of other technology engines. As a result, the challenge now for state policymakers is to take the steps needed not only to advance the digital economy but also to put in place the conditions for the emergence of the next economy and its accompanying technology system.

Build on the Transition to a Low-Carbon Economy: Third, can the U.S. economy transition to a low-carbon economy in a way that supports robust economic growth and technological innovation, or will we remain locked into the current energy system, seeking to reduce carbon emissions through higher energy costs, reduced activity, and costly regulatory restrictions? The answer largely depends on whether technological innovation will be robust enough to create clean and cost-effective energy technologies. Without technological innovation, the low-carbon economy will not be the economic nirvana that some proclaim, since it will rely on a combination of expensive technologies and reduced economic activity by businesses and consumers. Moreover, simply raising the price of carbon (by either carbon taxes or a "cap-and-trade" system) will not necessarily automatically lead to a reduction in carbon emissions. At the risk of over-simplifying, we won't be able to get to a low-carbon future by simply taking the bus, recycling more, turning down our thermostats, and switching to compact fluorescent bulbs. The problem is too large, in part because of continuing economic growth throughout the

world. Rather, a green economy requires fundamentally new clean technologies, such as much cheaper solar and fuel cells, high-performance batteries, more efficient energy transmission systems, etc. Developing and widely deploying these technologies could not only potentially reduce energy prices for states, but lead to the development of new business opportunities and jobs for firms in these fields. These opportunities promise to be wide-ranging, from local jobs installing clean energy systems (e.g., solar panels installation) to export-led jobs in solar cells, wind turbines, and other alternative energy production facilities.

Take Advantage of the New Globalization: Fourth, can states not only take advantage of new conditions of globalization—most prominently higher energy prices and a lower value of the dollar—or will they lose critical mass of manufacturing capabilities, leading them, in UK-like fashion, to struggle to compete globally? For the decade preceding 2005, the trade deficit in manufacturing goods grew significantly, meaning that, on net, the United States was losing manufacturing jobs to trade. While the lion's share of manufacturing job loss had been due to higher productivity growth in manufacturing than in services, some of the loss was due to an increasing trade deficit. While some deny that manufacturing has been weakened by foreign competition, manufacturing's share of GDP (omitting computers) has declined from 13 percent in 1993 to 11.4 percent in 2003, at a time when the goods trade deficit had increased 3.6 percentage points as a share of GDP.[16]

But, between 2005 and mid-2008, things began to turn around. As the value of the dollar has fallen to more sustainable levels, particularly against the euro, U.S. exports have gotten cheaper and U.S. imports more expensive. Moreover, as energy costs have risen, the cost of shipping goods internationally also has risen. For example, the Baltic Capesize Index (which measures the cost of chartering cargo ships transporting ore and coal) has increased by a factor of five since 2003.[17] As a result, for the last two years, manufacturing exports have grown faster than manufacturing imports, which means that, on net, new manufacturing opportunities are being created in the United States. Depending on a host of factors (including future administrations' trade and currency policies, and energy trends), it is possible that, on net, trade will present U.S. manufacturing with economic opportunities. Those potential opportunities are likely to be stronger in some sectors than others, particularly those sectors that compete less on cost and more on high skills and complex technology. In this environment, states that have stronger manufacturing sectors, particularly in advanced technology sectors, could benefit.

Build on More Balanced Regional Growth: Fifth, can we take advantage of the opportunity to expand economic opportunity in many regions of the nation where housing prices and wages are lower and infrastructure not overburdened, or will we continue the trend toward unbalanced regional growth, with some regions enjoying robust growth while others grow more slowly or even decline? In the last decade, 30 percent of the job growth in the United States occurred in just five states. And these patterns show a distinct regional pattern, with most Southern and Western states growing more rapidly than most Midwestern and Northeastern states. But, it is perhaps ironic that the states that are growing the fastest are also the states that are facing challenges from growth: more expensive housing (even with the correction in housing prices, this is still true in many places), congested transportation, relatively poor air quality, and higher labor and other business costs. With the population of the United States expected to grow 28.5 percent to 392 million by 2050, a key question is whether these current unbalanced growth trends will continue.[18]

To be sure, there are some structural reasons why some states have lost population, including less favorable weather and relative economic isolation, but, if heretofore, slow-growing states can craft effective economic strategies, they may be able to build on the possible new demographic and economic trends toward more balanced growth.[19]

NEW ECONOMIC OPPORTUNITIES AND CHALLENGES, NEW ECONOMIC STRATEGIES

These and other new opportunities and challenges mean that, for states to succeed, they will need to have in place the right economic policy and implementation framework. For, in the last decade, an increasing number of economists have concluded that innovation—the creation and adoption of new products, services, production processes, and business models—is the key to improved standards of living.[20] If states are going to meet the economic challenges of the future, they will need to make the promotion of innovation a larger part of their economic development policy framework.

Innovation is essential if states are to create a future of better jobs for their residents. Properly conceived, innovation is not just "high tech"—although "high-tech" sectors are generally innovative. It is also about all sectors and organizations learning, adapting, and changing. Properly conceived, a state innovation agenda benefits workers, firms, and regions that

depend on manufacturing, as well as those that depend on information technology, and high school and community college graduates, as well as PhDs. Properly conceived, innovation is not just about creating more jobs for engineers and managers in high-technology industries. It is also about providing more and better training for incumbent workers in manufacturing and "low-tech" services, and reorganizing work processes so that their companies can perform better.

Innovation is central to state economic success in large part because, in order to succeed in the new global economy, all states and most regions no longer can rely solely on old-economy strategies of relentlessly driving down costs and providing large incentives to attract locationally mobile branch plants or offices. Even low-cost regions will have a hard time competing for facilities producing commodity goods and services against nations whose wage and land costs are less than one-fifth of those in the United States. Rather, regions now must look for competitive advantage in earlier-stage product (and service) cycle activities. This can mean either fostering new entrepreneurial activities or helping existing firms innovate so that they don't become commodity producers searching for any number of interchangeable, low-cost locations. In short, regions need to be places where existing firms can become more productive and innovative, where new firms can emerge and thrive, and where locationally mobile establishments want to locate because of the innovation environment.

Yet, the challenges listed above are so great and opportunities so large that pursuing modest, incremental change no longer will suffice. If states are to meet these challenges of creating more innovation-based economies, they will need to start with "institutional innovation" of their own: embracing new and often-untested approaches; many that will upset existing constituencies. In the words of Franklin Roosevelt, states need to embrace "bold, persistent experimentation." This is not the time for inertia, timidity, or the status quo.

Toward that end, the final section details steps states need to take to craft an innovation-oriented public policy framework designed to foster success. This starts with getting the fundamentals of economic development right, both the right theory of economic doctrine and the right operational principles. It means putting in place a strong and well-funded technology-based economic development (TBED) framework. Finally, it means risking moving beyond the status quo to embrace bold institutional innovations in a number of areas. States that get the fundamentals right, craft effective TBED strategies, and embrace cutting-edge institutional innovation will be well positioned to experience strong growth, particularly in per-capita incomes. And that is the true objective. Developing a vibrant New Economy is not an end in itself; it is the means to advance larger progressive goals: higher incomes, new economic opportunities, more individual choice and freedom, greater dignity and autonomy for working Americans, and stronger communities.

THE INDICATORS

OVERVIEW AND METHODOLOGY

The purpose of the *State New Economy Index* is to measure the economic *structure* of states. Unlike some reports, which measure state economic performance or state economic policies, this report focuses more narrowly on a simple question: To what degree does the structure of state economies match the ideal structure of the New Economy? For example, we know that a defining characteristic of the New Economy is that it is global. Therefore, the Index uses a number of variables to assess how globally linked a state's economy is.

One challenge in measuring new-economy structure is that many of the factors that are appropriate to measure cannot currently be measured due to lack of available data. Going forward, the federal government can and should play a much more active role in defining the variables needed at the state level and collecting the data to better measure them.

Overall, the report uses twenty-nine indicators, divided into five categories that best capture what is new about the New Economy:

1) **Knowledge jobs.** Indicators measure employment of IT professionals outside the IT industry; jobs held by managers, professionals, and technicians; the educational attainment of the entire workforce; immigration of knowledge workers; migration of domestic knowledge workers; employment in high value-added manufacturing sectors; and employment in high-wage traded services.
2) **Globalization.** Indicators measure the export orientation of manufacturing and services, and foreign direct investment.
3) **Economic dynamism.** Indicators measure the number of fast-growing "gazelle" companies; the degree of job churning (which is a product of new business startups and existing business failures); the number of Deloitte Technology Fast 500 and Inc. 500 firms, the number and

value of initial public stock offerings (IPOs) by companies; the number of entrepreneurs starting new businesses; and the number of individual inventor patents issued.

4) **Transformation to a digital economy.** Indicators measure the percentage of population online; the number of Internet domain name registrations; technology in schools; the degree to which state and local governments use information technologies to deliver services; use of IT in the health care sector; Internet and computer use by farmers; residential and business access to broadband telecommunications; and use of information technology in the health care system.
5) **Technological innovation capacity.** Indicators measure the number of jobs in technology-producing industries; the number of scientists and engineers in the workforce; the number of patents issued; industry investment in research and development; non-industry R&D; venture capital activity; and movement toward a green energy economy.

The 2008 State New Economy Index builds on the *2007 SNEI* and *2002 SNEI*, using many of the indicators contained in that report. However, in our continuing effort to better measure the New Economy, the *2008 Index* includes four new indicators: domestic in-migration of knowledge workers, use of information technology in the health care system; non-corporate R&D, and movement toward a green energy economy. Because of data availability, the package exports indicator was not included this year.

Like the *2002* and *2007 Indexes*, for variables that measure company behavior (R&D, exports, patents, manufacturing value-added), the report controls for a state's industry sector mix. Holding constant the industry mix is important, because some industries by their nature export, patent, spend more on R&D, or have higher value-added than others. For example, without controlling for industry mix, Washington state would score very high in manufacturing exports because the aviation sector (e.g., Boeing) is so large, and exports are a large share of that industry's output. To present a more accurate measure of the degree to which companies in a state, irrespective of the industry they are in, export, invest in R&D, or patent, these three indicators account for the state's industrial composition.[22] Similarly, manufacturing value-added is measured on a sector-by-sector basis, ensuring that a state's companies are compared to the nationwide performance of firms in the same industry.

Because the 1999, 2002, 2007, and 2008 reports use different indicators and methodologies, the total scores are not

BOX 2: DATA NEEDS TO BETTER ASSESS STATE ECONOMIC STRUCTURE

A wide array of factors captures the proliferation of structural changes that have occurred in the U.S. economy in the last few decades. However, operationalizing these factors at the state level is anything but easy, in part because there are relatively little data. To be sure, a host of data are collected on state economic performance (e.g., jobs, firms, incomes, etc.), but there is a paucity of data on state economic structure. In part, this is a holdover from the post-World War II era, when national and state economic statistics were collected to help manage the business cycle. But, in an era when we need to understand innovation systems, and firm structure and performance, our national statistical system has not kept up. It is also an issue of resources, with some data sources available only at the federal level, but not at the state level. As a result, this is an area that cries out for better measures, in at least five areas.

Knowledge Jobs: Currently, data to make sense of the knowledge economy at the state level is largely confined to measures of occupations or formal years of schooling. But these are, at best, proxies for knowledge. Better indicators would measure factors such as actual skills of workers; annual organization investments in workforce training; and organizations' use of knowledge-based, high-performance work practices, such as quality circles and self-managed teams.

Globalization: Globalization is about more than just exports and foreign direct investment, where data exist (albeit, it could be better, with more data on service exports needed). It is also about communication and people flows, but here data are non-existent. Getting data in areas like international communication flows, package exports, and foreign travel by Americans would help paint a much richer picture of states' global linkages.

Economic Dynamism: Data regarding entrepreneurship is spotty at best. It's not enough just to count firm startups. It's

necessarily compatible. Therefore, a state's movement to a higher or lower overall rank between the years does not necessarily reflect changes in its economy.

In all cases, the report relies on the most recently published statistics available, but, because of the delays in publishing federal statistics, the data may, in some cases, be several years old. In addition, in all cases, data are reported to control for the size of the state, using factors such as the number of workers or total worker earnings as the denominator.

Scores in each indicator are calculated as follows: In order to measure the magnitude of the differences between the states instead of just their rank from one to fifty, raw scores are based on standard deviations from the mean. Therefore, on average for most indicators, approximately half the states initially have negative scores (below the national mean) and approximately half have positive scores. The scores are equally adjusted (ten is added to each of the five indicator category totals) to ensure that all are positive.

In the calculation of the five indicator category totals (e.g., globalization, economic dynamism, etc.) and the overall New Economy scores, the indicators are weighted both according to their relative importance and so that closely correlated ones (for example, patents, R&D spending, and high-tech jobs) don't bias the results. (See Appendix).

The overall scores are calculated by adding the states' adjusted scores in each of the five indicator categories and then dividing that total by the sum of the highest score achieved by any state in each category. Thus, each state's final score is a percentage of the total score a state would have achieved if it had finished first in every category.

The maps were coded using the following methodology: The range between the highest and lowest scores was calculated and divided by four. That product was subtracted from the top score to calculate the range for the 100th to 76th percentile, and likewise for the other three percentile ranges. In other words, the percentiles do not necessarily divide into an equal number of states, but rather indicate which state scores fall into a particular range.

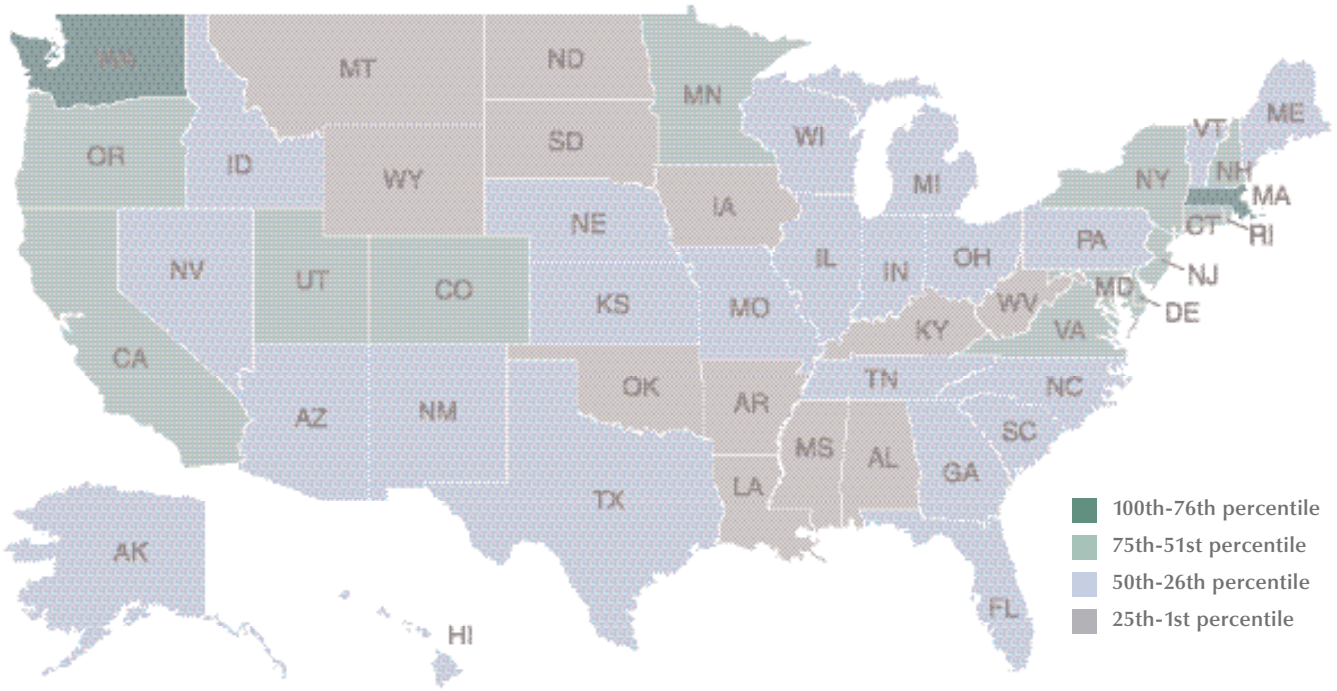
important to know what sectors they are in, and to also track firm dynamics by age and sector. It also would be valuable to have data on the amount of value-added by new and young firms, as opposed to just the number of firms. Likewise, it would be valuable to know about firm spin-offs from existing firms, and demographic characteristics of entrepreneurs.

Digital Economy: Very little is known at the state level of the actual extent of IT use, particularly by organizations. Data are not available for indicators such as firm investments in IT capital, use of B-to-B e-commerce, retail e-commerce sales, and other factors. In addition, more accurate and comprehensive data on broadband use are needed, particularly given that FCC data sets do not appear to be fully accurate.[21] In addition, sectoral progress in IT, such as health IT adoption, would be a useful guide to overall digital transformation.

Innovation Capacity: Most available innovation indicators measure innovation inputs (such as R&D spending, number of scientists, etc.), but it would be valuable to have data on what firms are actually doing. Valuable indicators would include: firm investment in new capital equipment in existing facilities each year (not counting investment in new factories) and introduction of new or significantly improved production process. In addition, information on the number and sales of new products or service innovations developed, investments in collaborative research partnerships, and better measures of firm productivity also would help shed light on the innovation capacity and performance of states.

Some of these measures are being worked on. The Census Bureau will be making publicly available new data on firm dynamics organized by firm size and sector. The National Science Foundation is redesigning its industry and academic R&D surveys, which will attempt to get at issues such as introduction of new or significantly improved products, services, or processes. But it is important for both Congress and the Administration to support such efforts, and for states and local governments to make it clear that such data at the sub-national level are critical to help inform their effective innovation-based economic development activities.

OVERALL SCORES



2008 Rank	2008 Score	State	1999 Rank	2002 Rank	2007 Rank	Change from 2002*	Change from 2007*
1	97	Massachusetts	1	1	1	0	0
2	81.9	Washington	4	4	4	2	2
3	80	Maryland	11	5	3	2	0
4	79.3	Delaware	9	9	7	5	3
5	77	New Jersey	8	6	2	1	-3
6	76.1	Connecticut	5	7	6	1	0
7	75.6	Virginia	12	8	8	1	1
8	75	California	2	2	5	-6	-3
9	74.4	New York	16	11	10	2	1
10	70.4	Colorado	3	3	9	-7	-1
11	67.7	Rhode Island	29	23	15	12	4
12	67.7	Utah	6	16	12	4	0
13	67.7	New Hampshire	7	12	13	-1	0
14	66	Minnesota	14	14	11	0	-3
15	63.8	Oregon	15	13	17	-2	2
16	62.6	Illinois	22	19	16	3	0
17	62.2	Michigan	34	22	19	5	2
18	62.1	Texas	17	10	14	-8	-4
19	60.5	Vermont	18	26	20	7	1
20	60	Arizona	10	15	22	-5	2
21	60	Georgia	25	18	18	-3	-3
22	59.2	Pennsylvania	24	21	21	-1	-1
23	58.3	Florida	20	17	23	-6	0
24	57.4	North Carolina	30	24	26	0	2
25	56.7	Nevada	21	31	27	6	2
26	55.6	Idaho	23	20	24	-6	-2
27	55.4	Nebraska	36	36	28	9	1
28	53.9	Maine	28	29	32	1	4
29	53.2	New Mexico	19	25	33	-4	4
30	53	Ohio	33	27	29	-3	-1
31	52.9	Kansas	27	30	34	-1	3
32	50.8	Alaska	13	39	25	7	-7
33	50.6	Wisconsin	32	37	30	4	-3
34	48.7	South Carolina	38	35	39	1	5
35	47.5	Hawaii	26	38	41	3	6
36	47.4	Indiana	37	32	31	-4	-5
37	46.9	Missouri	35	28	35	-9	-2
38	46.7	Tennessee	31	34	36	-4	-2
39	46.5	North Dakota	45	47	37	8	-2
40	46	Montana	46	41	42	1	2
41	44.7	Louisiana	47	44	44	3	3
42	44.5	Iowa	42	40	38	-2	-4
43	43.2	Oklahoma	40	33	40	-10	-3
44	42.9	South Dakota	43	46	48	2	4
45	41.3	Kentucky	39	42	45	-3	0
46	40.1	Wyoming	41	43	43	-3	-3
47	37.4	Alabama	44	45	46	-2	-1
48	35.3	Arkansas	49	49	47	1	-1
49	31.9	West Virginia	48	48	50	-1	1
50	29.9	Mississippi	50	50	49	0	-1

** Because of differences in methodology and indicators measured, changes in ranks between 1999, 2002, 2007, and 2008 cannot all be attributed to changes in actual economic conditions in the state.*

STATE NEW ECONOMY SCORES BY OVERALL RANK

STATE NEW ECONOMY SCORES BY OVERALL RANK

State	Overall Rank	Overall Score	IT Professionals Rank	IT Professionals Score	Managerial, Professional, Technical Jobs Rank	Managerial, Professional, Technical Jobs Score	Workforce Education Rank	Workforce Education Score	Immigration of Knowledge Workers Rank	Immigration of Knowledge Workers Score	Manufacturing Value-Added Rank	Manufacturing Value-Added Score	Mirgration of U.S. Knowledge Workers Rank	Mirgration of U.S. Knowledge Workers Score	High-Wage Traded Services Rank	High-Wage Traded Services Score	Export Focus of Manufacturing and Services Rank	Export Focus of Manufacturing and Services Score	Foreign Direct Investment Rank	Foreign Direct Investment Score	"Gazelle Jobs" Rank	"Gazelle Jobs" Score	Job Churning Rank	Job Churning Score	Fastest Growing Firms Rank	Fastest Growing Firms Score	IPOs Rank	IPOs Score
Massachusetts	1	97.03	5	1.91%	1	27.1%	1	46.3	9	12.8	1	14.6	8	105.8%	9	16.6%	11	$32,576	6	4.1%	17	7.9%	20	34.3%	1	0.0367%	2	6.93
Washington	2	81.91	6	1.76%	15	21.8%	8	39.7	13	12.8	13	13.8	1	122.5%	32	12.0%	2	$60,418	32	2.3%	4	10.2%	39	30.9%	9	0.0174%	31	4.21
Maryland	3	79.99	4	1.94%	3	25.0%	2	44.0	14	12.7	8	14.0	3	109.8%	22	13.5%	26	$22,682	20	3.0%	7	9.6%	26	33.0%	4	0.0229%	13	5.15
Delaware	4	79.31	2	1.97%	5	24.4%	24	32.0	11	12.8	23	13.1	14	100.7%	1	23.2%	3	$50,217	3	4.6%	6	9.8%	23	33.8%	28	0.0058%	41	3.63
New Jersey	5	77.04	3	1.97%	6	24.0%	10	39.1	32	11.5	11	13.9	41	90.3%	5	17.3%	12	$32,123	4	4.5%	3	11.0%	28	32.4%	5	0.0206%	11	5.20
Connecticut	6	76.07	7	1.75%	4	24.9%	4	42.2	5	13.2	5	14.1	2	112.2%	2	20.6%	20	$26,064	1	4.7%	23	7.4%	49	22.0%	7	0.0197%	7	5.63
Virginia	7	75.58	1	2.37%	8	23.6%	9	39.4	7	13.0	7	14.0	4	107.6%	8	16.7%	25	$23,606	18	3.1%	21	7.7%	41	30.2%	2	0.0348%	20	4.87
California	8	75.02	21	1.31%	11	22.5%	23	32.3	42	10.7	16	13.7	16	100.6%	6	17.2%	10	$33,414	23	2.8%	9	9.2%	47	27.9%	10	0.0171%	8	5.61
New York	9	74.42	10	1.66%	2	25.0%	13	37.1	16	12.3	3	14.3	20	99.7%	3	20.0%	5	$41,284	10	3.6%	2	12.3%	14	36.9%	15	0.0106%	10	5.57
Colorado	10	70.38	9	1.72%	12	22.2%	3	42.9	36	11.3	10	13.9	37	93.7%	16	14.4%	38	$18,772	29	2.4%	22	7.7%	5	42.5%	11	0.0159%	4	6.12
Rhode Island	11	67.75	25	1.25%	9	23.0%	20	33.1	23	12.0	6	14.1	38	91.0%	25	13.3%	50	$10,768	17	3.1%	19	7.8%	8	40.8%	45	0.0015%	23	4.59
Utah	12	67.72	14	1.40%	22	20.8%	12	38.3	35	11.3	22	13.2	33	94.9%	11	15.4%	21	$26,023	35	2.2%	14	8.1%	3	42.6%	3	0.0268%	6	5.78
New Hampshire	13	67.69	15	1.38%	14	21.9%	6	40.7	3	13.4	9	14.0	39	90.9%	13	14.9%	45	$13,573	5	4.3%	32	6.3%	12	37.5%	20	0.0085%	41	3.63
Minnesota	14	66.05	8	1.74%	7	23.7%	7	39.8	31	11.5	15	13.7	15	100.7%	4	17.7%	27	$22,425	27	2.4%	5	9.9%	34	31.5%	14	0.01118%	16	5.09
Oregon	15	63.79	29	1.09%	24	20.5%	17	35.2	20	12.1	24	13.1	10	101.7%	17	14.1%	16	$30,250	42	1.9%	28	6.4%	15	35.9%	18	0.0099%	41	3.63
Illinois	16	62.61	11	1.57%	10	22.9%	19	34.3	24	11.9	17	13.7	23	98.9%	7	16.9%	15	$30,590	16	3.2%	24	7.2%	18	34.6%	19	0.0091%	18	5.01
Michigan	17	62.21	22	1.30%	13	22.2%	28	30.7	8	12.9	26	13.0	26	97.7%	31	12.2%	29	$21,937	11	3.5%	31	6.3%	10	38.9%	32	0.0050%	32	4.19
Texas	18	62.13	12	1.48%	18	21.1%	41	25.1	46	10.2	41	12.5	9	103.2%	28	13.1%	1	$69,268	25	2.7%	16	8.0%	38	30.9%	8	0.0190%	5	5.90
Vermont	19	60.49	40	0.82%	23	20.6%	5	41.8	12	12.8	2	14.3	28	97.4%	48	7.9%	8	$34,744	33	2.3%	49	3.7%	17	35.0%	34	0.0046%	41	3.63
Arizona	20	59.98	20	1.31%	19	21.0%	30	30.4	50	9.3	28	12.9	7	106.5%	20	13.8%	7	$35,692	38	2.1%	33	6.2%	11	37.7%	12	0.0124%	28	4.35
Georgia	21	59.96	23	1.26%	20	20.9%	35	29.4	41	10.8	38	12.6	29	97.1%	15	14.5%	19	$26,105	15	3.2%	25	7.2%	2	44.2%	6	0.0200%	30	4.28
Pennsylvania	22	59.16	19	1.33%	16	21.7%	33	29.9	15	12.4	19	13.3	13	100.9%	14	14.9%	35	$20,080	12	3.4%	11	8.5%	21	34.2%	13	0.0119%	22	4.59
Florida	23	58.26	30	1.07%	37	19.3%	31	30.0	38	11.0	34	12.7	24	98.6%	24	13.4%	9	$33,677	30	2.4%	12	8.5%	6	42.1%	23	0.0070%	21	4.60
North Carolina	24	57.39	18	1.35%	25	20.4%	37	27.9	40	10.8	27	13.0	11	101.1%	23	13.4%	31	$20,913	8	3.9%	10	8.5%	16	35.1%	17	0.0104%	19	4.94
Nevada	25	56.71	43	0.72%	50	15.9%	43	24.3	48	9.9	45	12.4	5	107.6%	42	9.4%	4	$41,908	34	2.2%	13	8.3%	9	39.6%	16	0.0104%	3	6.29
Idaho	26	55.63	36	0.95%	31	19.8%	34	29.5	45	10.4	42	12.5	49	71.3%	37	11.3%	13	$30,635	47	1.4%	40	5.0%	4	42.5%	36	0.0040%	12	5.16
Nebraska	27	55.42	17	1.37%	35	19.4%	18	34.7	37	11.1	37	12.7	30	96.9%	10	15.7%	40	$17,918	46	1.5%	1	20.8%	36	31.3%	35	0.0042%	41	3.63
Maine	28	53.87	42	0.79%	30	19.8%	22	32.5	26	11.8	12	13.9	18	99.9%	36	11.3%	36	$20,044	21	2.9%	45	4.1%	32	31.6%	42	0.0024%	15	5.12
New Mexico	29	53.23	38	0.92%	28	20.3%	32	29.9	47	10.2	25	13.1	32	95.5%	45	9.0%	23	$24,973	48	1.3%	38	5.3%	13	37.4%	46	0.0011%	41	3.63
Ohio	30	52.98	16	1.38%	21	20.8%	38	27.3	4	13.2	30	12.9	21	99.6%	18	14.1%	33	$20,724	19	3.1%	29	6.4%	37	31.0%	25	0.0066%	37	4.07
Kansas	31	52.92	27	1.23%	26	20.3%	15	35.4	10	12.8	36	12.7	45	83.4%	30	12.3%	37	$19,428	26	2.5%	8	9.5%	31	31.8%	26	0.0064%	41	3.63
Alaska	32	50.78	39	0.86%	17	21.4%	14	35.5	28	11.6	29	12.9	17	100.2%	44	9.1%	30	$21,190	24	2.8%	20	7.8%	1	45.6%	39	0.0029%	41	3.63
Wisconsin	33	50.60	28	1.15%	33	19.7%	25	31.6	39	11.0	21	13.3	22	99.5%	26	13.3%	42	$17,214	28	2.4%	27	6.7%	44	29.1%	27	0.0058%	39	3.98
South Carolina	34	48.66	34	0.97%	38	19.1%	42	24.8	25	11.9	31	12.9	27	97.5%	33	12.0%	17	$28,728	2	4.7%	39	5.0%	33	31.6%	24	0.0067%	41	3.63
Hawaii	35	47.50	44	0.71%	43	18.5%	11	38.3	6	13.1	4	14.2	40	90.8%	46	8.4%	48	$12,345	14	3.3%	48	3.9%	40	30.5%	48	0.0000%	33	4.18
Indiana	36	47.43	37	0.94%	39	19.0%	39	25.5	30	11.6	35	12.7	19	99.7%	41	9.8%	49	$10,796	7	4.0%	36	5.6%	25	33.1%	21	0.0080%	26	4.44
Missouri	37	46.89	13	1.47%	29	20.2%	36	28.0	18	12.3	39	12.5	42	89.9%	12	15.2%	39	$18,346	31	2.3%	26	7.1%	45	28.9%	30	0.0054%	36	4.13
Tennessee	38	46.71	31	1.00%	42	18.6%	44	22.4	33	11.4	46	12.4	35	94.5%	34	11.7%	24	$23,658	13	3.4%	15	8.1%	48	26.8%	22	0.0075%	24	4.53
North Dakota	39	46.53	45	0.68%	47	17.9%	21	32.6	1	14.2	14	13.7	44	88.5%	40	10.6%	14	$30,633	43	1.7%	30	6.4%	35	31.5%	33	0.0050%	17	5.01
Montana	40	46.03	47	0.62%	44	18.1%	16	35.3	2	14.2	20	13.3	50	60.9%	47	8.0%	28	$22,191	50	1.1%	46	4.1%	7	40.8%	40	0.0028%	41	3.63
Louisiana	41	44.72	48	0.53%	34	19.5%	47	19.5	27	11.6	43	12.4	12	101.0%	21	13.5%	6	$38,117	40	2.0%	34	6.0%	22	34.1%	47	0.0010%	27	4.38
Iowa	42	44.50	26	1.24%	40	18.9%	29	30.5	22	12.0	33	12.7	6	106.5%	19	13.9%	41	$17,518	41	2.0%	41	4.9%	43	29.3%	38	0.0035%	40	3.93
Oklahoma	43	43.24	24	1.25%	27	20.3%	40	25.2	49	9.8	47	12.1	36	93.7%	38	11.3%	44	$14,867	45	1.7%	37	5.5%	24	33.3%	37	0.0038%	1	7.88
South Dakota	44	42.92	32	0.99%	49	17.2%	27	31.2	44	10.6	18	13.4	47	82.4%	27	13.2%	43	$16,262	49	1.2%	42	4.7%	30	31.9%	48	0.0000%	9	5.61
Kentucky	45	41.32	33	0.98%	41	18.7%	46	20.6	29	11.6	40	12.5	34	94.6%	39	10.8%	18	$26,448	9	3.7%	44	4.5%	29	31.9%	43	0.0023%	34	4.18
Wyoming	46	40.08	50	0.50%	46	17.9%	26	31.3	34	11.4	32	12.9	48	77.9%	50	7.6%	22	$25,466	37	2.1%	47	4.0%	19	34.5%	48	0.0000%	14	5.14
Alabama	47	37.39	35	0.95%	36	19.3%	45	22.3	19	12.2	44	12.4	43	89.5%	35	11.4%	32	$20,809	22	2.8%	35	5.7%	50	19.7%	31	0.0052%	25	4.51
Arkansas	48	35.34	41	0.81%	45	17.9%	48	18.4	43	10.7	50	11.5	31	96.7%	29	12.4%	47	$12,705	39	2.1%	18	7.8%	46	28.2%	44	0.0022%	38	4.02
West Virginia	49	31.87	46	0.66%	32	19.8%	50	16.1	17	12.3	49	11.8	25	97.8%	49	7.7%	34	$20,145	36	2.1%	50	3.3%	42	29.4%	29	0.0054%	29	4.30
Mississippi	50	29.91	49	0.51%	48	17.3%	49	18.4	21	12.1	48	12.0	46	82.7%	43	9.4%	46	$12,738	44	1.7%	43	4.5%	27	32.4%	41	0.0027%	35	4.14
U.S. Average		**57.30**		**1.37%**		**21.5%**		**31.5**		**11.4**		**13.1**		**99.2%**		**14.7%**		**$31,606**		**3.0%**		**8.0%**		**33.4%**		**0.013%**		**5.00**

State	Entrepreneurial Activity Rank Score	Inventor Patents Rank Score	Online Population Rank Score	Internet Domain Names Rank Score	Technology in Schools Rank Score	E-Gov't. Rank Score	Online Agriculture Rank Score	Broadband Telecommunications Rank Score	Health IT Rank Score	High-Tech Jobs Rank Score	Scientists and Engineers Rank Score	Patents Rank Score	Industry Investment in R&D Rank Score	Non-Industry Investment in R&D Rank Score	Alternative Energy Use Rank Score	Venture Capital Rank Score
MA	16 0.32%	4 0.012	23 72.92%	13 4.98	23 5.33	5 5.98	7 6.70	4 7.52	1 13.4	1 7.3%	1 0.77%	7 1.00	4 5.10%	3 1.34%	28 4.8	2 1.39%
NJ	40 0.25%	11 0.010	3 81.67%	5 7.43	24 5.26	18 5.19	1 6.96	13 5.56	10 2.6	10 5.0%	7 0.44%	2 1.71	5 4.61%	10 0.83%	1 8.0	3 0.76%
MD	24 0.30%	16 0.008	8 76.76%	15 4.92	41 4.12	4 5.99	28 5.26	5 7.34	6 3.2	4 6.1%	2 0.77%	11 0.86	20 2.42%	2 4.57%	34 4.4	5 0.40%
WA	49 0.16%	23 0.007	24 72.75%	9 6.03	47 3.37	6 5.96	27 5.26	3 8.52	4 4.2	12 4.5%	4 0.57%	5 1.22	1 7.37%	49 0.24%	46 3.7	27 0.08%
CA	34 0.26%	12 0.009	15 74.08%	23 4.02	27 5.10	24 5.00	13 6.39	1 9.04	11 2.5	5 5.9%	12 0.41%	9 0.88	13 3.26%	42 0.36%	48 3.7	16 0.22%
CT	35 0.26%	2 0.014	21 73.39%	21 4.19	25 5.24	37 4.61	5 6.70	9 6.57	9 2.6	15 4.2%	6 0.46%	14 0.78	9 3.82%	38 0.39%	12 5.7	18 0.20%
DE	41 0.24%	32 0.006	13 75.04%	2 11.12	7 5.98	12 5.60	41 4.57	8 6.58	20 1.6	3 6.3%	11 0.41%	26 0.48	19 2.54%	6 1.02%	27 4.8	13 0.23%
VA	9 0.37%	3 0.014	17 73.64%	6 6.95	49 3.32	13 5.43	23 5.36	11 6.08	22 1.4	7 5.7%	8 0.43%	3 1.35	7 4.14%	7 0.86%	24 5.1	1 1.48%
CO	14 0.33%	19 0.008	38 68.00%	11 5.00	37 4.48	19 5.18	24 5.32	7 6.73	21 1.6	22 3.7%	9 0.42%	10 0.88	32 1.70%	30 0.49%	9 5.9	17 0.21%
NY	17 0.31%	10 0.010	6 78.89%	14 4.95	35 4.55	32 4.74	17 5.63	19 5.15	24 1.2	6 5.8%	10 0.41%	4 1.26	10 3.52%	12 0.74%	49 3.4	4 0.56%
MN	31 0.27%	21 0.007	27 72.48%	30 3.52	45 3.73	41 4.45	9 6.70	2 8.70	2 9.1	18 3.9%	5 0.49%	18 0.69	3 5.23%	4 1.24%	37 4.1	32 0.06%
UT	27 0.28%	1 0.015	2 82.00%	4 8.48	50 2.92	7 5.95	12 6.57	23 4.47	33 0.9	11 4.7%	17 0.35%	16 0.71	30 1.91%	20 0.62%	40 4.0	6 0.38%
NH	36 0.26%	9 0.010	4 80.60%	18 4.51	39 4.36	47 3.77	8 6.70	12 6.03	14 2.3	8 5.2%	25 0.29%	38 0.28	8 3.94%	17 0.64%	3 7.4	7 0.37%
TX	15 0.32%	7 0.011	7 78.63%	24 3.98	28 5.09	14 5.40	15 5.77	36 3.47	26 1.2	13 4.4%	18 0.33%	13 0.80	6 4.19%	43 0.35%	30 4.7	10 0.27%
RI	6 0.38%	6 0.011	12 75.28%	12 4.99	42 4.12	34 4.68	2 6.89	17 5.20	18 1.7	14 4.2%	15 0.36%	6 1.04	11 3.44%	31 0.45%	4 7.1	34 0.05%
IL	44 0.23%	20 0.007	22 73.36%	20 4.31	34 4.78	25 4.97	25 5.30	16 5.23	27 1.2	23 3.7%	21 0.32%	25 0.49	14 3.18%	26 0.52%	13 5.7	20 0.15%
OR	30 0.27%	17 0.008	30 70.68%	28 3.59	33 4.84	1 7.48	19 5.53	26 4.17	5 4.2	17 4.0%	20 0.32%	17 0.69	2 5.70%	32 0.44%	18 5.2	38 0.04%
GA	37 0.26%	28 0.006	36 68.12%	10 5.61	21 5.45	11 5.71	32 5.01	18 5.17	29 1.0	20 3.8%	29 0.27%	15 0.72	16 2.63%	41 0.36%	33 4.4	9 0.28%
MI	3 0.42%	13 0.009	5 79.42%	16 4.87	12 5.88	44 4.21	10 6.70	39 3.26	30 1.0	21 3.7%	14 0.39%	8 0.95	27 2.01%	23 0.56%	2 7.5	15 0.22%
VT	23 0.30%	15 0.009	29 71.73%	3 8.81	40 4.13	15 5.38	33 4.88	22 4.73	8 2.9	19 3.9%	34 0.25%	12 0.85	18 2.61%	27 0.52%	16 5.4	19 0.17%
PA	2 0.43%	38 0.005	28 71.95%	17 4.79	29 5.05	20 5.10	47 3.60	14 5.41	37 0.7	25 3.4%	37 0.24%	23 0.52	33 1.61%	33 0.44%	23 5.1	14 0.24%
AZ	48 0.17%	24 0.007	33 69.26%	27 3.61	14 5.67	23 5.03	39 4.63	27 4.14	13 2.5	16 4.0%	13 0.40%	24 0.50	12 3.43%	19 0.63%	14 5.7	11 0.27%
FL	26 0.29%	14 0.009	32 69.74%	8 6.05	13 5.71	29 4.88	31 5.12	10 6.54	19 1.6	28 3.2%	49 0.17%	22 0.53	34 1.42%	46 0.32%	32 4.5	21 0.14%
ID	38 0.25%	40 0.005	39 67.78%	22 4.14	32 4.91	26 4.89	36 4.82	21 4.80	7 3.1	24 3.6%	16 0.36%	27 0.47	22 2.40%	22 0.60%	15 5.5	12 0.24%
AK	46 0.20%	8 0.011	20 73.40%	1 12.30	44 3.85	35 4.63	34 4.88	6 6.98	3 7.1	36 2.4%	50 0.16%	20 0.60	37 1.27%	50 0.21%	47 3.7	39 0.04%
NC	8 0.37%	5 0.012	31 69.87%	34 3.30	17 5.62	45 4.18	4 6.76	40 3.17	15 2.2	9 5.0%	23 0.31%	1 2.66	26 2.08%	11 0.75%	25 5.0	36 0.05%
NV	18 0.31%	27 0.006	16 73.85%	43 2.70	5 6.20	16 5.35	18 5.55	31 3.97	42 0.5	29 3.1%	38 0.24%	37 0.29	35 1.29%	25 0.53%	20 5.2	49 0.00%
NE	7 0.38%	43 0.005	14 74.53%	41 2.76	2 7.40	9 5.76	6 6.70	28 4.04	16 2.0	34 2.5%	27 0.28%	32 0.37	38 1.26%	35 0.44%	5 6.9	43 0.03%
OH	28 0.27%	26 0.007	40 67.42%	25 3.66	9 5.92	50 3.32	46 4.09	42 2.96	36 0.8	2 6.6%	3 0.75%	19 0.63	25 2.11%	1 7.33%	36 4.1	8 0.27%
WI	43 0.24%	30 0.006	34 69.13%	29 3.56	19 5.45	10 5.74	40 4.62	24 4.41	12 2.5	32 2.8%	24 0.30	31 0.37	15 2.81%	24 0.55%	31 4.5	31 0.06%
IN	42 0.24%	36 0.005	9 76.72%	40 2.80	4 6.55	28 4.88	22 5.37	20 4.88	41 0.5	26 3.4%	39 0.23	29 0.41	21 2.42%	39 0.38%	22 5.1	23 0.11%
ME	21 0.30%	37 0.005	1 84.25%	26 3.63	15 5.66	30 4.80	29 5.25	37 3.47	47 0.2	38 2.3%	33 0.25	44 0.23	49 0.43%	15 0.67%	50 3.1	49 0.00%
NM	19 0.31%	22 0.007	10 76.60%	38 3.05	10 5.92	22 5.04	16 5.70	30 3.98	43 0.4	33 2.7%	30 0.26	36 0.32	17 2.62%	28 0.50%	26 4.9	29 0.07%
KS	45 0.22%	45 0.004	42 66.75%	32 3.43	26 5.14	36 4.62	35 4.87	32 3.96	46 0.2	39 2.3%	35 0.24	42 0.25	28 1.95%	29 0.49%	6 6.9	28 0.08%
MO	29 0.27%	34 0.006	26 72.51%	7 6.87	43 4.02	40 4.48	30 5.25	15 5.38	44 0.3	41 2.2%	19 0.33	40 0.25	45 0.74%	13 0.72%	45 3.8	45 0.01%
TN	39 0.25%	42 0.005	37 68.03%	31 3.45	18 5.62	8 5.91	21 5.38	38 3.28	32 0.9	30 3.1%	31 0.26	48 0.19	29 1.94%	37 0.40%	8 6.0	35 0.05%
ND	33 0.26%	41 0.005	41 67.31%	33 3.40	22 5.35	33 4.73	44 4.31	33 3.75	25 1.2	31 3.1%	32 0.25	35 0.33	24 2.21%	34 0.44%	38 4.1	24 0.10%
IA	12 0.35%	44 0.005	44 65.85%	19 4.47	36 4.55	3 6.08	45 4.13	29 4.00	28 1.1	40 2.3%	28 0.27	47 0.21	36 1.28%	14 0.72%	19 5.2	25 0.09%
SC	32 0.26%	25 0.007	25 72.59%	45 2.62	11 5.88	26 4.89	14 6.07	45 2.77	50 0.1	35 2.4%	26 0.28	33 0.35	39 1.14%	8 0.86%	41 4.0	46 0.00%
OK	1 0.47%	18 0.008	35 68.57%	39 3.04	6 6.11	31 4.77	11 6.59	47 2.65	45 0.2	46 2.0%	22 0.31	21 0.56	43 0.90%	9 0.84%	10 5.9	26 0.09%
HI	5 0.39%	35 0.006	46 63.15%	35 3.18	38 4.37	43 4.33	43 4.39	25 4.39	17 2.0	47 1.9%	41 0.22	43 0.24	48 0.60%	36 0.42%	21 5.1	44 0.02%
MT	20 0.31%	39 0.005	18 73.63%	46 2.47	16 5.66	46 3.97	20 5.49	46 2.68	39 0.6	37 2.4%	36 0.24%	34 0.34	31 1.80%	21 0.61%	43 3.9	37 0.05%
WY	11 0.35%	33 0.006	45 63.69%	36 3.16	20 5.45	39 4.50	42 4.56	35 3.48	40 0.6	43 2.1%	44 0.21%	28 0.44	42 0.91%	40 0.37%	35 4.1	30 0.06%
LA	10 0.36%	31 0.006	19 73.63%	48 2.18	1 7.44	17 5.20	26 5.30	34 3.52	49 0.1	45 2.0%	47 0.19%	41 0.25	44 0.82%	48 0.27%	29 4.7	42 0.02%
KY	25 0.30%	48 0.003	43 66.67%	42 2.75	31 4.91	2 6.33	50 3.29	43 2.93	31 1.0	44 2.0%	45 0.20%	39 0.26	40 1.14%	44 0.34%	42 3.9	22 0.13%
AL	22 0.30%	29 0.006	11 76.42%	44 2.67	3 6.59	49 3.40	3 6.79	41 3.03	35 0.8	50 1.4%	46 0.19%	30 0.40	50 0.31%	45 0.33%	44 3.9	47 0.00%
AR	47 0.17%	47 0.004	48 60.61%	37 3.11	46 3.62	42 4.38	48 3.35	44 2.90	34 0.8	27 3.2%	40 0.23%	46 0.22	23 2.24%	5 1.09%	7 6.4	41 0.02%
SD	13 0.34%	50 0.003	47 61.98%	47 2.20	30 4.95	21 5.08	38 4.68	49 2.37	38 0.6	42 2.1%	48 0.18%	50 0.11	46 0.72%	47 0.28%	11 5.8	48 0.00%
MS	50 0.15%	46 0.004	50 58.20%	50 1.89	8 5.94	48 3.44	37 4.69	48 2.46	23 1.3	48 1.9%	43 0.22%	45 0.22	41 0.98%	16 0.65%	39 4.0	40 0.04%
WV	4 0.42%	49 0.003	49 59.73%	49 1.90	48 3.36	38 4.61	49 3.29	50 1.48	48 0.1	49 1.6%	42 0.22%	49 0.13	47 0.62%	18 0.64%	17 5.3	33 0.06%
	0.30%	**0.008**	**71.67%**	**5.09**	**5.00**	**5.00**	**5.00**	**5.00**	**1.9**	**4.0%**	**0.34%**	**0.74**	**3.31%**	**0.70%**	**5.0**	**0.40%**

STATE NEW ECONOMY SCORES IN ALPHABETICAL ORDER

State	Overall Rank	Overall Score	IT Professionals Rank	IT Professionals Score	Managerial, Professional, Technical Jobs Rank	Managerial, Professional, Technical Jobs Score	Workforce Education Rank	Workforce Education Score	Immigration of Knowledge Workers Rank	Immigration of Knowledge Workers Score	Manufacturing Value-Added Rank	Manufacturing Value-Added Score	Mirgration of U.S. Knowledge Workers Rank	Mirgration of U.S. Knowledge Workers Score	High-Wage Traded Services Rank	High-Wage Traded Services Score	Export Focus of Manufacturing and Services Rank	Export Focus of Manufacturing and Services Score	Foreign Direct Investment Rank	Foreign Direct Investment Score	"Gazelle Jobs" Rank	"Gazelle Jobs" Score	Job Churning Rank	Job Churning Score	Fastest Growing Firms Rank	Fastest Growing Firms Score	IPOs Rank	IPOs Score
Alabama	47	37.39	35	0.95%	36	19.3%	45	22.3	19	12.2	44	12.4	43	89.5%	35	11.4%	32	$20,809	22	2.8%	35	5.7%	50	19.7%	31	0.0052%	25	4.51
Alaska	32	50.78	39	0.86%	17	21.4%	14	35.5	28	11.6	29	12.9	17	100.2%	44	9.1%	30	$21,190	24	2.8%	20	7.8%	1	45.6%	39	0.0029%	41	3.63
Arizona	20	59.98	20	1.31%	19	21.0%	30	30.4	50	9.3	28	12.9	7	106.5%	20	13.8%	7	$35,692	38	2.1%	33	6.2%	11	37.7%	12	0.0124%	28	4.35
Arkansas	48	35.34	41	0.81%	45	17.9%	48	18.4	43	10.7	50	11.5	31	96.7%	29	12.4%	47	$12,705	39	2.1%	18	7.8%	46	28.2%	44	0.0022%	38	4.02
California	8	75.02	21	1.31%	11	22.5%	23	32.3	42	10.7	16	13.7	16	100.6%	6	17.2%	10	$33,414	23	2.8%	9	9.2%	47	27.9%	10	0.0171%	8	5.61
Colorado	10	70.38	9	1.72%	12	22.2%	3	42.9	36	11.3	10	13.9	37	93.7%	16	14.4%	38	$18,772	29	2.4%	22	7.7%	5	42.5%	11	0.0159%	4	6.12
Connecticut	6	76.07	7	1.75%	4	24.9%	4	42.2	5	13.2	5	14.1	2	112.2%	2	20.6%	20	$26,064	1	4.7%	23	7.4%	49	22.0%	7	0.0197%	7	5.63
Delaware	4	79.31	2	1.97%	5	24.4%	24	32.0	11	12.8	23	13.1	14	100.7%	1	23.2%	3	$50,217	3	4.6%	6	9.8%	23	33.8%	28	0.0058%	41	3.63
Florida	23	58.26	30	1.07%	37	19.3%	31	30.0	38	11.0	34	12.7	24	98.6%	24	13.4%	9	$33,677	30	2.4%	12	8.5%	6	42.1%	23	0.0070%	21	4.60
Georgia	21	59.96	23	1.26%	20	20.9%	35	29.4	41	10.8	38	12.6	29	97.1%	15	14.5%	19	$26,105	15	3.2%	25	7.2%	2	44.2%	6	0.0200%	30	4.28
Hawaii	35	47.50	44	0.71%	43	18.5%	11	38.3	6	13.1	4	14.2	40	90.8%	46	8.4%	48	$12,345	14	3.3%	48	3.9%	40	30.5%	48	0.000%	33	4.18
Idaho	26	55.63	36	0.95%	31	19.8%	34	29.5	45	10.4	42	12.5	49	71.3%	37	11.3%	13	$30,635	47	1.4%	40	5.0%	4	42.5%	36	0.0040%	12	5.16
Illinois	16	62.61	11	1.57%	10	22.9%	19	34.3	24	11.9	17	13.7	23	98.9%	7	16.9%	15	$30,590	16	3.2%	24	7.2%	18	34.6%	19	0.0091%	18	5.01
Indiana	36	47.43	37	0.94%	39	19.0%	39	25.5	30	11.6	35	12.7	19	99.7%	41	9.8%	49	$10,796	7	4.0%	36	5.6%	25	33.1%	21	0.0080%	26	4.44
Iowa	42	44.50	26	1.24%	40	18.9%	29	30.5	22	12.0	33	12.7	6	106.5%	19	13.9%	41	$17,518	41	2.0%	41	4.9%	43	29.3%	38	0.0035%	40	3.93
Kansas	31	52.92	27	1.23%	26	20.3%	15	35.4	10	12.8	36	12.7	45	83.4%	30	12.3%	37	$19,428	26	2.5%	8	9.5%	31	31.8%	26	0.0064%	41	3.63
Kentucky	45	41.32	33	0.98%	41	18.7%	46	20.6	29	11.6	40	12.5	34	94.6%	39	10.8%	18	$26,448	9	3.7%	44	4.5%	29	31.9%	43	0.0023%	34	4.18
Louisiana	41	44.72	48	0.53%	34	19.5%	47	19.5	27	11.6	43	12.4	12	101.0%	21	13.5%	6	$38,117	40	2.0%	34	6.0%	22	34.1%	47	0.0010%	27	4.38
Maine	28	53.87	42	0.79%	30	19.8%	22	32.5	26	11.8	12	13.9	18	99.9%	36	11.3%	36	$20,044	21	2.9%	45	4.1%	32	31.6%	42	0.0024%	15	5.12
Maryland	3	79.99	4	1.94%	3	25.0%	2	44.0	14	12.7	8	14.0	3	109.8%	22	13.5%	26	$22,682	20	3.0%	7	9.6%	26	33.0%	4	0.0229%	13	5.15
Massachusetts	1	97.03	5	1.91%	1	27.1%	1	46.3	9	12.8	1	14.6	8	105.8%	9	16.6%	11	$32,576	6	4.1%	17	7.9%	20	34.3%	1	0.0367%	2	6.93
Michigan	17	62.21	22	1.30%	13	22.2%	28	30.7	8	12.9	26	13.0	26	97.7%	31	12.2%	29	$21,937	11	3.5%	31	6.3%	10	38.9%	32	0.0050%	32	4.19
Minnesota	14	66.05	8	1.74%	7	23.7%	7	39.8	31	11.5	15	13.7	15	100.7%	4	17.7%	27	$22,425	27	2.4%	5	9.9%	34	31.5%	14	0.01118%	16	5.09
Mississippi	50	29.91	49	0.51%	48	17.3%	49	18.4	21	12.1	48	12.0	46	82.7%	43	9.4%	46	$12,738	44	1.7%	43	4.5%	27	32.4%	41	0.0027%	35	4.14
Missouri	37	46.89	13	1.47%	29	20.2%	36	28.0	18	12.3	39	12.5	42	89.9%	12	15.2%	39	$18,346	31	2.3%	26	7.1%	45	28.9%	30	0.0054%	36	4.13
Montana	40	46.03	47	0.62%	44	18.1%	16	35.3	2	14.2	20	13.3	50	60.9%	47	8.0%	28	$22,191	50	1.1%	46	4.1%	7	40.8%	40	0.0028%	41	3.63
Nebraska	27	55.42	17	1.37%	35	19.4%	18	34.7	37	11.1	37	12.7	30	96.9%	10	15.7%	40	$17,918	46	1.5%	1	20.8%	36	31.3%	35	0.0042%	41	3.63
Nevada	25	56.71	43	0.72%	50	15.9%	43	24.3	48	9.9	45	12.4	5	107.6%	42	9.4%	4	$41,908	34	2.2%	13	8.3%	9	39.6%	16	0.0104%	3	6.29
New Hampshire	13	67.69	15	1.38%	14	21.9%	6	40.7	3	13.4	9	14.0	39	90.9%	13	14.9%	45	$13,573	5	4.3%	32	6.3%	12	37.5%	20	0.0085%	41	3.63
New Jersey	5	77.04	3	1.97%	6	24.0%	10	39.1	32	11.5	11	13.9	41	90.3%	5	17.3%	12	$32,123	4	4.5%	3	11.0%	28	32.4%	5	0.0206%	11	5.20
New Mexico	29	53.23	38	0.92%	28	20.3%	32	29.9	47	10.2	25	13.1	32	95.5%	45	9.0%	23	$24,973	48	1.3%	38	5.3%	13	37.4%	46	0.0011%	41	3.63
New York	9	74.42	10	1.66%	2	25.0%	13	37.1	16	12.3	3	14.3	20	99.7%	3	20.0%	5	$41,284	10	3.6%	2	12.3%	14	36.9%	15	0.0106%	10	5.57
North Carolina	24	57.39	18	1.35%	25	20.4%	37	27.9	40	10.8	27	13.0	11	101.1%	23	13.4%	31	$20,913	8	3.9%	10	8.5%	16	35.1%	17	0.0104%	19	4.94
North Dakota	39	46.53	45	0.68%	47	17.9%	21	32.6	1	14.2	14	13.7	44	88.5%	40	10.6%	14	$30,633	43	1.7%	30	6.4%	35	31.5%	33	0.0050%	17	5.01
Ohio	30	52.98	16	1.38%	21	20.8%	38	27.3	4	13.2	30	12.9	21	99.6%	18	14.1%	33	$20,724	19	3.1%	29	6.4%	37	31.0%	25	0.0066%	37	4.07
Oklahoma	43	43.24	24	1.25%	27	20.3%	40	25.2	49	9.8	47	12.1	36	93.7%	38	11.3%	44	$14,867	45	1.7%	37	5.5%	24	33.3%	37	0.0038%	1	7.88
Oregon	15	63.79	29	1.09%	24	20.5%	17	35.2	20	12.1	24	13.1	10	101.7%	17	14.1%	16	$30,250	42	1.9%	28	6.4%	15	35.9%	18	0.0099%	41	3.63
Pennsylvania	22	59.16	19	1.33%	16	21.7%	33	29.9	15	12.4	19	13.3	13	100.9%	14	14.9%	35	$20,080	12	3.4%	11	8.5%	21	34.2%	13	0.0119%	22	4.59
Rhode Island	11	67.75	25	1.25%	9	23.0%	20	33.1	23	12.0	6	14.1	38	91.0%	25	13.3%	50	$10,768	17	3.1%	19	7.8%	8	40.8%	45	0.0015%	23	4.59
South Carolina	34	48.66	34	0.97%	38	19.1%	42	24.8	25	11.9	31	12.9	27	97.5%	33	12.0%	17	$28,728	2	4.7%	39	5.0%	33	31.6%	24	0.0067%	41	3.63
South Dakota	44	42.92	32	0.99%	49	17.2%	27	31.2	44	10.6	18	13.4	47	82.4%	27	13.2%	43	$16,262	49	1.2%	42	4.7%	30	31.9%	48	0.0000%	9	5.61
Tennessee	38	46.71	31	1.00%	42	18.6%	44	22.4	33	11.4	46	12.4	35	94.5%	34	11.7%	24	$23,658	13	3.4%	15	8.1%	48	26.8%	22	0.0075%	24	4.53
Texas	18	62.13	12	1.48%	18	21.1%	41	25.1	46	10.2	41	12.5	9	103.2%	28	13.1%	1	$69,268	25	2.7%	16	8.0%	38	30.9%	8	0.0190%	5	5.90
Utah	12	67.72	14	1.40%	22	20.8%	12	38.3	35	11.3	22	13.2	33	94.9%	11	15.4%	21	$26,023	35	2.2%	14	8.1%	3	42.6%	3	0.0268%	6	5.78
Vermont	19	60.49	40	0.82%	23	20.6%	5	41.8	12	12.8	2	14.3	28	97.4%	48	7.9%	8	$34,744	33	2.3%	49	3.7%	17	35.0%	34	0.0046%	41	3.63
Virginia	7	75.58	1	2.37%	8	23.6%	9	39.4	7	13.0	7	14.0	4	107.6%	8	16.7%	25	$23,606	18	3.1%	21	7.7%	41	30.2%	2	0.0348%	20	4.87
Washington	2	81.91	6	1.76%	15	21.8%	8	39.7	13	12.8	13	13.8	1	122.5%	32	12.0%	2	$60,418	32	2.3%	4	10.2%	39	30.9%	9	0.0174%	31	4.21
West Virginia	49	31.87	46	0.66%	32	19.8%	50	16.1	17	12.3	49	11.8	25	97.8%	49	7.7%	34	$20,145	36	2.1%	50	3.3%	42	29.4%	29	0.0054%	29	4.30
Wisconsin	33	50.60	28	1.15%	33	19.7%	25	31.6	39	11.0	21	13.3	22	99.5%	26	13.3%	42	$17,214	28	2.4%	27	6.7%	44	29.1%	27	0.0058%	39	3.98
Wyoming	46	40.08	50	0.50%	46	17.9%	26	31.3	34	11.4	32	12.9	48	77.9%	50	7.6%	22	$25,466	37	2.1%	47	4.0%	19	34.5%	48	0.0000%	14	5.14
U.S. Average		**57.30**		**1.37%**		**21.5%**		**31.5**		**11.4**		**13.1**		**99.2%**		**14.7%**		**$31,606**		**3.0%**		**8.0%**		**33.4%**		**0.013%**		**5.00**

State	Entrepreneurial Activity Rank Score	Inventor Patents Rank Score	Online Population Rank Score	Internet Domain Names Rank Score	Technology in Schools Rank Score	E-Gov't. Rank Score	Online Agriculture Rank Score	Broadband Telecommunications Rank Score	Health IT Rank Score	High-Tech Jobs Rank Score	Scientists and Engineers Rank Score	Patents Rank Score	Industry Investment in R&D Rank Score	Non-Industry Investment in R&D Rank Score	Alternative Energy Use Rank Score	Venture Capital Rank Score
AL	47 0.17%	47 0.004	48 60.61%	37 3.11	46 3.62	42 4.38	48 3.35	44 2.90	34 0.8	27 3.2%	40 0.23%	46 0.22	23 2.24%	5 1.09%	7 6.4	41 0.02%
AK	21 0.30%	37 0.005	1 84.25%	26 3.63	15 5.66	30 4.80	29 5.25	37 3.47	47 0.2	38 2.3%	33 0.25	44 0.23	49 0.43%	15 0.67%	50 3.1	49 0.00%
AZ	23 0.30%	15 0.009	29 71.73%	3 8.81	40 4.13	15 5.38	33 4.88	22 4.73	8 2.9	19 3.9%	34 0.25%	12 0.85	18 2.61%	27 0.52%	16 5.4	19 0.17%
AR	13 0.34%	50 0.003	47 61.98%	47 2.20	30 4.95	21 5.08	38 4.68	49 2.37	38 0.6	42 2.1%	48 0.18%	50 0.11	46 0.72%	47 0.28%	11 5.8	48 0.00%
CA	9 0.37%	3 0.014	17 73.64%	6 6.95	49 3.32	13 5.43	23 5.36	11 6.08	22 1.4	7 5.7%	8 0.43%	3 1.35	7 4.14%	7 0.86%	24 5.1	1 1.48%
CO	17 0.31%	10 0.010	6 78.89%	14 4.95	35 4.55	32 4.74	17 5.63	19 5.15	24 1.2	6 5.8%	10 0.41%	4 1.26	10 3.52%	12 0.74%	49 3.4	4 0.56%
CT	35 0.26%	2 0.014	21 73.39%	21 4.19	25 5.24	37 4.61	5 6.70	9 6.57	9 2.6	15 4.2%	6 0.46%	14 0.78	9 3.82%	38 0.39%	12 5.7	18 0.20%
DE	49 0.16%	23 0.007	24 72.75%	9 6.03	47 3.37	6 5.96	27 5.26	3 8.52	4 4.2	12 4.5%	4 0.57%	5 1.22	1 7.37%	49 0.24%	46 3.7	27 0.08%
FL	26 0.29%	14 0.009	32 69.74%	8 6.05	13 5.71	29 4.88	31 5.12	10 6.54	19 1.6	28 3.2%	49 0.17%	22 0.53	34 1.42%	46 0.32%	32 4.5	21 0.14%
GA	2 0.43%	38 0.005	28 71.95%	17 4.79	29 5.05	20 5.10	47 3.60	14 5.41	37 0.7	25 3.4%	37 0.24%	23 0.52	33 1.61%	33 0.44%	23 5.1	14 0.24%
HI	29 0.27%	34 0.006	26 72.51%	7 6.87	43 4.02	40 4.48	30 5.25	15 5.38	44 0.3	41 2.2%	19 0.33	40 0.25	45 0.74%	13 0.72%	45 3.8	45 0.01%
ID	8 0.37%	5 0.012	31 69.87%	34 3.30	17 5.62	45 4.18	4 6.76	40 3.17	15 2.2	9 5.0%	23 0.31%	1 2.66	26 2.08%	11 0.75%	25 5.0	36 0.05%
IL	44 0.23%	20 0.007	22 73.36%	20 4.31	34 4.78	25 4.97	25 5.30	16 5.23	27 1.2	23 3.7%	21 0.32%	25 0.49	14 3.18%	26 0.52%	13 5.7	20 0.15%
IN	39 0.25%	42 0.005	37 68.03%	31 3.45	18 5.62	8 5.91	21 5.38	38 3.28	32 0.9	30 3.1%	31 0.26	48 0.19	29 1.94%	37 0.40%	8 6.0	35 0.05%
IA	20 0.31%	39 0.005	18 73.63%	46 2.47	16 5.66	46 3.97	20 5.49	46 2.68	39 0.6	37 2.4%	36 0.24%	34 0.34	31 1.80%	21 0.61%	43 3.9	37 0.05%
KS	42 0.24%	36 0.005	9 76.72%	40 2.80	4 6.55	28 4.88	22 5.37	20 4.88	41 0.5	26 3.4%	39 0.23	29 0.41	21 2.42%	39 0.38%	22 5.1	23 0.11%
KY	25 0.30%	48 0.003	43 66.67%	42 2.75	31 4.91	2 6.33	50 3.29	43 2.93	31 1.0	44 2.0%	45 0.20%	39 0.26	40 1.14%	44 0.34%	42 3.9	22 0.13%
LA	5 0.39%	35 0.006	46 63.15%	35 3.18	38 4.37	43 4.33	43 4.39	25 4.39	17 2.0	47 1.9%	41 0.22	43 0.24	48 0.60%	36 0.42%	21 5.1	44 0.02%
ME	7 0.38%	43 0.005	14 74.53%	41 2.76	2 7.40	9 5.76	6 6.70	28 4.04	16 2.0	34 2.5%	27 0.28%	32 0.37	38 1.26%	35 0.44%	5 6.9	43 0.03%
MD	24 0.30%	16 0.008	8 76.76%	15 4.92	41 4.12	4 5.99	28 5.26	5 7.34	6 3.2	4 6.1%	2 0.77%	11 0.86	20 2.42%	2 4.57%	34 4.4	5 0.40%
MA	16 0.32%	4 0.012	23 72.92%	13 4.98	23 5.33	5 5.98	7 6.70	4 7.52	1 13.4	1 7.3%	1 0.77%	7 1.00	4 5.10%	3 1.34%	28 4.8	2 1.39%
MI	30 0.27%	17 0.008	30 70.68%	28 3.59	33 4.84	1 7.48	19 5.53	26 4.17	5 4.2	17 4.0%	20 0.32%	17 0.69	2 5.70%	32 0.44%	18 5.2	38 0.04%
MN	15 0.32%	7 0.011	7 78.63%	24 3.98	28 5.09	14 5.40	15 5.77	36 3.47	26 1.2	13 4.4%	18 0.33%	13 0.80	6 4.19%	43 0.35%	30 4.7	10 0.27%
MS	4 0.42%	49 0.003	49 59.73%	49 1.90	48 3.36	38 4.61	49 3.29	50 1.48	48 0.1	49 1.6%	42 0.22%	49 0.13	47 0.62%	18 0.64%	17 5.3	33 0.06%
MO	33 0.26%	41 0.005	41 67.31%	33 3.40	22 5.35	33 4.73	44 4.31	33 3.75	25 1.2	31 3.1%	32 0.25	35 0.33	24 2.21%	34 0.44%	38 4.1	24 0.10%
MT	1 0.47%	18 0.008	35 68.57%	39 3.04	6 6.11	31 4.77	11 6.59	47 2.65	45 0.2	46 2.0%	22 0.31	21 0.56	43 0.90%	9 0.84%	10 5.9	26 0.09%
NE	18 0.31%	27 0.006	16 73.85%	43 2.70	5 6.20	16 5.35	18 5.55	31 3.97	42 0.5	29 3.1%	38 0.24%	37 0.29	35 1.29%	25 0.53%	20 5.2	49 0.00%
NV	46 0.20%	8 0.011	20 73.40%	1 12.30	44 3.85	35 4.63	34 4.88	6 6.98	3 7.1	36 2.4%	50 0.16%	20 0.60	37 1.27%	50 0.21%	47 3.7	39 0.04%
NH	36 0.26%	9 0.010	4 80.60%	18 4.51	39 4.36	47 3.77	8 6.70	12 6.03	14 2.3	8 5.2%	25 0.29%	38 0.28	8 3.94%	17 0.64%	3 7.4	7 0.37%
NJ	34 0.26%	12 0.009	15 74.08%	23 4.02	27 5.10	24 5.00	13 6.39	1 9.04	11 2.5	5 5.9%	12 0.41%	9 0.88	13 3.26%	42 0.36%	48 3.7	16 0.22%
NM	28 0.27%	26 0.007	40 67.42%	25 3.66	9 5.92	50 3.32	46 4.09	42 2.96	36 0.8	2 6.6%	3 0.75%	19 0.63	25 2.11%	1 7.33%	36 4.1	8 0.27%
NY	14 0.33%	19 0.008	38 68.00%	11 5.00	37 4.48	19 5.18	24 5.32	7 6.73	21 1.6	22 3.7%	9 0.42%	10 0.88	32 1.70%	30 0.49%	9 5.9	17 0.21%
NC	38 0.25%	40 0.005	39 67.78%	22 4.14	32 4.91	26 4.89	36 4.82	21 4.80	7 3.1	24 3.6%	16 0.36%	27 0.47	22 2.40%	22 0.60%	15 5.5	12 0.24%
ND	32 0.26%	25 0.007	25 72.59%	45 2.62	11 5.88	27 4.89	14 6.07	45 2.77	50 0.1	35 2.4%	26 0.28	33 0.35	39 1.14%	8 0.86%	41 4.0	46 0.00%
OH	43 0.24%	30 0.006	34 69.13%	29 3.56	19 5.45	10 5.74	40 4.62	24 4.41	12 2.5	32 2.8%	24 0.30	31 0.37	15 2.81%	24 0.55%	31 4.5	31 0.06%
OK	11 0.35%	33 0.006	45 63.69%	36 3.16	20 5.45	39 4.50	42 4.56	35 3.48	40 0.6	43 2.1%	44 0.21%	28 0.44	42 0.91%	40 0.37%	35 4.1	30 0.06%
OR	6 0.38%	6 0.011	12 75.28%	12 4.99	42 4.12	34 4.68	2 6.89	17 5.20	18 1.7	14 4.2%	15 0.36%	6 1.04	11 3.44%	31 0.45%	4 7.1	34 0.05%
PA	48 0.17%	24 0.007	33 69.26%	27 3.61	14 5.67	23 5.03	39 4.63	27 4.14	13 2.5	16 4.0%	13 0.40%	24 0.50	12 3.43%	19 0.63%	14 5.7	11 0.27%
RI	31 0.27%	21 0.007	27 72.48%	30 3.52	45 3.73	41 4.45	9 6.70	2 8.70	2 9.1	18 3.9%	5 0.49%	18 0.69	3 5.23%	4 1.24%	37 4.1	32 0.06%
SC	45 0.22%	45 0.004	42 66.75%	32 3.43	26 5.14	36 4.62	35 4.87	32 3.96	46 0.2	39 2.3%	35 0.24	42 0.25	28 1.95%	29 0.49%	6 6.9	28 0.08%
SD	10 0.36%	31 0.006	19 73.63%	48 2.18	1 7.44	17 5.20	26 5.30	34 3.52	49 0.1	45 2.0%	47 0.19%	41 0.25	44 0.82%	48 0.27%	29 4.7	42 0.02%
TN	12 0.35%	44 0.005	44 65.85%	19 4.47	36 4.55	3 6.08	45 4.13	29 4.00	28 1.1	40 2.3%	28 0.27	47 0.21	36 1.28%	14 0.72%	19 5.2	25 0.09%
TX	37 0.26%	28 0.006	36 68.12%	10 5.61	21 5.45	11 5.71	32 5.01	18 5.17	29 1.0	20 3.8%	29 0.27%	15 0.72	16 2.63%	41 0.36%	33 4.4	9 0.28%
UT	27 0.28%	1 0.015	2 82.00%	4 8.48	50 2.92	7 5.95	12 6.57	23 4.47	33 0.9	11 4.7%	17 0.35%	16 0.71	30 1.91%	20 0.62%	40 4.0	6 0.38%
VT	3 0.42%	13 0.009	5 79.42%	16 4.87	12 5.88	44 4.21	10 6.70	39 3.26	30 1.0	21 3.7%	14 0.39%	8 0.95	27 2.01%	23 0.56%	2 7.5	15 0.22%
VA	41 0.24%	32 0.006	13 75.04%	2 11.12	7 5.98	12 5.60	41 4.57	8 6.58	20 1.6	3 6.3%	11 0.41%	26 0.48	19 2.54%	6 1.02%	27 4.8	13 0.23%
WA	40 0.25%	11 0.010	3 81.67%	5 7.43	24 5.26	18 5.19	1 6.96	13 5.56	10 2.6	10 5.0%	7 0.44%	2 1.71	5 4.61%	10 0.83%	1 8.0	3 0.76%
WV	50 0.15%	46 0.004	50 58.20%	50 1.89	8 5.94	48 3.44	37 4.69	48 2.46	23 1.3	48 1.9%	43 0.22%	45 0.22	41 0.98%	16 0.65%	39 4.0	40 0.04%
WI	19 0.31%	22 0.007	10 76.60%	38 3.05	10 5.92	22 5.04	16 5.70	30 3.98	43 0.4	33 2.7%	30 0.26	36 0.32	17 2.62%	28 0.50%	26 4.9	29 0.07%
WY	22 0.30%	29 0.006	11 76.42%	44 2.67	3 6.59	49 3.40	3 6.79	41 3.03	35 0.8	50 1.4%	46 0.19%	30 0.40	50 0.31%	45 0.33%	44 3.9	47 0.00%
	0.30%	**0.008**	**71.67%**	**5.09**	**5.00**	**5.00**	**5.00**	**5.00**	**1.9**	**4.0%**	**0.34%**	**0.74**	**3.31%**	**0.70%**	**5.0**	**0.40%**

SUMMARY OF RESULTS

The state farthest along the path to the New Economy is Massachusetts. Topping the list in 1999, 2002, and 2007, Massachusetts' lead over other states in 2008 has increased yet again. Boasting a concentration of software, hardware, and biotech firms supported by world-class universities such as MIT and Harvard in the Route 128 region around Boston, Massachusetts survived the early 2000s downturn and has continued to thrive, enjoying the fourth-highest increase in per-capita income. Washington state ranked fourth in 2007 and second in 2002, and has moved back to second place. Washington scores high due to its strength in software (in no small part due to Microsoft) and aviation (Boeing), but also because of the entrepreneurial hotbed of activity that has developed in the Puget Sound region and very strong use of digital technologies by all sectors. Maryland comes in at third (third in 2007 as well), in part because of the high concentration of knowledge workers, many employed in the District of Columbia suburbs and many in federal laboratory facilities or companies related to them. Delaware has continued its slow, steady climb in the rankings, from ninth in 2002 to seventh in 2007, to fourth in 2008. One reason for its leading score is its strong lead in high-wage traded services, a reflection in part on its proximity to New York and Philadelphia, and also the consistent and long-standing state policies to build a strong financial services industry. Reflecting in part its location and policies, Delaware also leads the nation on foreign direct investment.

New Jersey's strong pharmaceutical industry, coupled with its high-tech agglomeration around Princeton and its advanced services sector in Northern New Jersey, coupled with high levels of inward foreign direct investment, help drive it to fifth place (up from sixth in 2002, but down from second in 2007). These and the other top ten New Economy states (Connecticut, California, Virginia, New York, and Colorado) have more in common than just high-tech firms. They tend to have a high concentration of managers, professionals, and college-educated residents working in "knowledge jobs" (jobs that require at least a two-year degree). With one or two exceptions, their manufacturers tend to be more geared toward global markets, both in terms of export orientation and the amount of foreign direct investment. All the states also show above-average levels of entrepreneurship, even though some, like Massachusetts and Connecticut, are not growing rapidly in employment. Most are at the forefront of the IT and Internet revolutions, with a large share of their institutions and residents embracing the digital economy. In fact, the variable that is more closely correlated (0.81) with a high ranking is jobs in IT occupations outside the IT industry itself. Most have a solid "innovation infrastructure" that fosters and supports technological innovation. Many have high levels of domestic and foreign immigration of highly mobile, highly skilled knowledge workers seeking good employment opportunities coupled with a good quality of life.

While top-ranking states tend to be richer (there is a strong and positive correlation of 0.75 between their rankings and their per-capita income), wealth is not a simple proxy for advancement toward the New Economy. Some states with higher per-capita incomes lag behind in their scores (for example, Alaska, Hawaii, Iowa, and Oklahoma), while other states with lower incomes do better than their incomes would predict (such as Utah, Idaho, Georgia, and Arizona).

The two states whose economies have lagged the most in making the transition to the New Economy are Mississippi and West Virginia. Other states with low scores include, in reverse order, Arkansas, Alabama, Wyoming, Kentucky, South Dakota, Oklahoma, and Iowa. Historically, the economies of many of these, and other Southern and Plains states depended on natural resources or on mass-production manufacturing (or tourism, in the case of Hawaii), and relied on low costs rather than innovative capacity, to gain advantage. But innovative capacity (derived through universities, R&D investments, scientists and engineers, and entrepreneurial drive) is increasingly what drives competitive success in the New Economy. While lower-ranking states face challenges, they also can take advantage of new opportunities. The IT revolution gives companies and individuals more geographical freedom,

making it easier for businesses to relocate, or start up and grow in less densely populated states farther away from existing agglomerations of industry and commerce. Moreover, notwithstanding the recent decline in housing prices, metropolitan areas in many of the top states suffer from high costs (largely due to high land and housing costs) and near-gridlock on their roads. Both factors may make locating in less-congested metros, many in lower-ranking states, more attractive.

Regionally, the New Economy has taken hold most strongly in the Northeast, the mid-Atlantic, the Mountain West, and the Pacific regions; fourteen of the top twenty states are in these four regions. (The exceptions are Pennsylvania, Illinois, Michigan, Minnesota, Texas, and Virginia.) In contrast, sixteen of the twenty lowest-ranking states are in the Midwest, Great Plains, and the South. Given some states' reputations as technology-based, New Economy states, their scores seem surprising at first. For example, North Carolina and New Mexico rank twenty-fourth and twenty-ninth, respectively, in spite of the fact that the region around Research Triangle Park boasts top universities, a highly educated workforce, cutting-edge technology companies, and global connections, while Albuquerque is home to leading national laboratories and an appealing quality of life. In both cases, however, many parts of the state outside these metropolitan regions are more rooted in the old economy—with more jobs in traditional manufacturing, agriculture, and lower-skilled services; a less-educated workforce; and a less-developed innovation infrastructure. As these examples reveal, most state economies are, in fact, a composite of many regional economies that differ in the degree to which their economies are structured in accordance with New Economy factors.

Between 2007 and 2008, most states and the United States as a whole made sustained progress toward the New Economy. Of the twenty-three indicators that were comparable between 2008 and 2007, overall the United States increased on sixteen and decreased on seven, for a net increase of nine indicators. The seven indicators in which the average U.S. score declined were FDI, gazelle jobs, IPOs, inventor patents and total patents, scientists and engineers, and high-tech jobs (although for most indicators the decline was less than 1 percent). In terms of states, only eleven states regressed, with thirty-six increased. Of the decliners, Mississippi led the way, falling in twice as many indicators as it increased, while Wyoming and Indiana also fell (a net of -6 and -5, respectively). In contrast, many more states saw significant increases in movement to a New Economy. Nine states saw at least twice as many indicators increasing as decreasing, with Arizona, California, and North Carolina showing the most progress, with eighteen indicators increasing and only five decreasing.

How closely do high scores correlate with economic growth? States that score higher appear to create jobs at a slightly faster rate than lower-ranking states. Between 2002 and 2006, there was virtually no correlation (0.02) between employment growth and New Economy scores. However, job creation is not necessarily the best measure of long-term economic wellbeing, especially if growth comes in the form of low-paying jobs. Instead, growth in per-capita income provides a more accurate picture of economic health. Higher New Economy scores were positively correlated with higher growth in state per-capita incomes between 2002 and 2006 (0.34).

Yet, there are other paths to high-income growth, at least in the shorter term. For example, Wyoming, which ranks forty-sixth, enjoyed the fastest absolute per-capita income growth between 2002 and 2006, largely due to increases in prices and demand for resource mining, and oil and gas industries. While yielding impressive performance in the short term, this is not a winning strategy for the long run. As history has shown, such an undiversified approach leaves an economy at the mercy of world price fluctuations that bring busts as well as booms. On the other hand, states that embrace the New Economy can expect to sustain greater per-capita income growth for the foreseeable future.

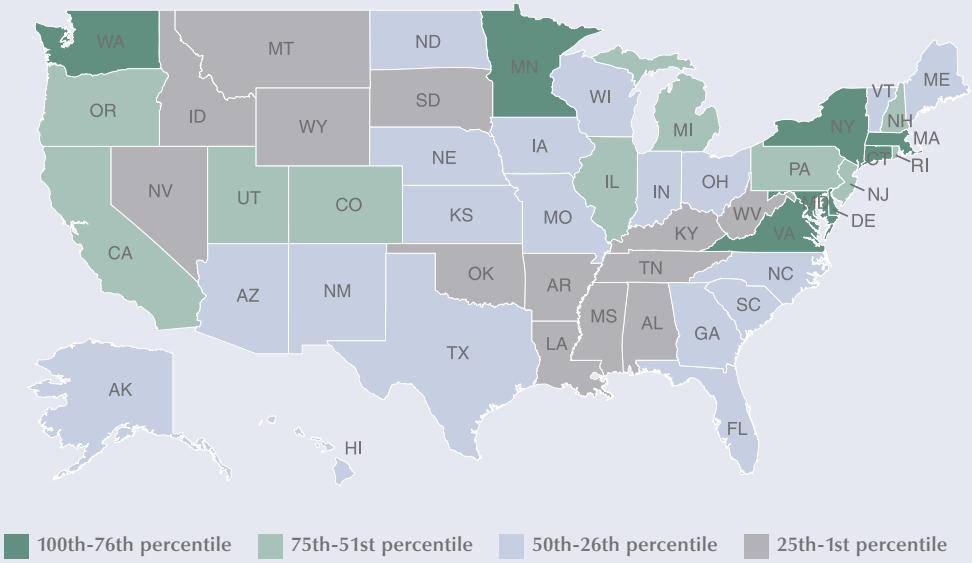
2008 Rank	State	2008 Score	2007 Rank*
1	Massachusetts	17.31	1
2	Connecticut	16.94	2
3	Virginia	15.82	3
4	Maryland	15.28	4
5	New York	14.75	5
6	Delaware	14.37	8
7	Washington	14.06	9
8	Minnesota	13.68	6
9	New Jersey	13.48	7
10	New Hampshire	12.34	11
11	Colorado	12.34	10
12	Illinois	12.19	12
13	Oregon	11.51	19
14	California	10.95	14
15	Rhode Island	10.92	13
16	Utah	10.57	15
17	Pennsylvania	10.44	16
18	Michigan	10.01	17
19	Vermont	9.82	27
20	Ohio	9.69	22
21	Nebraska	9.24	26
22	Iowa	9.10	18
23	Missouri	8.73	25
24	Kansas	8.72	28
25	Wisconsin	8.67	24
26	North Carolina	8.54	31
27	Arizona	8.50	23
28	Maine	8.44	32
29	Georgia	8.40	20
30	Hawaii	8.40	35
31	Alaska	8.30	21
32	Texas	8.08	33
33	Florida	7.68	30
34	North Dakota	7.54	29
35	New Mexico	7.31	37
36	South Carolina	6.94	39
37	South Dakota	6.42	46
38	Indiana	6.37	34
39	Oklahoma	6.17	36
40	Alabama	5.77	40
41	Montana	5.77	41
42	Tennessee	5.75	43
43	Kentucky	5.68	45
44	Louisiana	5.64	38
45	Idaho	5.11	44
46	Nevada	4.69	48
47	West Virginia	3.8	49
48	Arkansas	3.76	42
49	Wyoming	3.08	47
50	Mississippi	2.6	50
	U.S. Average	**10.0**	

KNOWLEDGE JOBS

Workers who were skilled with their hands and could reliably work in repetitive and sometimes physically demanding jobs were the engine of the old economy. In today's New Economy, knowledge-based jobs are driving prosperity. These jobs tend to be managerial, professional, and technical positions held by individuals with at least two years of college. Such skilled and educated workers are the backbone of states' most important industries, from high value-added manufacturing to high-wage traded services.

The "knowledge jobs" indicators in this section measure six aspects of knowledge-based employment: 1) employment in IT occupations in non-IT sectors; 2) the share of the workforce employed in managerial, professional, and technical occupations; 3) the education level of the workforce; 4) the average educational attainment of recent immigrants; 5) the average education attainment of recent U.S. inter-state migrants; 6) employment in high value-added manufacturing sectors; and 7) employment in high-wage traded services.

AGGREGATED KNOWLEDGE JOBS SCORES



Source: Authors' calculations based on the states' scores in seven indicators—IT jobs; managerial, professional, and technical jobs; workforce education; immigration of knowledge workers; migration of U.S. knowledge workers; manufacturing value-added; and high-wage traded services.

* Due to methodological improvements and/or data discrepancies between the 2007 and 2008 *Index*, ranking comparisons are not exact.

INFORMATION TECHNOLOGY JOBS

Employment in IT occupations in non-IT industries as a share of total jobs.[23]

Why Is This Important? The IT revolution continues to transform the economy, as businesses in all industries use IT to find new ways to boost productivity, develop new products and services, and create new business models. IT workers, even in "traditional" industries, are bringing IT to an ever-growing list of applications, from standard Web site design, to tracking supply and product shipments in real time, to streamlining internal office operations. In fact, because of the continuing digital transformation of the economy, IT jobs in non-IT industries grew 5.5 percent between 2003 and 2005, significantly faster than average job growth.[24] The number of IT workers in non-IT industries is a good proxy to measure the extent to which traditional industries are making use of IT.

The Rankings: Even after controlling for the size of states' software and IT-producing industries, most of the states with high scores are states with more technology-driven economies, including every one of the top five. Over one-third of IT jobs in non-IT industries are located in only five states. One reason is that the creation of strong IT-producing industries leads to complementary work in non-IT fields. Virginia, for example, which ranks number one, has the highest concentration of IT workers as a percentage of overall private sector workforce.[25] Low-scoring states tend to have natural resource-based or traditional manufacturing-based economies.

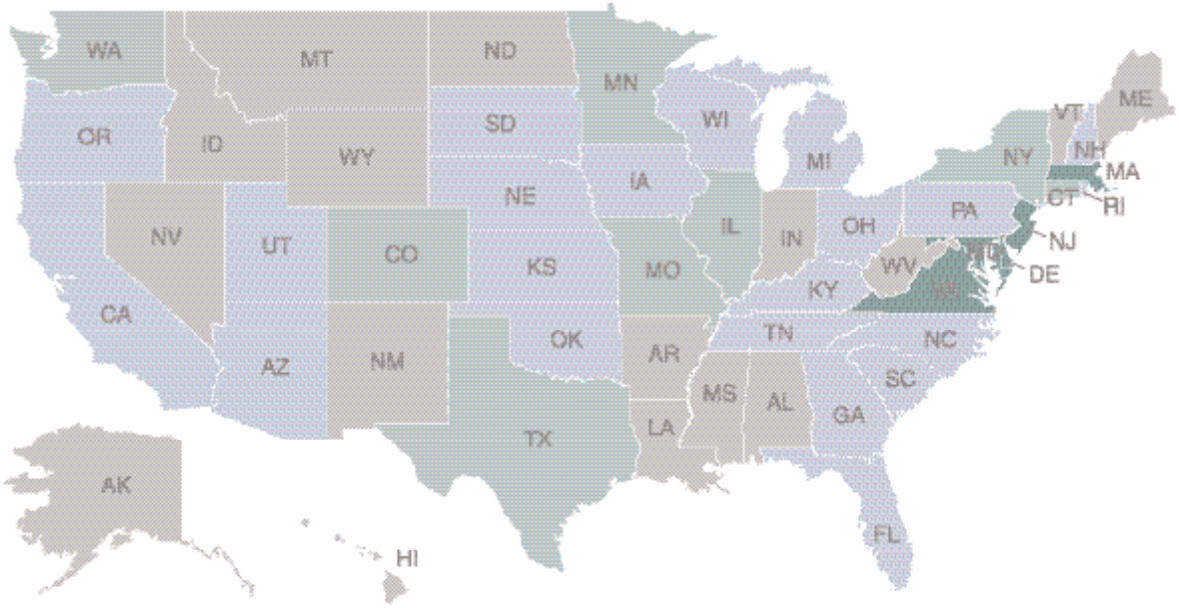
"Over one-third of IT jobs in non-IT industries are located in only five states."

	The Top Five	Percentage of jobs in IT occupations
1	Virginia	2.37%
2	New Jersey	1.97%
3	Delaware	1.97%
4	Maryland	1.94%
5	Massachusetts	1.91%
	U.S. Average	**1.37%**

Source: Bureau of Labor Statistics, 2005 and 2006 data.

	The Top Five Movers	2002 Rank*	2008 Rank	Change '02-'08
1	Ohio	27	15	↑ 12
2	Oklahoma	36	24	↑ 12
3	Kentucky	42	33	↑ 9
3	New Hampshire	25	16	↑ 9
3	New Jersey	11	2	↑ 9

* 2002 state ranks have been revised for data comparability.[26]



100th-76th percentile | 75th-51st percentile | 50th-26th percentile | 25th-1st percentile

MANAGERIAL, PROFESSIONAL, AND TECHNICAL JOBS

Managers, professionals, and technicians as a share of the total workforce.

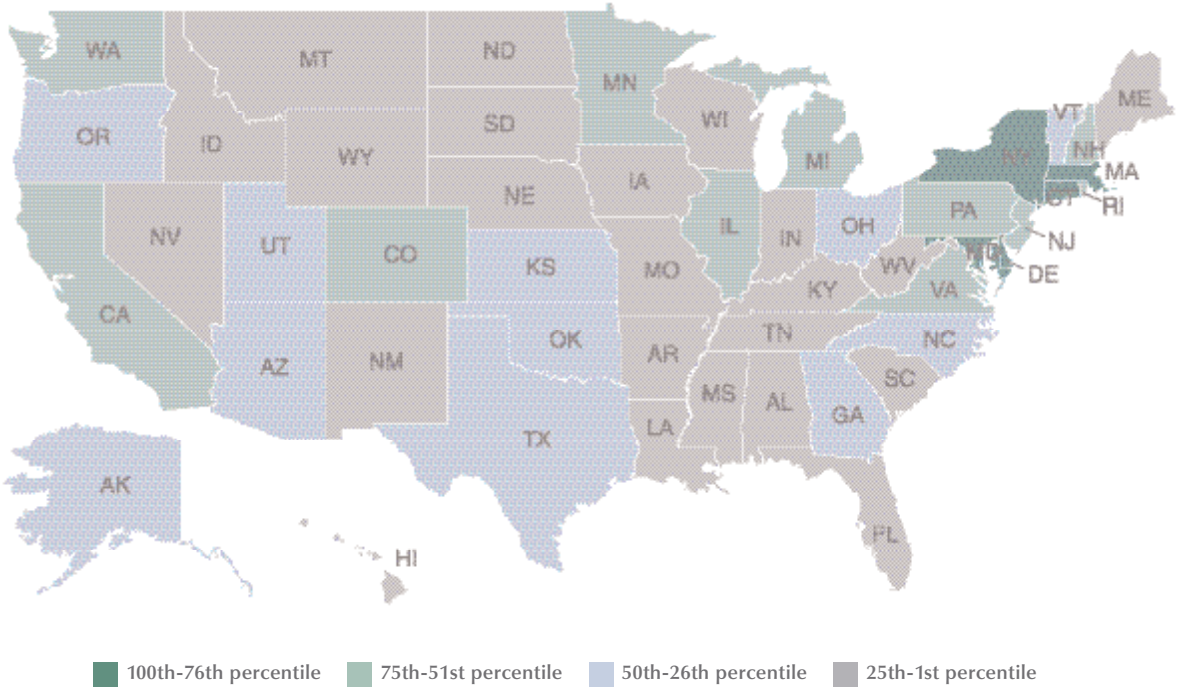
Why Is This Important? As more routine jobs are automated or offshored and as the economy becomes more complex and knowledge-based, managers, professionals, and technicians are playing a more important role in the economy. Indeed, professional and technical jobs grew 68 percent faster than overall employment between 1999 and 2005. These include engineers and scientists, health professionals, lawyers, teachers, accountants, bankers, consultants, and engineering technicians.[27] Managerial jobs, although they have declined by a quarter since 1999, perhaps in part due to the slowdown after 2000, are still key drivers of growth and innovation.

The Rankings: Managerial, professional, and technical jobs grew over 50 percent faster than overall employment between 1999 and 2007. States with high rankings, such as Massachusetts, New York, Maryland, and Connecticut, tend to have a large number of technology and professional service companies and corporate headquarters or regional offices. In Connecticut, for example, Hartford is home to insurance and defense headquarters, while southwestern Connecticut is dominated by corporate headquarters (such as Pitney Bowes), financial services, and high-tech jobs—many of which have moved out of New York City. Maryland and Virginia rank high in part because of the high number of federal government managerial and professional jobs there. States that rank low tend to be either "branch-plant" and "back-office" states (e.g., Nevada, Mississippi, Tennessee) or natural resource-based states (Wyoming, South Dakota, Montana).

The Top Five		Percentage of jobs held by managers, professionals, and technicians
1	Massachusetts	27.1%
2	New York	25.0%
3	Maryland	25.0%
4	Connecticut	24.9%
5	Delaware	24.4%
	U.S. Average	**21.5%**

Source: Bureau of Labor Statistics, 2006 data.

"Managerial, professional, and technical jobs grew more than 50 percent faster than overall employment between 1999 and 2007."



WORKFORCE EDUCATION

A weighted measure of the educational attainment (advanced degrees, bachelor's degrees, associate's degrees, or some college coursework) of the workforce.[28]

Why Is This Important? In the New Economy, an educated workforce is critical to increasing productivity and fostering innovation. Fortunately, the American workforce has become more educated in the last half century to meet the economy's increased need for skilled workers. In 2006, 27 percent of Americans older than 25 years of age held at least a bachelor's degree, up from 24 percent in 2000, 21 percent in 1990, and 16 percent in 1980.

The Rankings: Highly educated individuals are more geographically mobile than less-educated individuals.[29] Colorado attracts individuals from other regions that are, on average, more educated than those heading to other fast-growing Western states. Likewise, Virginia and Maryland are sustained in part by immigration of more-educated individuals to the Washington, D.C., region.[30] States that have strong higher education systems (such as Connecticut and Massachusetts) also score very well. Meanwhile, those that have historically invested less in education (like Alabama, Louisiana, Mississippi, and Nevada) tend to fall near the bottom.

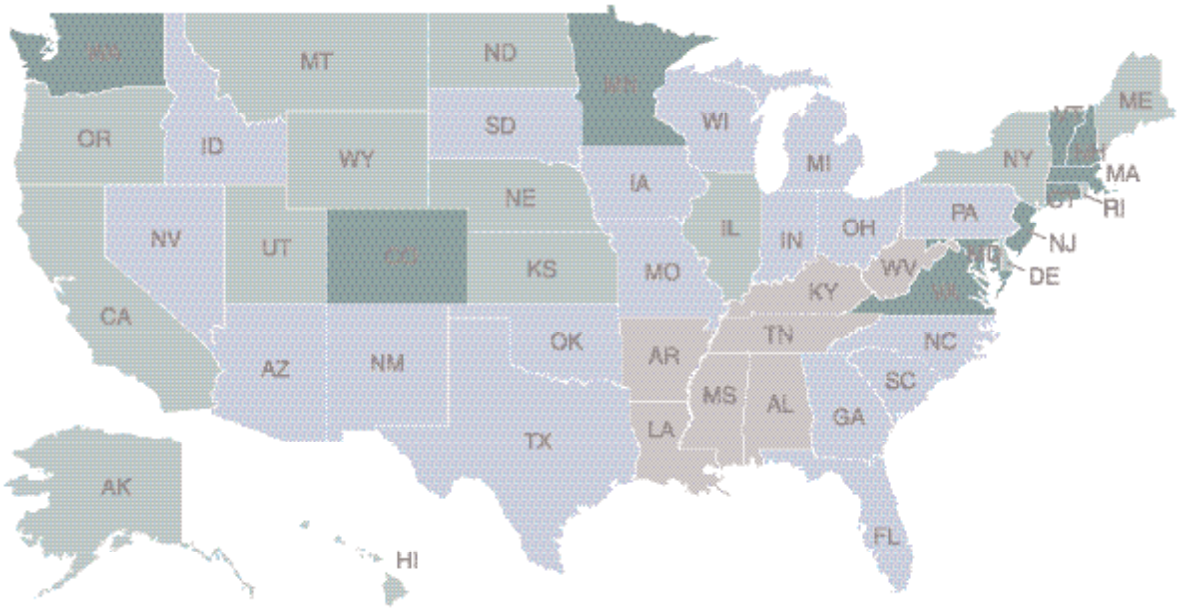
The Top Five		Composite score
1	Massachusetts	46.3
2	Maryland	44.0
3	Colorado	42.9
4	Connecticut	42.2
5	Vermont	41.8
	U.S. Average	**39.7**

Source: U.S. Census, 2006 data.

The Top Five Movers		2002 Rank*	2008 Rank	Change '02-'08
1	Wyoming	46	26	↑ 20
2	Nebraska	35	18	↑ 17
3	New Mexico	47	32	↑ 15
4	Maine	36	22	↑ 14
5	Arizona	41	30	↑ 11

* 2002 state ranks have been revised for data comparability.

"In 2006, 27 percent of Americans older than 25 years of age held at least a bachelor's degree, up from 24 percent in 2000 and 21 percent in 1990."



100th-76th percentile | 75th-51st percentile | 50th-26th percentile | 25th-1st percentile

IMMIGRATION OF KNOWLEDGE WORKERS

The average educational attainment of recent migrants from abroad.[31]

Why Is This Important? In the new global economy, states must have people with the right skills, educational background, and talent. And, in a world with ever-increasing flows of talent across national borders, a small, but growing, share of states' knowledge workers are from overseas. In many cases, these workers do more than merely fill occupational gaps: By contributing new perspectives and knowledge drawn from other places, they enhance a state's innovation.[32] Foreign-born and foreign-educated scientists and engineers in the United States, for example, are over-represented among authors of the most-cited scientific papers and inventors holding highly cited patents.[33] And, immigrants far outpaced native-born Americans in business ownership, increasing as a share of business owners from 0.37 percent in 2006 to 0.46 percent in 2007.

The Rankings: It's not clear why some states, such as North Dakota and Montana, have the highest-education foreign immigrants. States that have strong corporate and high-tech centers tend to score the highest. States with mixed European and Asian migration, such as Hawaii and Massachusetts, tend to do slightly better. Generally, states with migrants predominantly from Latin American countries, who, on average, have less years of education than European or Asian migrants, tend to do worse, such as Arizona, Nevada, Mexico, Texas, and California, which all are among the bottom ten states.

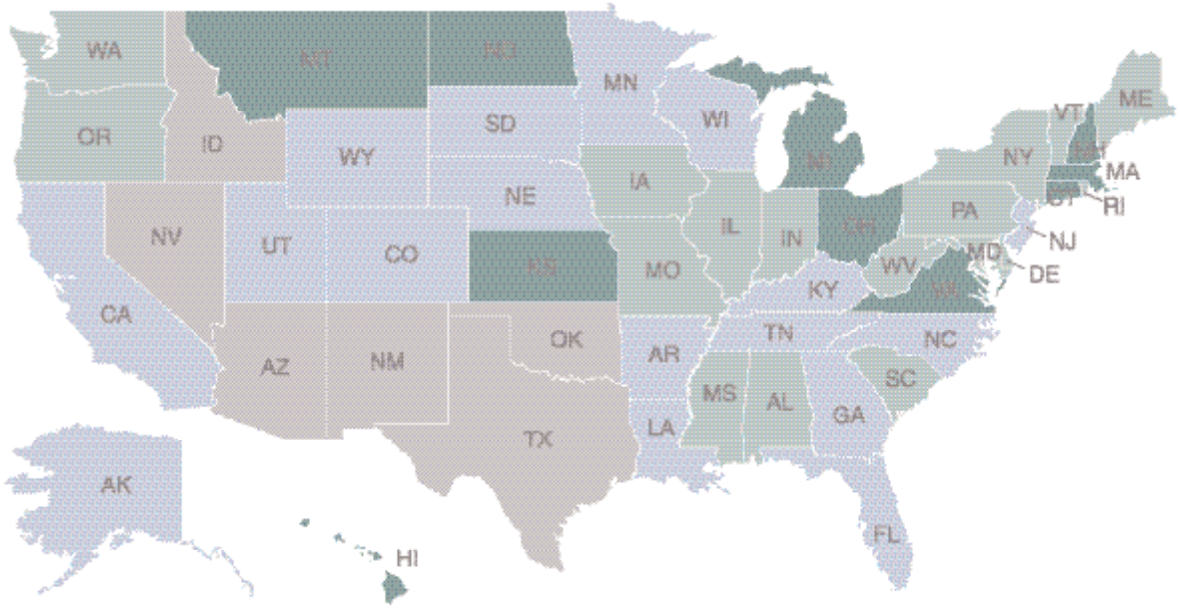
"Immigrants far outpaced native-born Americans in business ownership, increasing from 0.37 percent in 2006 to 0.46 percent in 2007." [34]

The Top Five		Average years of education
1	North Dakota	14.20
2	Montana	14.18
3	New Hampshire	13.38
4	Ohio	13.20
5	Connecticut	13.18
	U.S. Average	**11.43**

Source: U.S. Census, 2005 and 2006 data.

The Top Five Movers		2007 Rank*	2008 Rank	Change '07-'08
1	Delaware	42	11	↑ 31
2	Connecticut	20	5	↑ 15
2	Pennsylvania	30	15	↑ 15
4	Utah	47	35	↑ 12
5	South Carolina	36	25	↑ 11

* 2007 state ranks have been revised for data comparability.



U.S. MIGRATION OF KNOWLEDGE WORKERS

The average educational attainment of recent migrants from within the United States.[35]

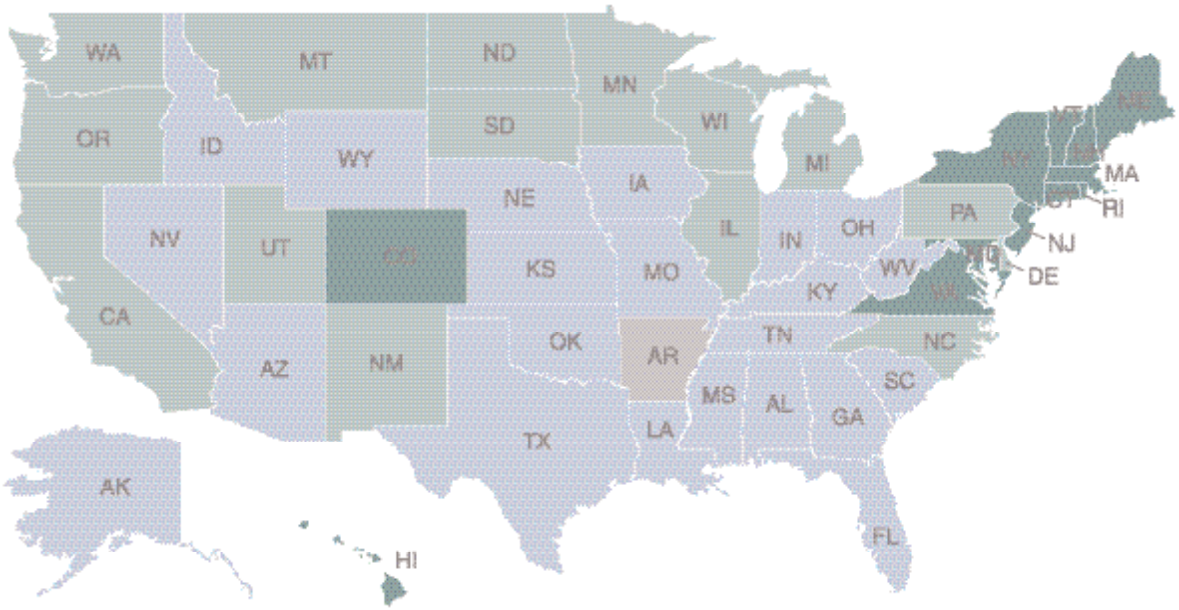
Why Is This Important? Just as countries compete for talent, so do states. And, while foreign immigration is important, the lion's share of immigration into states is from Americans moving across state lines. And, as information technology has become more accessible and companies have expanded their operations across the country, it has become easier for Americans to move than ever before. On average, Americans move every five years.[36] Accordingly, states now compete with one another not only to attract business, but also to attract the skilled workers who will work for those businesses or start their own. And there is a strong relationship between higher concentrations of well-educated residents and per-capita income growth.[37]

Rankings: There appear to be several factors driving in-migration of knowledge workers. First, states with strong higher education systems, such as Massachusetts and Rhode Island, rank high. In addition, states with a large share of high-wage professional and managerial jobs that rely more on knowledge workers do well.[38] These include Massachusetts, New York, Connecticut, Virginia, and Maryland. Knowledge workers also tend to move to where other knowledge workers already are highly concentrated.[39] In addition, quality of outdoor life appears to play a key role, with states like Vermont, Hawaii, New Hampshire, Colorado, and Maine ranking high.

The Top Five		Average years of education
1	Massachusetts	14.59
2	Vermont	14.31
3	New York	14.27
4	Hawaii	14.24
5	Connecticut	14.12
	U.S. Average	**13.11**

Source: U.S. Census, 2006 data.

"On average, Americans move every five years."



MANUFACTURING VALUE-ADDED

Manufacturing value-added per production hour worked as a percentage of the national average, adjusted by industrial sector.[40]

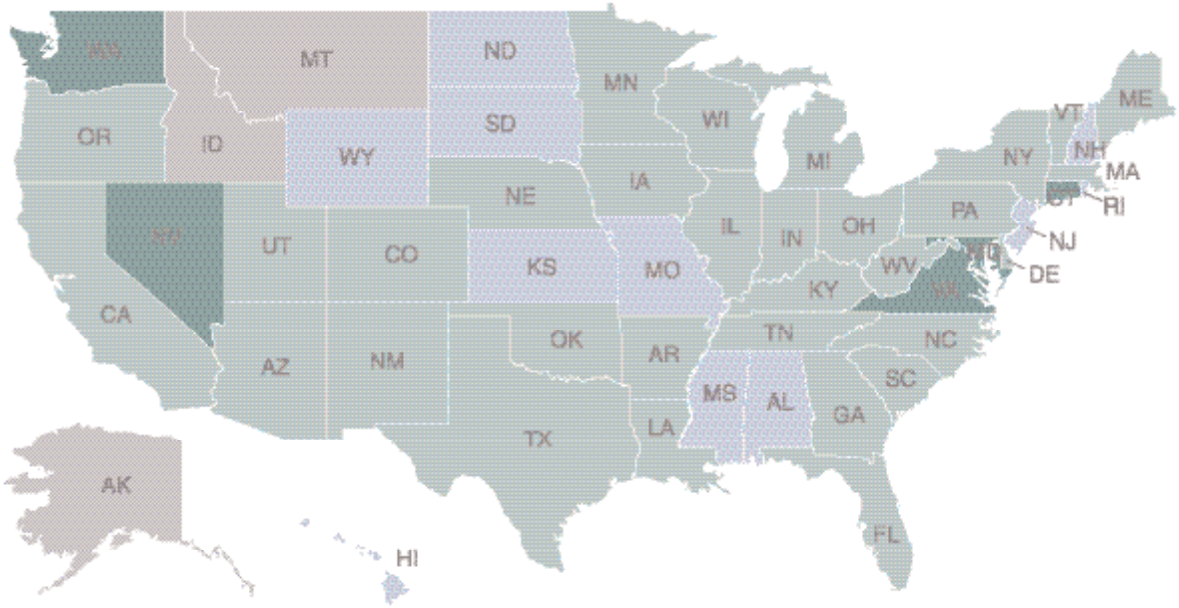
Why Is This Important? Value-added is the difference in value between inputs into the production process (e.g., materials, energy) and the value of final products or services sold. Within manufacturing, high value-added sectors tend to be those that are capital intensive and producing technologically complex products. Because their workers are more productive, generating greater value for each hour worked, they, in turn, typically earn higher wages than other workers. And, within sectors, firms with higher value-added levels, all else being equal, are better equipped to meet competitive challenges, both at home and abroad.

The Rankings: Even after controlling for a state's industry mix, states with high-tech firms outperform those without strong technology sectors. For example, the top four states, Washington, Connecticut, Maryland, and Virginia, all have strong technology industries and score in the top ten in the overall New Economy rankings. In addition, states with higher incomes, and presumably higher business costs, score higher, as firms in these states have stronger incentives to find ways to compete on the basis of higher productivity, rather than just low costs. Finally, states with manufacturing sectors dominated by firms concentrated in a small number of industries tend to score the highest. One explanation might be state specialization, another may be that states with homogeneous, high-skilled firms develop knowledge-based clusters that increase production efficiency. Virginia stands out as an exception to the rule, as a wide range of industries are responsible for its strong performance. Still, California, with its large and diversified manufacturing base, falls near the middle (20th).

"States with concentrated manufacturing in specialized sectors tend to have higher value-added production."

	The Top Five	Value-added as a percent of U.S. average
1	Washington	122.5%
2	Connecticut	112.2%
3	Maryland	109.8%
4	Virginia	107.6%
5	Nevada	107.6%
	U.S. Average	**100.0%**

Source: U.S. Census, 2006 data.



HIGH-WAGE TRADED SERVICES

The share of employment in traded service sectors in which the average wage is above the national median for traded services.[41]

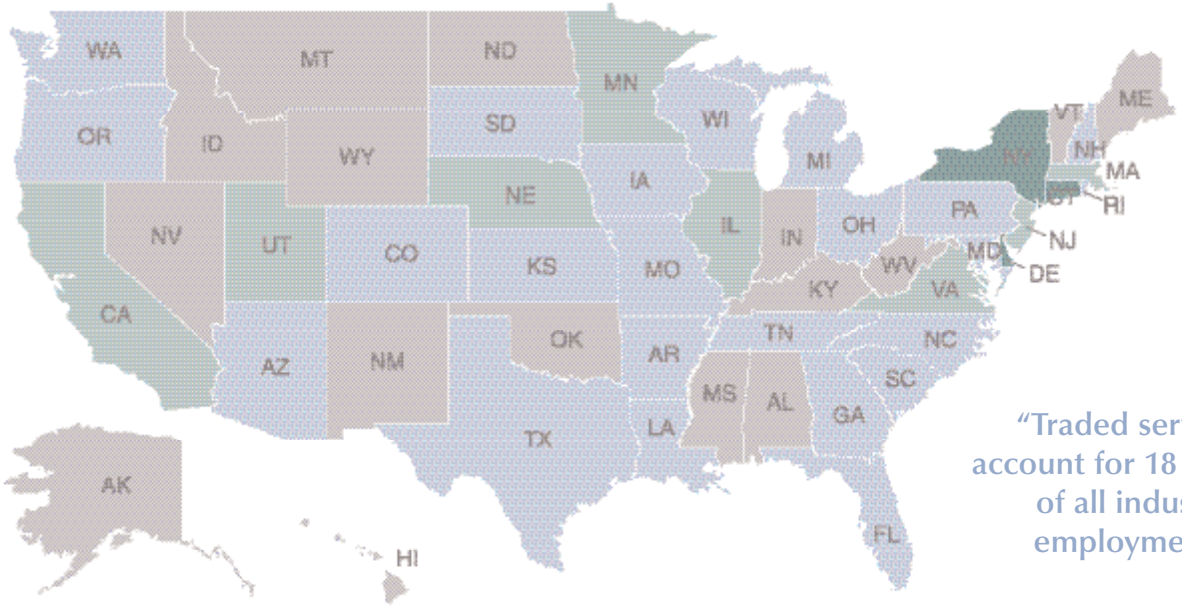
Why Is This Important? The service sector consists of more than just local-serving, low-wage industries, like fast-food establishments. From insurance and financial services to publishing and goods transportation, traded services—those that are not primarily consumed locally—accounted for 18 percent of private-sector employment in 2005. And many of these, like investment services, publishing, legal services, advertising, and shipping, pay wages above the national average. Moreover, in the New Economy, services are increasingly the only part of a region's economic base (firms that sell most of their output outside the region) that is growing in employment. Indeed, the IT revolution is enabling a growing share of information-based services to be physically distant from the customer while remaining functionally close. In the old economy, services like banking and book sales were local-serving industries. In the New Economy, these and a host of other industries are now traded, as consumers can use the Internet and telephone to consume these services from companies not necessarily located in their communities.

The Rankings: Large, traditional centers of business activity lead the rankings. Delaware's state strategy to attract credit and banking industries has helped propel it to the top of the rankings. Connecticut hosts a large number of insurance companies and law firms, while the New York metropolitan area is home to a wide array of corporate headquarters, financial services, and publishing. States near the bottom of the rankings, such as Wyoming, Montana, and West Virginia, tend to be economies more heavily based on resource-dependent industries and traditional manufacturing.

The Top Five		Percentage of service jobs in high-wage traded sectors
1	Delaware	23.2%
2	Connecticut	20.6%
3	New York	20.0%
4	Minnesota	17.7%
5	New Jersey	17.3%
	U.S. Average	**14.7%**

Source: Bureau of Labor Statistics, 2006.

The Top Movers		2007 Rank	2008 Rank	Change '07-'08
1	North Carolina	28	23	↑ 5
2	Maryland	25	22	↑ 3
3	Nebraska	12	10	↑ 2
3	Oregon	19	17	↑ 2
3	Kansas	32	30	↑ 2
3	Alabama	37	35	↑ 2
3	Nevada	44	42	↑ 2
3	Montana	49	47	↑ 2
3	Vermont	50	48	↑ 2



"Traded services account for 18 percent of all industry employment."

100th-76th percentile | 75th-51st percentile | 50th-26th percentile | 25th-1st percentile

2008 Rank	State	2008 Score	2007 Rank*
1	Delaware	13.37	2
2	Texas	12.98	3
3	Washington	11.75	1
4	New Jersey	11.67	6
5	South Carolina	11.56	5
6	New York	11.45	7
7	Connecticut	11.34	8
8	Massachusetts	11.28	4
9	Kentucky	10.37	10
10	Illinois	10.15	12
11	North Carolina	10.1	17
12	Nevada	10.1	18
13	California	9.97	15
14	New Hampshire	9.86	11
15	Georgia	9.8	14
16	Michigan	9.76	16
17	Tennessee	9.75	19
18	Louisiana	9.58	34
19	Florida	9.53	25
20	Vermont	9.52	9
21	Pennsylvania	9.48	24
22	Virginia	9.45	31
23	Arizona	9.45	27
24	Maryland	9.32	30
25	Indiana	9.25	22
26	Ohio	9.2	21
27	Alabama	8.94	36
28	Maine	8.92	29
29	Alaska	8.87	26
30	Oregon	8.76	28
31	Hawaii	8.69	23
32	Utah	8.68	32
33	Minnesota	8.63	20
34	North Dakota	8.59	40
35	Wyoming	8.58	35
36	Kansas	8.48	42
37	Rhode Island	8.39	13
38	Colorado	8.28	37
39	Idaho	8.28	43
40	Missouri	8.19	38
41	Wisconsin	8.18	33
42	West Virginia	8.14	41
43	Iowa	7.75	39
44	New Mexico	7.66	44
45	Arkansas	7.46	47
46	Nebraska	7.28	45
47	Oklahoma	7.19	46
48	Montana	7.18	50
49	Mississippi	7.01	48
50	South Dakota	6.82	49
	U.S. Average	**10**	

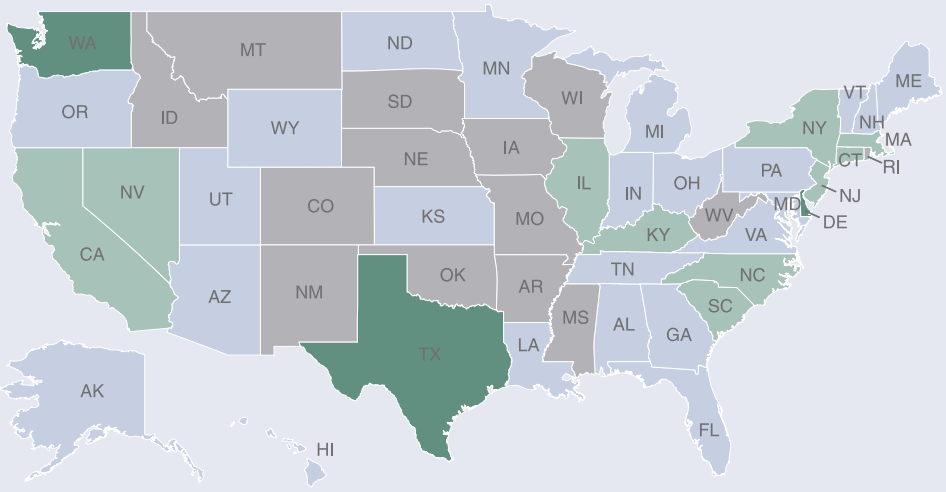
GLOBALIZATION

.While the old economy was national in scope, the New Economy is global. While in 1975 there were about 7,000 multi-national companies, today there are approximately 60,000.[42] The net income of U.S. companies from operations outside the United States accounts for about half of income earned at home, compared to just 10 percent in the 1950s.[43]

When the old economy emerged after World War II, the winners were states whose businesses sold to national markets, as opposed to local or regional ones. In the New Economy of the 21st century, the winners will be the states whose businesses are most integrated into the world economy. A global orientation ensures expanding markets for a state's industries. Since the workforce of globally oriented firms also earns more than those at other firms, a global orientation means that a state's workforce will have a higher standard of living.

The globalization indicators in this section measure two aspects of globalization: 1) the extent to which the state's manufacturing and service workforce is employed producing goods and services for export;[44] and 2) the share of the workforce employed by foreign-owned companies.

AGGREGATED GLOBALIZATION SCORES



100th-76th percentile | 75th-51st percentile | 50th-26th percentile | 25th-1st percentile

Source: Authors' calculations based on the states' scores in two indicators—export focus of manufacturing, and foreign direct investment.

* Due to methodological improvements and/or data discrepancies between the 2007 and 2008 *Index*, ranking comparisons are not exact.

EXPORT FOCUS OF MANUFACTURING AND SERVICES

The value of exports per manufacturing and service worker.[45]

Why Is This Important? Trade has become an integral part of the United States and world economies. The combined total of U.S. exports and imports has increased from just 11 percent of GDP in 1970 to 20 percent in 1990, reaching 25 percent in 2004. Service exports are growing even faster than goods exports, accounting for 30 percent of total exports in 2004, up from 20 percent in 1980. Moreover, export industries are a source of higher incomes. On average, workers employed at export-oriented manufacturing firms earn 9.1 percent more than workers at comparable non-exporting firms. In business services, workers at exporting firms earn an even larger premium—12.9 percent more than their counterparts at comparable non-exporting firms.[46] As a result, states whose companies are not global traders risk being left behind.

The Rankings: Therefore, the leading states are generally those that have high value-added, technologically advanced manufacturing sectors, such as Washington, Texas, Vermont, and New York. Texas' top rank is owed to trade with Mexico, which accounts for one-third of the state's exports, as well as its robust oil and petroleum industry exports. Even after holding constant oil and petroleum industry sectors' propensity to export, Texas manufacturers export more than three times the national average. Washington's rank demonstrates the importance of software publishing (a service industry), as Microsoft's software exports, together with Boeing's aerospace manufacturing, largely are responsible for its strong performance. States with low rankings tend to have more lower value-added industries that compete directly with lower-wage nations, making it more difficult to export (e.g., Arkansas and Mississippi), branch-plant domestic supplier firms (e.g., Indiana and Wisconsin), or with mostly smaller firms that tend to export less than larger firms (such as Rhode Island).

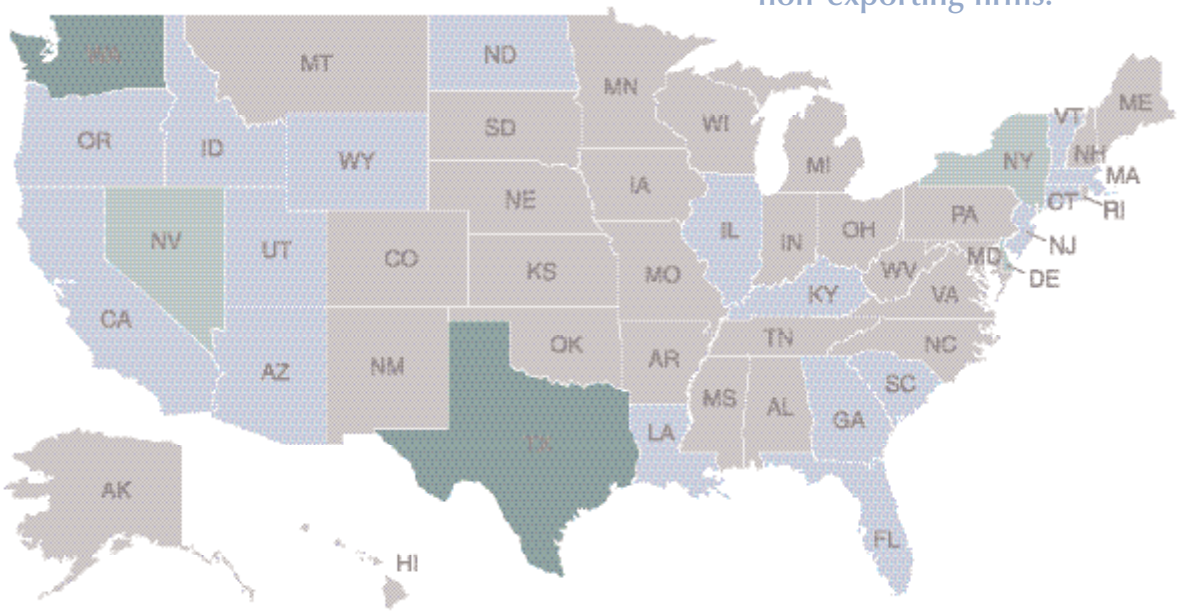
The Top Five		Adjusted export sales per manufacturing and service worker
1	Texas	$69,268
2	Washington	$60,418
3	Delaware	$50,217
4	Nevada	$41,908
5	New York	$38,117
	U.S. Average	**$31,606**

Source: U.S. Census, 2002 data, and U.S. Department of Commerce, 2007 data.

The Top Five Movers		2002 Rank*	2008 Rank	Change '02-'08
1	North Dakota	40	14	↑26
2	Utah	36	21	↑15
3	South Carolina	29	17	↑12
4	Delaware	14	3	↑11
4	Maine	47	36	↑11

* 2002 state ranks have been revised for data comparability.[47]

"On average, workers employed at export-oriented manufacturing firms earn 9.1 percent more than workers at comparable non-exporting firms."



100th-76th percentile | 75th-51st percentile | 50th-26th percentile | 25th-1st percentile

FOREIGN DIRECT INVESTMENT

The percentage of each state's workforce employed by foreign companies.

Why Is This Important? Incoming foreign direct investment (FDI) includes significant investments by foreign companies in new facilities in the United States that employ workers in economic-base activities. FDI grew rapidly in the late 1990s, reaching an apex in 2000 of $336 billion, before dropping precipitously to $52 billion in 2002. Since then, FDI has rebounded by 50 percent to $77 billion in 2005 (all in 2000 dollars).[48] In 2006, more than 80 percent of states saw an increase in FDI.

Rankings: Similarly to prior indexes, states in the Northeast scored the highest, yet FDI grew in four-fifths of states in 2006. While a significant share of FDI is in manufacturing, some states have a higher share than others. Manufacturing accounted for more than half of FDI in South Carolina, but only a quarter of employment in Connecticut. Manufacturing FDI originates almost exclusively in Europe, especially German- and French-owned affiliates, and, to a lesser extent, from Japan.

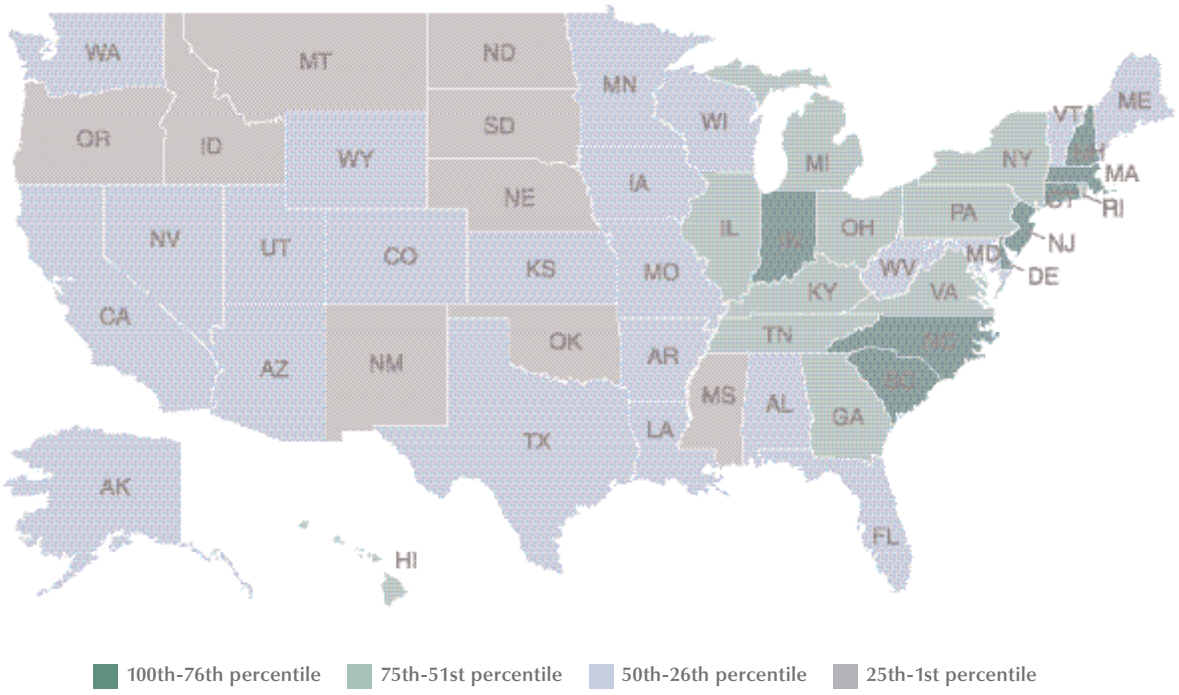
The Top Five		Percentage of workforce employed by foreign companies
1	Connecticut	4.69%
2	South Carolina	4.68%
3	Delaware	4.64%
4	New Jersey	4.51%
5	New Hampshire	4.31%
	U.S. Average	**2.97%**

Source: Bureau of Economic Analysis, 2006 data.

The Top Five Movers		2002 Rank*	2008 Rank	Change '02-'08
1	Alaska	35	24	↑11
2	Wyoming	45	37	↑8
3	Pennsylvania	19	12	↑7
4	Minnesota	33	27	↑6
5	New York	15	10	↑5

* 2002 state ranks have been revised for data comparability.

"Four-fifths of states saw an increase in FDI from 2005 to 2006."

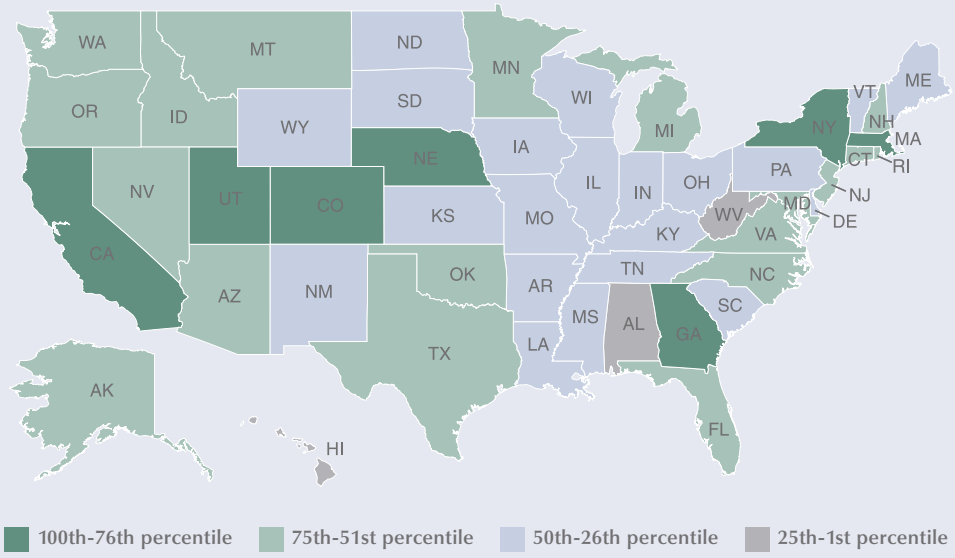


ECONOMIC DYNAMISM

The old economy was epitomized by large companies facing limited competition in stable markets with high barriers to entry. The New Economy is about economic dynamism and competition, epitomized by the fast-growing, entrepreneurial companies that are one of its hallmarks. As innovation has become an important determinant of competitive advantage, the ability of state economies to rejuvenate themselves through the formation of new, innovative companies is critical to their economic vitality.

The dynamism and competition indicators in this section measure six aspects of economic dynamism: 1) the share of jobs in fast-growing gazelle firms; 2) the degree of job churning (which is a product of new business startups and existing business failures); 3) the number of Deloitte Technology Fast 500 and Inc. 500 firms; 4) the value of companies' IPOs; 5) the number of entrepreneurs starting businesses; and 6) the number of individual inventor patents issued.

Aggregated Economic Dynamism Scores



100th-76th percentile | 75th-51st percentile | 50th-26th percentile | 25th-1st percentile

2008 Rank	State	2008 Score	2007 Rank*
1	Utah	14.34	1
2	Massachusetts	14.04	11
3	Colorado	12.98	3
4	Georgia	12.88	17
5	New York	12.54	8
6	Nebraska	12.5	14
7	California	11.77	4
8	New Jersey	11.47	5
9	Maryland	11.45	2
10	Idaho	11.35	10
11	Florida	11.15	15
12	Nevada	11.04	7
13	Minnesota	10.91	12
14	Oregon	10.43	21
15	Virginia	10.23	13
16	Alaska	10.18	18
17	Montana	10.14	23
18	Washington	10.03	6
19	Oklahoma	9.94	19
20	Arizona	9.87	26
21	Texas	9.78	9
22	Rhode Island	9.59	39
23	North Carolina	9.2	27
24	Connecticut	9.17	24
25	New Hampshire	9.05	30
26	Michigan	8.95	33
27	Vermont	8.86	29
28	Illinois	8.7	25
29	Louisiana	8.65	41
30	Pennsylvania	8.48	28
31	South Dakota	8	47
32	Tennessee	7.98	20
33	Kansas	7.87	45
34	North Dakota	7.79	43
35	Delaware	7.73	16
36	Maine	7.68	34
37	Mississippi	7.58	40
38	Wisconsin	7.5	36
39	New Mexico	7.49	31
40	Wyoming	7.44	32
41	Indiana	7.21	35
42	Arkansas	6.99	22
43	Ohio	6.96	38
44	Missouri	6.8	37
45	Iowa	6.28	48
46	Kentucky	6.23	49
47	South Carolina	5.85	44
48	Hawaii	5.74	46
49	West Virginia	4.22	50
50	Alabama	3.5	42
	U.S. Average	**10**	

Source: Authors' calculations based on the states' scores in six indicators—gazelle employment, job churning, fastest-growing firms, initial public offerings, entrepreneurial activity, and inventor patents.

* Due to methodological improvements and/or data discrepancies between the 2007 and 2008 *Index*, ranking comparisons are not exact.

"GAZELLE" JOBS

Jobs in gazelle companies (firms with annual sales revenue that has grown 20 percent or more for four straight years) as a share of total employment.[49]

Why Is This Important? The prevalence of new, rapidly growing firms—gazelles—is the sign of a dynamic and adaptive state economy. States that offer fertile ground for the entrepreneurial activity that spawns gazelles reap the harvest of robust job creation. In fact, it is the relatively small number of fast-growing firms of all sizes that accounted for the lion's share of new jobs created in the 1990s. Between 1993 and 1999, the number of gazelles grew almost 40 percent, to more than 350,000. One study estimates that such gazelles (termed "high-expectations entrepreneurs") are responsible for 80 percent of the jobs created by entrepreneurs.[50]

The Rankings: The high-ranking states in the *2002 Index* tended to be high-tech centers of entrepreneurial activity (Massachusetts, Washington, and California). However, after the dot-com bust in 2000, these states began to fall behind in new, fast-growing firms. Yet, since the *2007 Index*, all three of these states have seen a rebound; most significant is Washington, which has moved up five spots into fourth place. A number of other states continue to experience high levels of gazelle employment growth. Especially in smaller states, a relatively small number of extremely fast-growing gazelles can account for a large percentage of state gazelle employment. This phenomenon may be at work in Nebraska, ranked first, and Delaware, which ranks sixth. More remote agricultural, natural-resource, and tourism-dependent states (e.g., West Virginia, Hawaii, and Wyoming) tend to produce fewer gazelles.

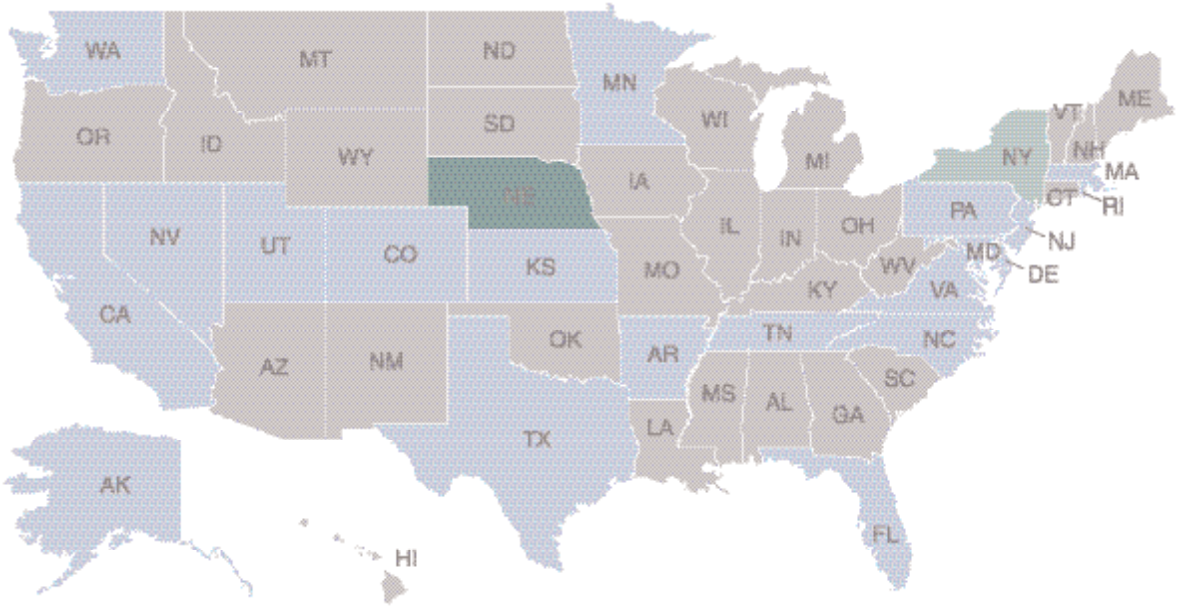
"Gazelles are responsible for as much as 80 percent of the jobs created by entrepreneurs."

The Top Five		Jobs in fast-growing companies as a percentage of total employment
1	Nebraska	20.8%
2	New York	12.3%
3	New Jersey	11.0%
4	Washington	10.2%
5	Minnesota	9.9%
	U.S. Average	**8.0%**

Source: National Policy Research Council, 2007 data.

The Top Five Movers		2002 Rank*	2008 Rank	Change '02-'08
1	Nebraska	36	1	↑35
3	Alaska	46	20	↑26
2	Arkansas	41	18	↑23
4	Nevada	33	13	↑20
5	Delaware	25	6	↑19

* 2002 state ranks have been revised for data comparability.



JOB CHURNING

The number of new startups and business failures, combined, as a share of the total firms in each state.[51]

Why Is This Important? Steady growth in employment masks the constant churning of job creation and destruction, as less-innovative and -efficient companies downsize or go out of business, and more-innovative and -efficient companies grow or take their places. Almost 1 million jobs were added to the economy between 2002 and 2003, but that was after startup firms had created 6.4 million jobs and failing firms had eliminated 6.1 million others.[52] The service sector is particularly volatile, representing more than 75 percent of total job creations and losses. This process of dynamic equilibrium is a result of the highly competitive reality of the New Economy. Indeed there is a reasonably strong correlation between job growth and firm closures (.39).

Rankings: Churning is, in part, related to fast employment growth.[53] As a result, some fast-growing states (like Colorado, Florida, Idaho, Nevada, and Utah) experience a great deal of churning. In part, this is because fast-growing economies produce more startups, especially in local-serving industries (such as restaurants, dry cleaners, or accountants). At the other end, states with significant levels of economic distress also score high, as exemplified by Michigan, since there are higher rates of job loss.

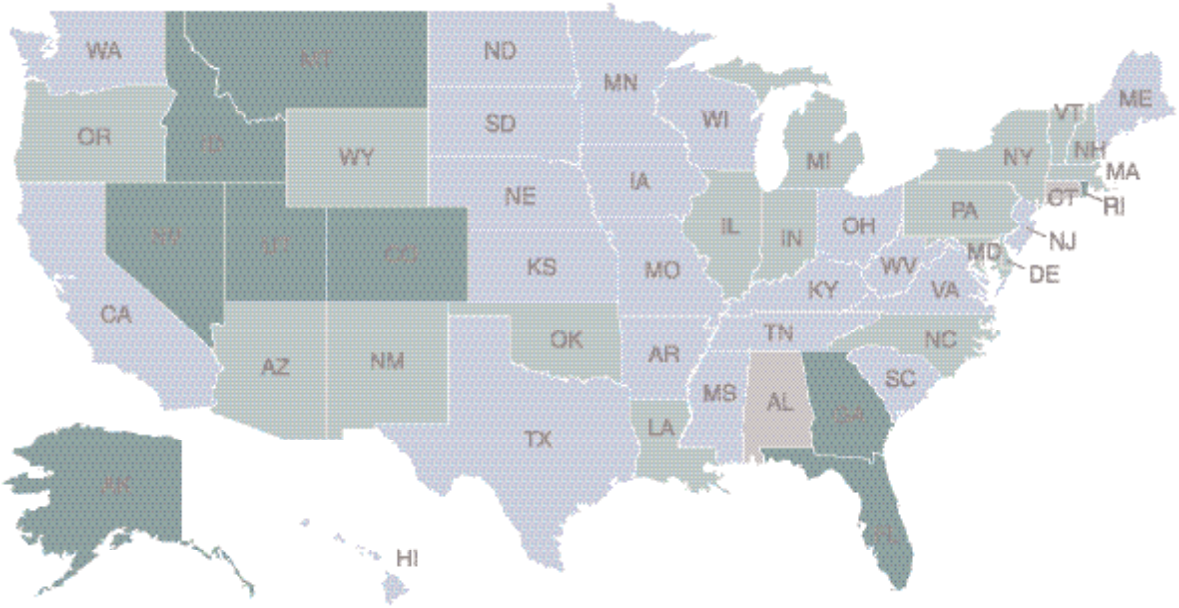
"In 2007, service-providing establishments represented more than 75 percent of total job creations and losses."

The Top Five		Business startups and failures as a percentage of total firms
1	Alaska	45.6%
2	Georgia	44.2%
3	Utah	42.6%
4	Idaho	42.5%
5	Colorado	42.5%
	U.S. Average	**33.4%**

Source: U.S. Department of Labor, 2006 and 2007 data.[54]

The Top Movers		2007 Rank*	2008 Rank	Change '07-'08
1	Delaware	41	23	↑18
2	Minnesota	46	34	↑12
3	Louisiana	29	22	↑7
3	Pennsylvania	28	21	↑7
5	Arizona	15	11	↑4
5	North Carolina	20	16	↑4

* 2007 state ranks have been revised for data comparability.



100th-76th percentile | 75th-51st percentile | 50th-26th percentile | 25th-1st percentile

FASTEST-GROWING FIRMS

The number of Deloitte Technology Fast 500 and Inc. 500 firms as a share of total firms.[55]

Why Is This Important? The Fast 500 and Inc. 500 lists are composed of the fastest-growing firms. Every firm that made the 2007 Fast 500 list had experienced revenue growth of at least 200 percent over a four-year span. Those on the 2007 Inc. 500 list had achieved 300 percent revenue growth in three years. While firms attaining such growth rates are generally quite small, with fewer than 100 employees, they represent a state's most successful entrepreneurial efforts and hold the most promise for continued growth. In fact, a number of well-known companies (including Microsoft and Paul Mitchell) were listed on the Inc. 500 before they became household names. A state's performance in this measure is one indication of the vitality of its entrepreneurial network.

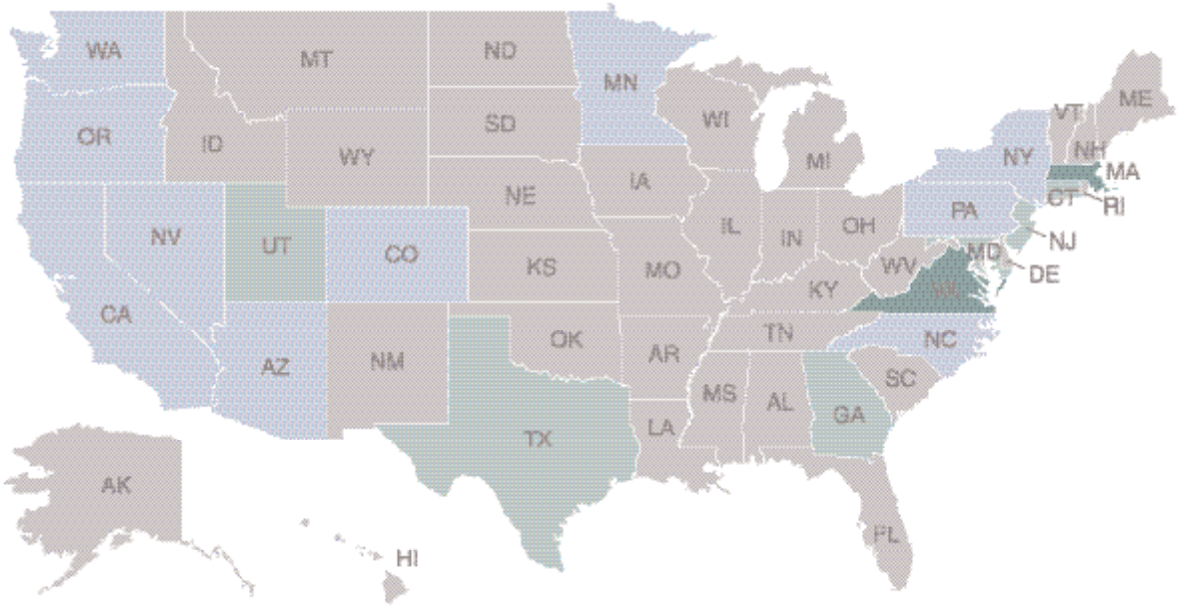
Rankings: Not surprisingly, states that perform well generally are known for their entrepreneurial technology sectors. Indeed, the majority of Inc. 500 firms in the top states, especially Virginia and Maryland, are IT, telecommunications, or medical technology firms. Many states that perform well have developed clusters of well-organized, fast-growing firms and support systems to help firms grow. For example, local university partnerships have helped Provo, Utah, become the highest Inc. 500 per-capita metro area in the country.[56] However, fast-growing firms are not isolated to specific geographic areas; between 2006 and 2007, the median number of Inc. 500 companies in the states increased by 25 percent.

The Top Five		Percentage of firms that are fast growing
1	Massachusetts	0.037 %
2	Virginia	0.035 %
3	Utah	0.027 %
4	Maryland	0.023 %
5	New Jersey	0.021 %
	U.S. Average	**0.013%**

Source: Deloitte Fast 500, 2006 and 2007 data and Inc. 500, 2007 and 2008 data.

The Top Five Movers		2007 Rank	2008 Rank	Change '07-'08
1	West Virginia	49	29	↑20
2	North Dakota	47	33	↑14
3	Wisconsin	38	27	↑11
4	Kansas	36	26	↑10
4	Rhode Island	42	32	↑10

"Between 2006 and 2007, the median number of Inc. 500 companies in the states increased by 25 percent, reflecting the fact top growing firms have found homes in a larger range of states.."



INITIAL PUBLIC OFFERINGS

A weighted measure of the number and value of initial public stock offerings of companies as a share of total worker earnings.[57]

Why Is This Important? In the last two decades, financial markets have embraced entrepreneurial dynamism. One measure of this is the number of initial public offerings (first rounds of companies' stock sold when they make their debut in public markets). After growing by 50 percent since the 1960s, IPOs peaked in the 1990s. The Internet slump and economic recession reduced the number of offerings in 2001-2003 to just 20 percent of 2000 numbers. However, 2004-2007 have seen a strong rebound, with the number of IPOs more than doubling those of the previous three years. In fact, the number of IPOs in 2007 was at its highest level since 2000.[58] However, some evidence suggests a slowdown of IPOs in the next several years.

The Ranking: Despite predictions to the contrary, the weak equity market did not affect U.S.-based IPOs. In fact, the number of IPOs increased in 2007 from 2006. States such as California, Massachusetts, and Texas perform well on the strength of their high-tech sectors. But the generation of companies with high-growth potential is not limited to what generally are viewed as the high-tech leaders: States like Nevada, Oklahoma, and South Dakota also ranked high. Colorado's strong performance comes from a variety of sectors, including technology, health care, and natural-resource extraction.

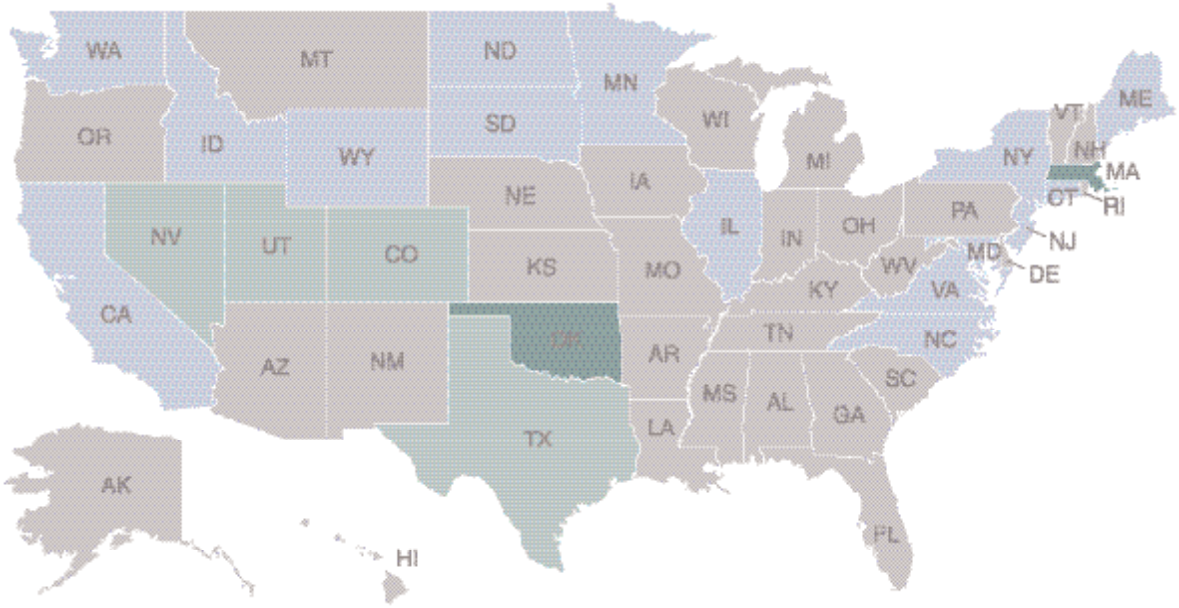
"The number of IPOs in 2007 was at its highest level since 2000."[59]

The Top Five		IPOs score
1	Oklahoma	7.9
2	Massachusetts	6.9
3	Nevada	6.3
4	Colorado	6.1
5	Texas	5.9
	U.S. Average	**5.0**

Source: Renaissance Capital's IPOHome.com, 2005-2007 data.

The Top Five Movers		2002 Rank*	2008 Rank	Change '02-'08
1	Nevada	30	3	↑27
2	South Dakota	34	9	↑25
3	Idaho	34	12	↑22
4	Wyoming	34	14	↑20
5	North Dakota	34	17	↑17

* 2002 state ranks have been revised for data comparability.[60]



100th-76th percentile | 75th-51st percentile | 50th-26th percentile | 25th-1st percentile

ENTREPRENEURIAL ACTIVITY

The adjusted number of entrepreneurs starting new businesses.[61]

Why Is This Important? In the New Economy, competitive advantage increasingly is based on innovation and the generation of new business models. Moreover, in a global economy, with low-wage developing nations an increasingly attractive option for U.S. multinationals, fewer U.S. companies are establishing greenfield plants domestically. For both reasons, entrepreneurial activity is more important to state economic wellbeing than it was even a decade ago. Although only one in twenty entrepreneurial firms are high growth in terms of adding jobs, firms that survive the first few years create jobs and also often create innovative goods, services, and processes.[62]

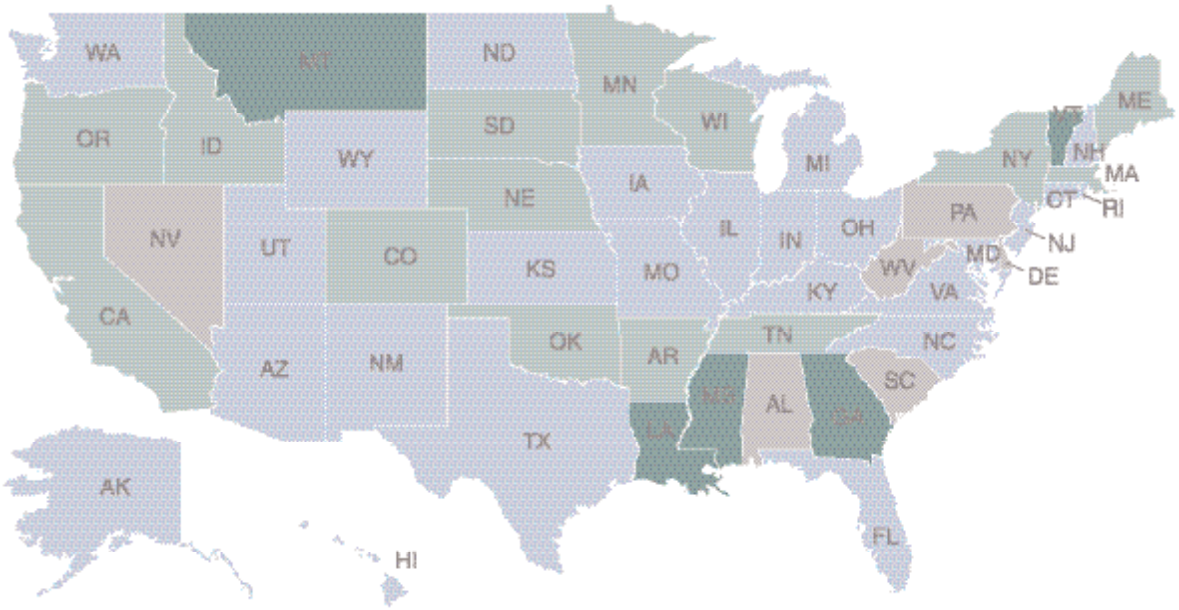
Rankings: Western states generally rank higher than Midwest or Northeast states. Even after adjusting for different state growth rates, because fast-growing states provide a disproportionate number of entrepreneurial opportunities, the rankings may reflect some residual growth effects that have not been accounted for. There is a modest negative correlation between state per-capita income and entrepreneurial activity (-.18), indicating that entrepreneurialism is not a direct function of wealth. Instead, there appear to be many factors affecting levels of entrepreneurial activity, making it difficult to predict which states will fare better than others. For example, a state that ranks second-to-last in job growth from 2002 to 2006, Louisiana, ranks fifth in entrepreneurial activity.

The Top Five		Adjusted number of entrepreneurs as a percentage of population
1	Montana	0.47%
2	Georgia	0.43%
3	Vermont	0.42%
4	Mississippi	0.42%
5	Louisiana	0.42%
	U.S. Average	**0.30%**

Source: Robert Fairlie, 2007 data.

The Top Five Movers		2007 Rank	2008 Rank	Change '07-'08
1	Tennessee	41	12	↑29
2	Massachusetts	43	16	↑27
3	Louisiana	30	5	↑25
4	Kentucky	42	25	↑17
4	South Dakota	27	10	↑17

"Firms that survive the first few years create jobs and also often create innovative goods, services, and processes."



INVENTOR PATENTS

The number of independent inventor patents per 1,000 people.[63]

Why Is This Important? From Benjamin Franklin to Bill Gates, the independent inventor is an established American icon. Today, many owners of individual patents—those patents not assigned to any organization—are not mere tinkerers. More often, they are trained scientists, engineers, or students, pursuing independent research. Because the New Economy places a premium on innovation, this wellspring of innovative activity has become an important foundation for many entrepreneurial ventures. Indeed, in 2006, more than 14,000 inventor patents were issued. States with more inventor patents are better positioned to succeed in today's dynamic and innovative economy.

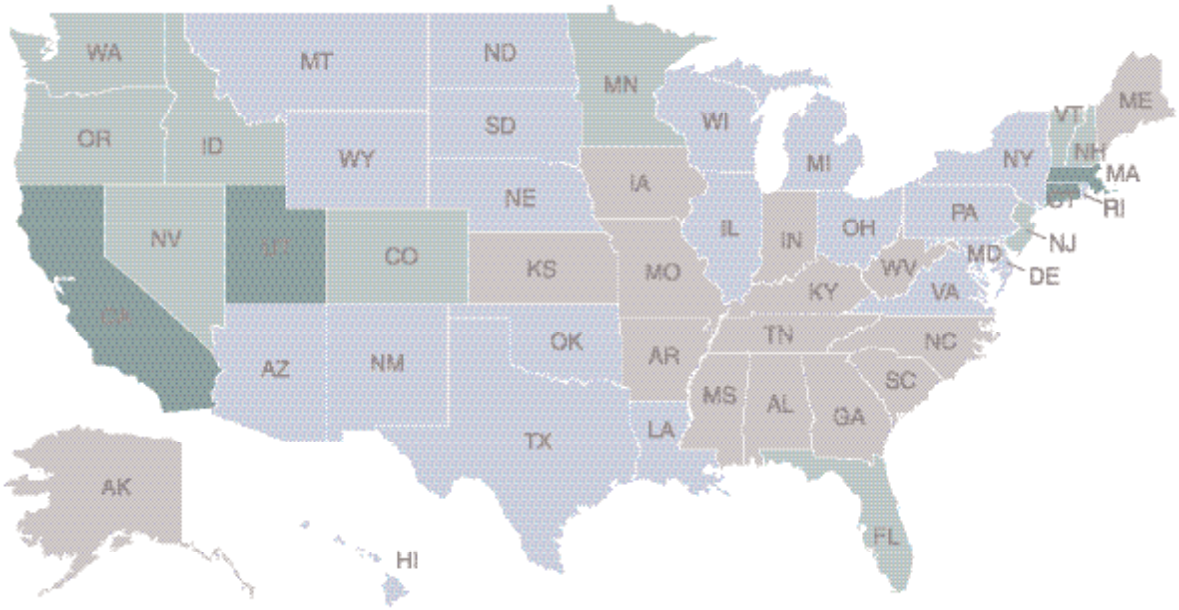
Rankings: Not surprisingly, states with a large number of inventor patents also are likely to have a large number of scientists and engineers.[64] Many of these states, such as Connecticut, also have strong higher-education science and engineering programs. Accordingly, Washington's high-tech industry has helped it move up in both indicators. States that typically are strong in tech-based entrepreneurial activity, including California, Utah, and Massachusetts, also perform well. The states generating the fewest inventor patents per capita tend to be Southeastern states, with workforces rooted in agriculture and more traditional industries, and long-standing lower levels of entrepreneurial activity.

The Top Five		Patents per 1,000 people of workforce age
1	Utah	0.147
2	Connecticut	0.141
3	California	0.140
4	Massachusetts	0.118
5	Idaho	0.116
	U.S. Average	**0.080**

Source: U.S. Patent and Trademark Office, 2006 and 2007 data.

The Top Movers		2007 Rank	2008 Rank	Change '07-'08
1	Rhode Island	31	21	↑10
2	Hawaii	43	34	↑9
3	Washington	18	11	↑7
4	Idaho	11	5	↑6
4	Montana	24	18	↑6
4	Illinois	26	20	↑6
4	Oklahoma	39	33	↑6
5	Georgia	44	38	↑6

"In 2006, more than 14,000 inventor patents were issued."



2008 Rank	State	2008 Score	2007 Rank*
1	Massachusetts	16.97	2
2	Nevada	15.32	10
3	New Jersey	15.16	4
4	Rhode Island	15.1	24
5	Virginia	14.88	6
6	Delaware	14.63	41
7	Washington	14	3
8	Maryland	13.58	11
9	Connecticut	12.73	7
10	Florida	12.41	5
11	New Hampshire	12.02	12
12	Utah	11.95	18
13	California	11.76	8
14	New York	11.7	14
15	Maine	11.35	19
16	Arizona	11.34	9
17	Oregon	11.18	20
18	Colorado	10.95	22
19	Michigan	10.89	26
20	Texas	10.83	23
21	Kansas	10.53	21
22	Hawaii	10.51	39
23	Illinois	10.39	15
24	Vermont	9.96	27
25	Georgia	9.85	13
26	Wisconsin	9.62	32
27	North Carolina	9.61	36
28	Ohio	9.6	31
29	Minnesota	9.58	17
30	Nebraska	9.49	16
31	Alaska	9.45	1
32	South Dakota	9.18	25
33	Pennsylvania	9.11	29
34	Wyoming	8.67	33
35	Idaho	8.64	34
36	Indiana	8.54	30
37	Tennessee	8.41	38
38	Montana	7.96	37
39	North Dakota	7.94	28
40	South Carolina	7.82	43
41	Missouri	7.75	40
42	Louisiana	7.45	44
43	Iowa	7.12	35
44	Oklahoma	6.99	42
45	Kentucky	6.65	45
46	New Mexico	6.42	46
47	Arkansas	5.51	48
48	West Virginia	5	47
49	Alabama	4.61	49
50	Mississippi	2.5	50
	U.S. Average	**10**	

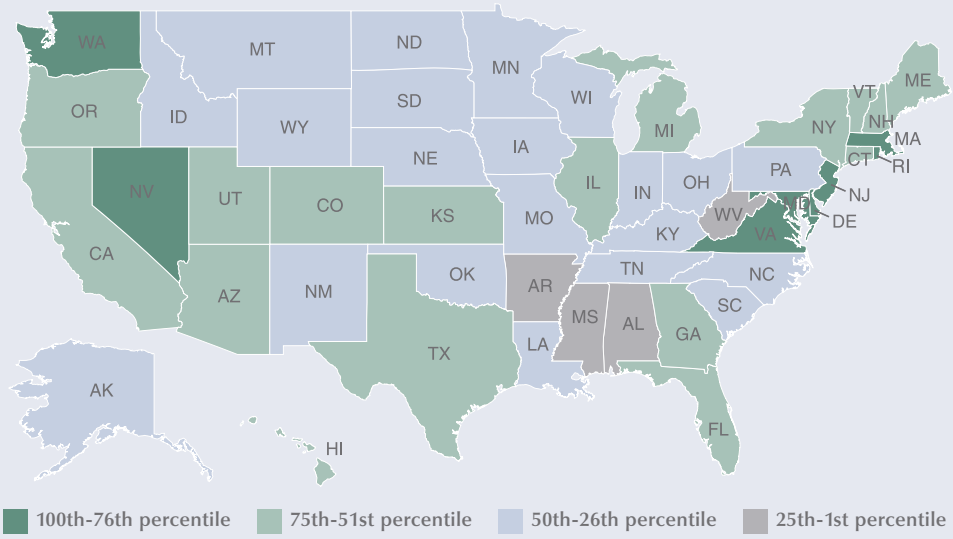
THE DIGITAL ECONOMY

In the old economy, virtually all economic transactions involved transferring physical goods and paper records, or the interaction of people in person or by phone. In the digital economy, a significant share of both business and government transactions are being conducted through digital electronic means. Indeed, e-commerce retail sales are growing six times faster than total retail sales.[65] By 2007, almost three-quarters of adults were online, and more than half of American households had broadband access.[66]

As the use of IT has transformed virtually all sectors of the economy, the result has been a significant boost in productivity.[67] For example, the $500 billion trucking industry has saved $16 billion annually through the use of on-board computers that allow companies to better track and more efficiently dispatch trucks.[68] Farmers use the Internet to buy seed and fertilizer, track market prices, and sell crops. Governments issue EZ passes to automate toll collection. Whether it is to pay bills or locate a package, consumers increasingly forgo a phone call to corporate customer service centers in favor of more efficient self-service over the Internet. Moreover, with the advent of health IT, patients and medical staff can exchange real-time information, making health care decisions faster and more reliable. All of this translates into productivity gains and increased standards of living. In this way, digital technology is doing as much to foster state economic growth in the early 21st century as mechanical and electrical technologies did in the early and mid-20th century.

The digital economy indicators measure seven aspects of the digital economy: 1) the percentage of the population online; 2) Internet domain names; 3) deployment of IT in public schools; 4) the use of IT to deliver state government services; 5) the percentage of farmers online and using computers; 6) the deployment of broadband telecommunications; and 7) health IT.

Aggregated Digital Economy Scores



Source: Authors' calculations based on the states' scores in six indicators—online population, domain name registrations, technology in schools, e-government, online agriculture, and broadband telecommunications.

* Due to methodological improvements and/or data discrepancies between the 2007 and 2008 *Index*, ranking comparisons are not exact.

ONLINE POPULATION

Internet users as a share of the population.

Why Is This Important? The number of people online is probably the most basic indicator of a state's progress toward a digital economy. In 2000, 46 percent of adults were online; by 2007, this number had grown to 72 percent, and the number of rural Americans with Internet in their homes has increased by 50 percent since 2000.[69] The average income and education levels of Internet users continue to drop so that the online population is looking more and more like the American population in general, with the exception of seniors, who are lagging significantly behind in Internet use.[70]

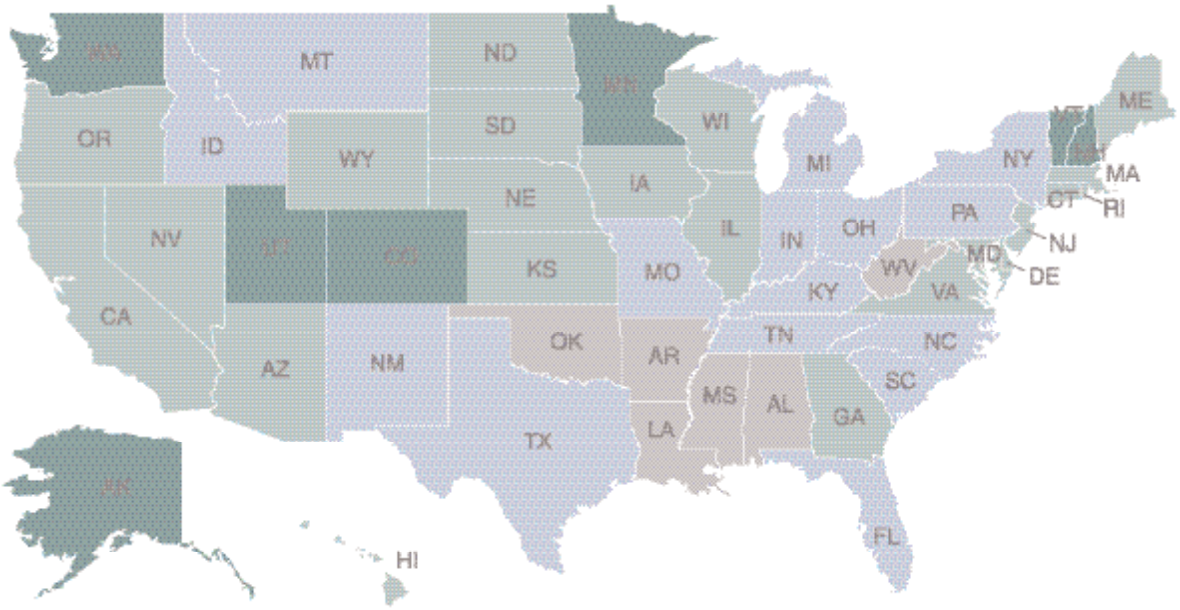
The Rankings: While Internet use by states differs, all states are moving ahead. Despite top-ranked Alaska having 26 percent more of its citizens online than bottom-ranked West Virginia, the national average is up 13 percent from 2003. States with more highly educated workforces tend to score well (including Maryland, Colorado, and Washington), as do states with higher per-capita incomes.[71] To some extent, state policies affect the level of Internet access, and these range from the taxes that some states impose on Internet access to policies that other states have implemented to promote rural Internet penetration. States that rank lower are those that generally have lower incomes and less-educated residents, as both of these factors drive Internet use nationally.

	The Top Five	Percentage of population online
1	Alaska	84%
2	Utah	82%
3	Washington	81%
4	New Hampshire	80%
5	Vermont	79%
	U.S. Average	**72%**

Source: National Telecommunications and Information Administration, 2007 data.

	The Top Five Movers	2002 Rank	2008 Rank	Change '02-'08
1	California	35	17	↑18
2	Nevada	36	20	↑16
2	Illinois	38	22	↑16
4	Hawaii	40	26	↑14
5	Georgia	41	28	↑13

"The number of rural Americans with Internet in their homes has increased by 50 percent since 2000."



100th-76th percentile | 75th-51st percentile | 50th-26th percentile | 25th-1st percentile

INTERNET DOMAIN NAMES

The number of Internet domain names (.com, .net, and .org) per firm.[72]

Why Is This Important? Use of the Internet by organizations continues to grow at a rapid pace. The number of ".com" domain names registered in the United States grew by more than 75 percent between 2004 and 2007.[73] For even small local businesses, a Web site has become the storefront of the 21st century. More importantly, an increasing number of firms, regardless of industry, have made a highly functional Web site integral to their business models, as doing so has become a competitive necessity.

The Rankings: It is not entirely clear what drives the number of domain name registrations in a state. The number of domain names per firm varies significantly across states. The highest-ranking state, Nevada, has almost 6.5 times more domains per firm than the lowest-ranking state, South Dakota. Yet, between 2004 and 2007, the median number of domain names throughout the states nearly doubled from 242,000 to 400,334. Nevada's particularly high score likely is attributable to the large number of gambling and adult industry sites located there, as firms in these industries may register a disproportionate number of domain names. A similar phenomenon may be at work in other online industries and states. However, as one would expect, states with a strong presence of high-tech companies tend to rank near the top, such as California, Utah, Virginia, and Washington, which take four of the top six spots. Also, as expected, there is a strong correlation between states with a high number of domain names per firm and states with more extensive broadband deployment.

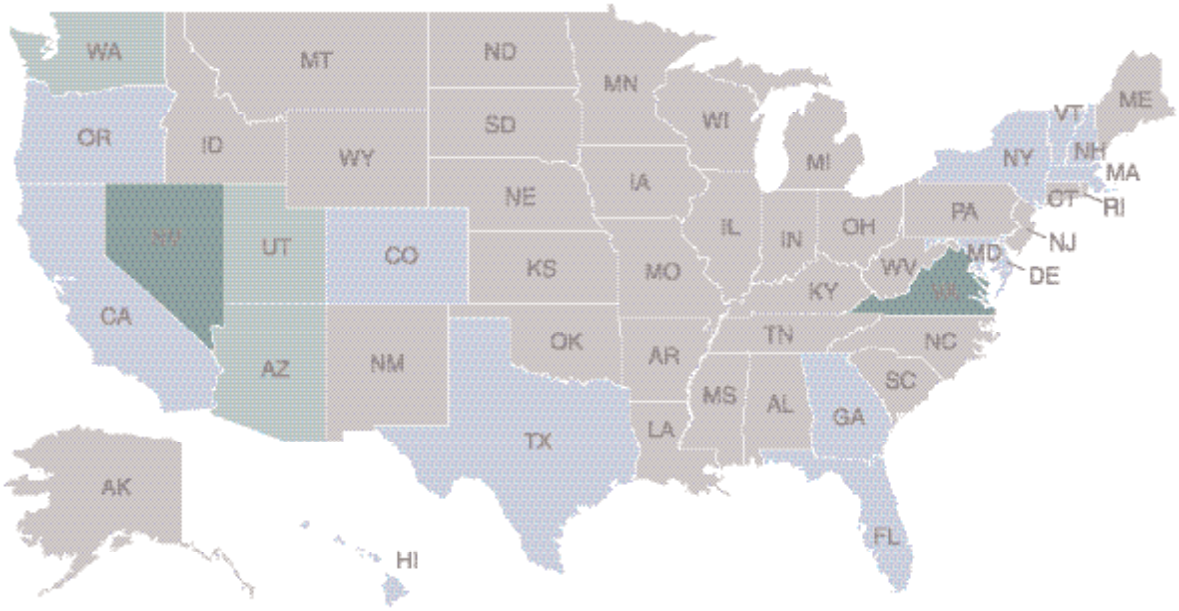
The Top Five		Domain names per firm
1	Nevada	12.3
2	Virginia	11.1
3	Arizona	8.8
4	Utah	8.5
5	Washington	7.4
	U.S. Average	**5.1**

Source: Matthew Zook, University of Kentucky, July 2007 data.

The Top Movers		2002 Rank*	2008 Rank	Change '02-'08
1	Tennessee	30	19	↑11
2	Texas	20	10	↑10
2	Washington	15	5	↑10
4	Vermont	25	16	↑9
5	South Carolina	39	32	↑7
5	Utah	11	4	↑7
5	Oregon	19	12	↑7

* 2002 scores measure ".com" domains only.

"The number of '.com' domain names registered in the United States grew by more than 75 percent between 2004 and 2007."



TECHNOLOGY IN SCHOOLS

A weighted measure of three factors measuring computer and Internet use in schools.[74]

Why Is This Important? There is increasing evidence that, when employed correctly, computers and the Internet boost educational outcomes.[75] Not surprisingly, the use of information technology in America's schools is growing. Virtually every public school now has access to the Internet. In 2000, there were 7.9 students per Internet-connected computer, but, by 2005, the number of students per *high speed* Internet-connected computer had dropped to 3.9. And, in 2007, there were 180,000 more instructional computers in the schools than in 2006. Even so, with the increase in students the levels of student computer access have shown little improvement since 2002, with the number of students per instructional computer remaining close to four.[76]

The Rankings: States that have done the most to integrate information technology into schools are the less-populated and more geographically dispersed states, suggesting that a motivating factor is the desire to establish better connections to information and resources in other parts of the nation and the world. Political leaders in these and other states may recognize that the widespread use of information technologies is an important key to their future prosperity and that it is essential to properly train the next generation of workers. Surprisingly, a number of states with strong technology economies have generally scored near the bottom on this measure, including California, Maryland, and New Hampshire. One answer could be that states with weak digital infrastructures rely more heavily on public schools as children's sole access to technology. Indeed, there is a slightly negative correlation between digital government and technology in schools (-.16).

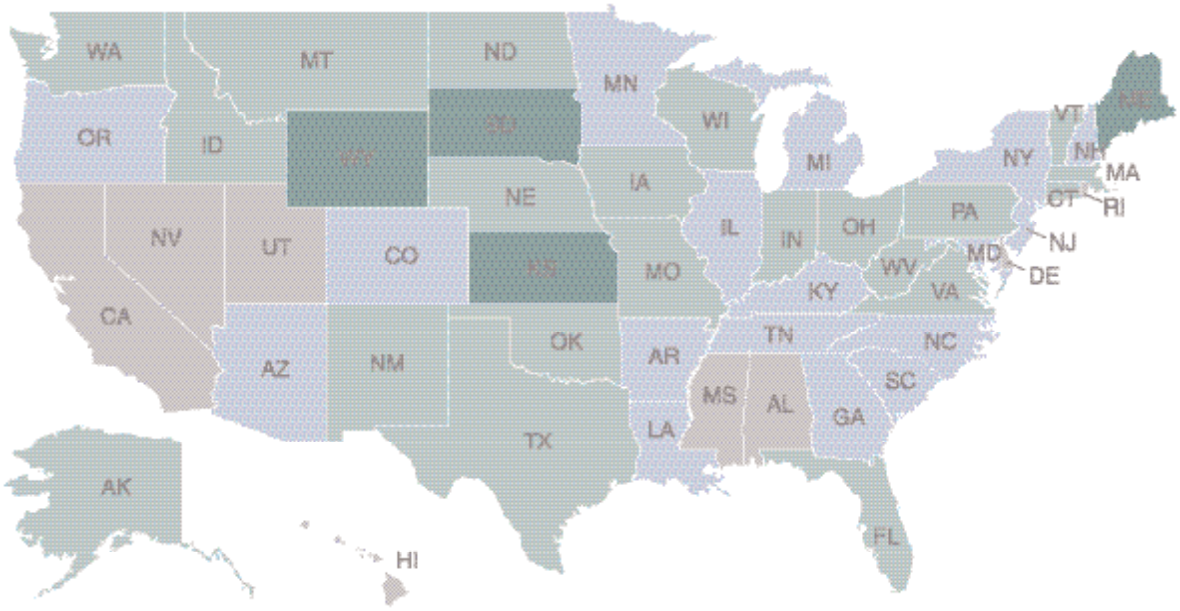
The Top Five		Composite score
1	South Dakota	7.45
2	Maine	7.41
3	Wyoming	6.59
4	Kansas	6.55
5	Nebraska	6.21
	U.S. Average	**5.00**

Source: *Education Week*, 2006 data.

The Top Five Movers		2002 Rank*	2008 Rank	Change '02-'08
1	New Mexico	38	9	↑29
2	Florida	39	13	↑26
3	Montana	31	6	↑25
4	Connecticut	47	25	↑22
5	Pennsylvania	34	14	↑20

* Different *Education Week* measures were used in different years.

"In 2007 there were 180,000 more instructional computers in the schools than just a year prior."



E-GOVERNMENT

A measure of the utilization of digital technologies in state governments.[77]

Why Is This Important? State governments that fully embrace the potential of networked information technologies will not only increase the quality and cut the costs of government services, but also help to foster broader use of information technologies among residents and businesses. State governments have made considerable progress in using the Internet to allow individuals to interact with government—from paying taxes to renewing drivers' licenses. But the next phase of e-government—breaking down bureaucratic barriers to create functionally oriented, citizen-centered government Web presences designed to give citizens a self-service government—has only just begun.[78] According to a recent report, the number of government sites offering multiple services, such as professional license renewal, trademark registration, or even campsite registration, has increased from seven in 2002 to fifty-eight in 2007, reflecting the fact numerous states have multiple government run websites.[79]

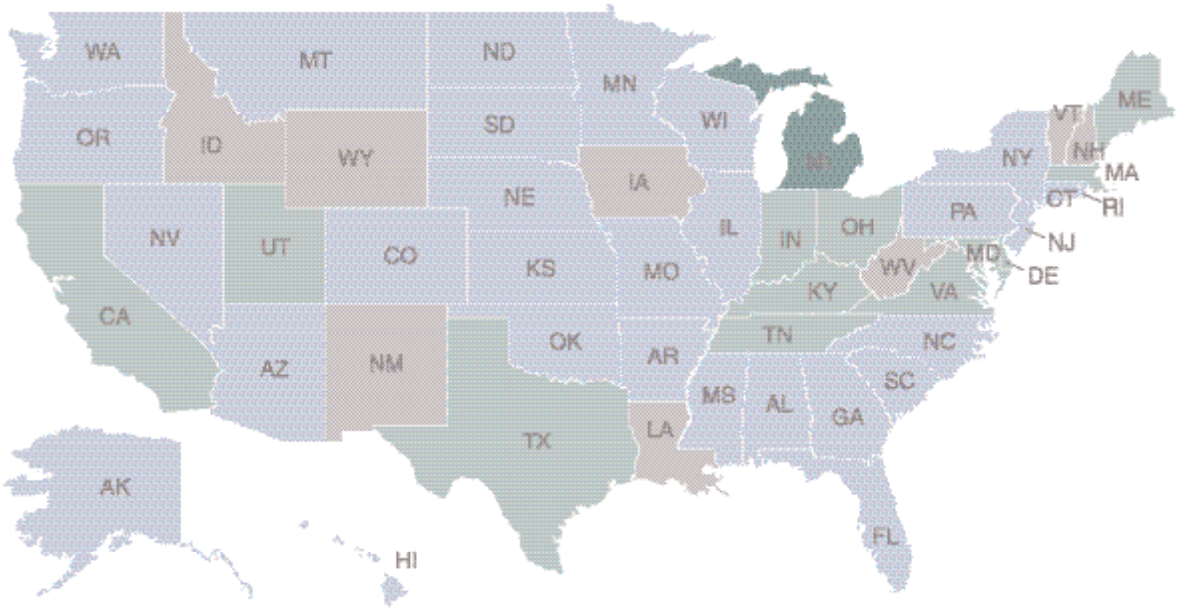
The Rankings: States with a tradition of "good government," such as Delaware, Maryland, Michigan, and Utah, appear to have gone farther along the path toward digital government than states without it. But this relationship is not completely predictive. In part, this may be because the move to digital government appears to be driven by the efforts of particular individuals, including governors, secretaries of state, and legislative committee chairmen. Strong gubernatorial leadership is surely at play in explaining some states' higher scores. In addition, because making the transformations to a digital government is expensive, more populous states with bigger budgets also tend to score higher, although the relative volatility in scores between years indicates the ability for states to rather radically improve their digital government.

The Top Five		Composite score
1	Michigan	7.48
2	Kentucky	6.33
3	Tennessee	6.08
4	Maryland	5.99
5	Massachusetts	5.98
	U.S. Average	**1.90**

Source: The Center for Digital Government, 2006 data; and Darrell West, Brown University, 2007 data.

The Top Five Movers		2002 Rank	2008 Rank	Change '02-'08
1	Tennessee	43	3	↑40
2	Delaware	36	6	↑30
2	Kentucky	32	2	↑30
4	Arizona	38	15	↑23
5	Massachusetts	27	5	↑22

"The number of government sites offering multiple services, such as professional license renewal and trademark registration, increased from seven in 2002 to fifty-eight in 2007, reflecting the fact numerous states have multiple government run websites."



ONLINE AGRICULTURE

A measure of the percentage of farmers with Internet access and using computers for business.[80]

Why Is This Important? While agriculture accounts for less than five percent of employment, in many states it remains an important component of the economy. Just as in other sectors, the New Economy is transforming agriculture. Farmers and ranchers increasingly use the Internet to buy feed and seed, check on weather conditions, obtain the latest technical information, and even to sell their livestock or crops. In 2005, 51 percent of farms had access to the Internet, compared to 29 percent in 1999, and farms with DSL as their primary method of Internet access doubled from 2005 to 2007.[81] The degree to which farmers take advantage of the New Economy will increasingly determine their competitive success. Two measures of this are the percentage of farmers with Internet access, and the percentage that use computers to run their farms.

The Rankings: Farmers in Northeastern and Western states lead the nation in use of computers and access to the Internet. States in the Northwest, particularly Washington, Oregon, and Idaho, have moved ahead. Southern states generally fall near the bottom.

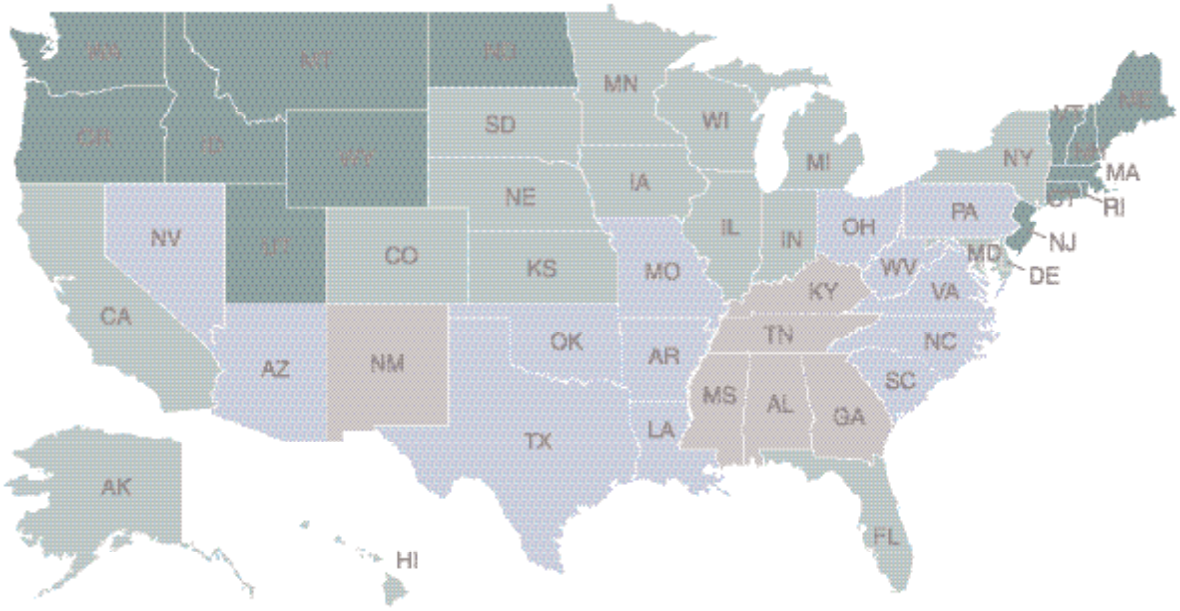
The Top Ten[82]		Composite scores
1	Washington	7.0
2	Oregon	6.9
3	Wyoming	6.8
4	Idaho	6.8
5	Connecticut	6.7
5	Maine	6.7
5	Massachusetts	6.7
5	New Hampshire	6.7
5	Rhode Island	6.7
5	Vermont	6.7
	U.S. Average	**5.0**

Source: U.S. Department of Agriculture, 2007 data.

The Top Five Movers		2002 Rank	2008 Rank	Change '03-'08
1	New Jersey	39	13	↑26
2	Indiana	38	21	↑17
3	Kansas	37	22	↑15
4	South Carolina	46	35	↑11
5	Washington	10	1	↑9

* 2002 state ranks have been revised for data comparability.

"Farms with DSL as the primary method of Internet access more than doubled from 2005 to 2007."



BROADBAND TELECOMMUNICATIONS

A weighted measure of the adoption of residential broadband services and median download speed.[83]

Why Is This Important? Over computer networks, bandwidth measures the "size of the pipes" between the sender and receiver of the data. Greater bandwidth allows faster transmission of larger amounts of data, which is critical for the increasing number of businesses that use the Internet to communicate with customers, suppliers, and other parts of the company. Broadband access for households also is important, not only allowing a state's residents to more robustly engage in e-commerce, but also enabling telecommuting, distance education, tele-medicine, and a host of other applications that can boost productivity and quality of life. It is no surprise, then, that broadband deployment is proceeding at a rapid pace. The number of high-speed lines increased by 22 percent during the first half of 2007, from 82.8 million to 100.9 million lines in service.[84] Between March 2005 and March 2006 alone, the percentage of American adults with a high-speed Internet connection at home increased from thirty to forty-two.[85]

The Rankings: Broadband deployment tends to be highest in high-tech, high-income states, including New Jersey, Massachusetts, New York, and Maryland, all of which rank in the top ten. Significantly more important to a state's score seems to be the density of its population. Because it is less costly to invest in broadband in metropolitan areas, states that are predominately urban are much more likely to have extensive broadband networks. Indeed, there is a strong correlation (.76) between the score on broadband telecommunications and state population density.[86] Therefore, it comes with little surprise that, for the most part, the lagging states (e.g., Mississippi, Montana, West Virginia, Arkansas, Iowa, and North Dakota) are those with more rural populations.

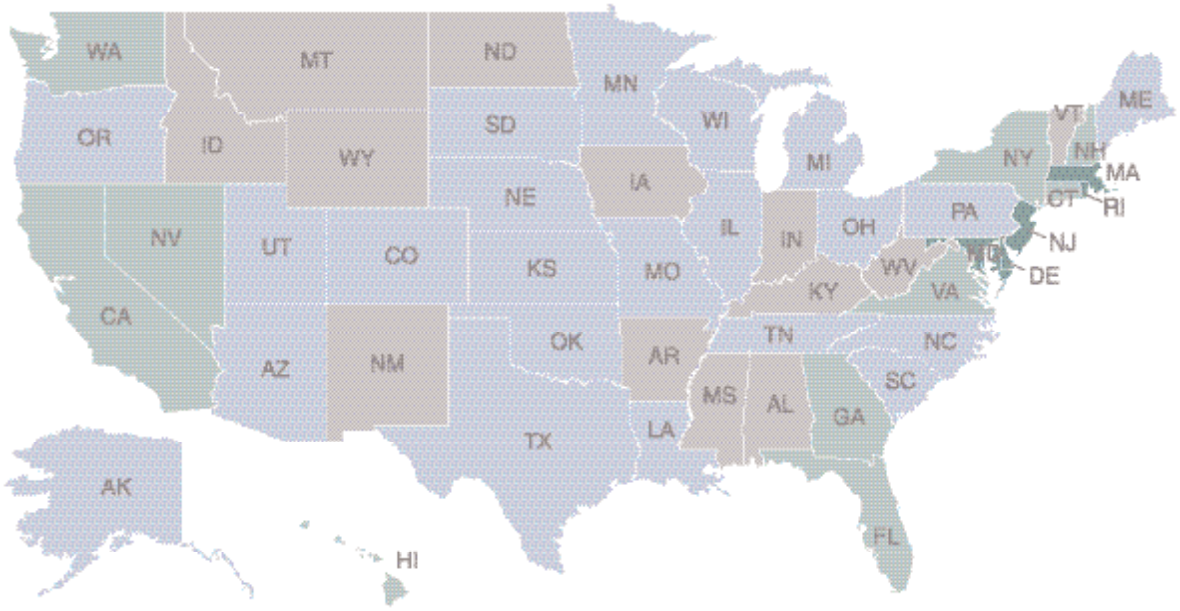
"High-speed lines increased by 22 percent during the first half of 2007, from 82.8 million to 100.9 million lines in service."

The Top Five		Composite score
1	New Jersey	9.0
2	Rhode Island	8.7
3	Delaware	8.5
4	Massachusetts	7.5
5	Maryland	7.3
	U.S. Average	**5.0**

Source: Federal Communications Commission, 2008 data. Communication Workers of America, 2008 data.

The Top Five Movers		2007 Rank*	2008 Rank	Change '07-'08
1	South Dakota	50	34	↑16
2	Utah	37	23	↑14
3	Delaware	15	3	↑12
4	Nevada	17	6	↑11
4	Ohio	35	24	↑11

* 2007 state ranks have been revised for data comparability.



HEALTH IT

Total number of prescriptions routed electronically as a percentage of total number of prescriptions eligible for electronic routing.

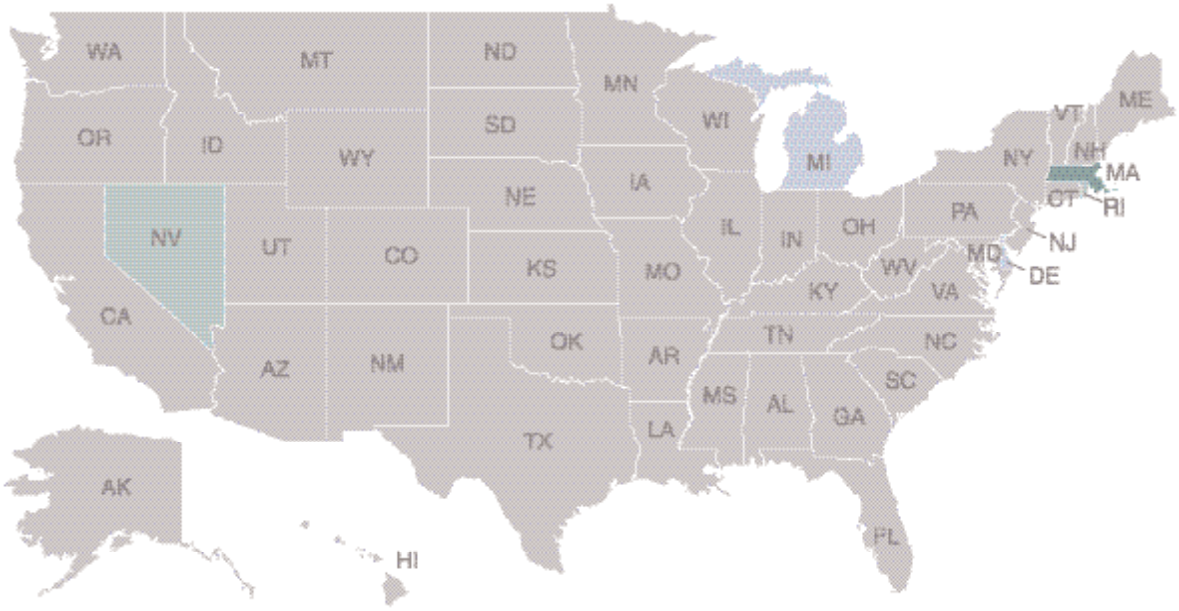
Why Is This Important? Significant improvements in health care in the future will come from increased use of IT. Robust adoption of health IT could reduce America's health bill by $80 billion annually.[87] And, with health care costs rising annually, the need for innovative, cost-saving strategies has never been more important. Since 1980, health care as a share of U.S. GDP almost doubled, from 8.8 percent to 15.3 percent in 2005.[88] To date, adoption of health IT has been relatively slow, but in one area, electronic prescribing, adoption has been faster and, as such, can serve as a proxy for overall health IT adoption. In 2007, 35 million prescriptions were routed electronically.[89] E-prescribing cuts medical transaction costs by eliminating the need for confirmation phone calls and faxes and reduces the chance of health risks due to prescription delays.

The Rankings: In 2004, more than half of states had legislation banning e-prescribing; now, all fifty states allow, and many have begun to promote, e-prescribing. State ranks appear in part to be determined by the extent of leadership in the health care industry and state government to make this a priority. Massachusetts' top position is a result of not only leadership from state government, but also the fact that the state's research hospitals are some of the most advanced in the nation.[90] Rhode Island's second-place ranking appears to stem from similar factors, including an organized effort to make the state a leader in e-prescribing.[91] Other states near the top, including Arizona, California, Florida, and New Hampshire, have used health information technology legislation to encourage electronic prescribing.

The Top Five		Percent E-prescribing
1	Massachusetts	13.4
2	Rhode Island	9.0
3	Nevada	7.0
4	Delaware	4.2
5	Michigan	4.2
	U.S. Average	**1.9**

Source: Surescribes, data 2007.

"In 2007, 35 million prescriptions were routed electronically."



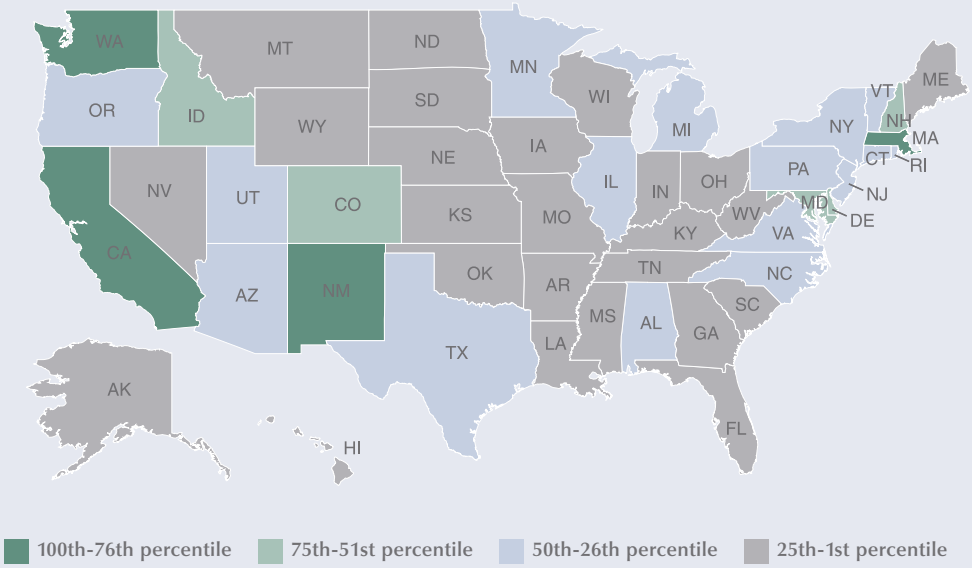
2008 Rank	State	2008 Score	2007 Rank*
1	Massachusetts	18.32	1
2	Washington	15.96	9
3	California	15.74	2
4	New Mexico	14.78	10
5	Maryland	14.40	4
6	Delaware	13.36	3
7	Colorado	11.93	7
8	Idaho	11.81	6
9	New Hampshire	11.14	15
10	Connecticut	10.90	11
11	Oregon	10.87	13
12	Rhode Island	10.86	8
13	Michigan	10.54	16
14	Vermont	10.32	17
15	New Jersey	10.27	5
16	Virginia	10.24	12
17	Minnesota	10.21	14
18	Pennsylvania	9.98	19
19	New York	9.30	20
20	Utah	8.87	18
21	Illinois	8.83	24
22	Arizona	8.74	23
23	North Carolina	8.66	21
24	Texas	8.27	22
25	Alabama	7.34	34
26	Georgia	7.19	26
27	Kansas	7.11	27
28	Ohio	7.06	25
29	South Carolina	6.94	43
30	Maine	6.79	39
31	Indiana	6.79	29
32	Wisconsin	6.74	28
33	Montana	6.58	32
34	Missouri	6.32	30
35	Florida	6.00	31
36	Nebraska	5.94	37
37	Tennessee	5.85	40
38	Iowa	5.46	35
39	North Dakota	5.33	33
40	Hawaii	4.91	42
41	Nevada	4.84	38
42	Oklahoma	4.73	41
43	Kentucky	4.62	47
44	Louisiana	4.61	50
45	Arkansas	4.59	49
46	Mississippi	4.55	36
47	West Virginia	4.39	45
48	South Dakota	4.39	48
49	Alaska	3.90	46
50	Wyoming	3.58	44
	U.S. Average	**10**	

INNOVATION CAPACITY

Most growth in the New Economy, especially growth in per-capita incomes, stems from increases in knowledge and innovation. Studies show that it is not the amount of capital, but the effectiveness with which it is used, that accounts for as much as 90 percent of the variation in growth of income per worker.[92] Technological innovation is a fundamental driver of growth because it transforms the way capital is put to use. Therefore, it is not surprising that state scores on innovation indicators are correlated with per-capita income growth between 1999 and 2006 (0.29). As a result, by embracing technological innovation, states can boost incomes.

The innovation capacity indicators in this section measure five aspects of innovation capacity: 1) share of jobs in high-tech industries; 2) scientists and engineers as a share of the workforce; 3) the number of patents relative to the size of the workforce; 4) industry R&D as a share of worker earnings; 5) non-industrial R&D as a share of GSP; 6) movement toward a green economy; and 7) venture capital invested as a share of worker earnings.

Aggregated Innovation Scores



Source: Authors' calculations based on the states' scores in seven indicators—high-tech jobs, scientists and engineers, patents, industry investment in R&D, non-industry investment in R&D, movement toward a green economy, and venture capital.

* Due to methodological improvements and/or data discrepancies between the 2007 and 2008 *Index*, ranking comparisons are not exact.

HIGH-TECH JOBS

Jobs in electronics manufacturing, software and computer-related services, telecommunications, and biomedical industries as a share of total employment.[93]

Why Is This Important? The high-tech sector remains a key engine of innovation and a source of high-paying jobs in the New Economy. The 2000 meltdown, growth of IT offshoring, and faster productivity growth in the IT sector all caused a decline in high-tech employment, which finally began to rebound in 2004 and 2005. Between 2005 and 2006, 60 percent more high-tech jobs were created than between 2004 and 2005. In the future, however, these factors may ensure that the high-tech sector does not add a disproportionate number of jobs. Undiminished is the industry's importance as a source of technological innovation that boosts productivity growth in all sectors.[94] Moreover, it remains a stronghold of high-wage, skilled jobs: Average high-tech industry wages reached $72,000 in 2005, compared to the U.S. average of $38,000.[95]

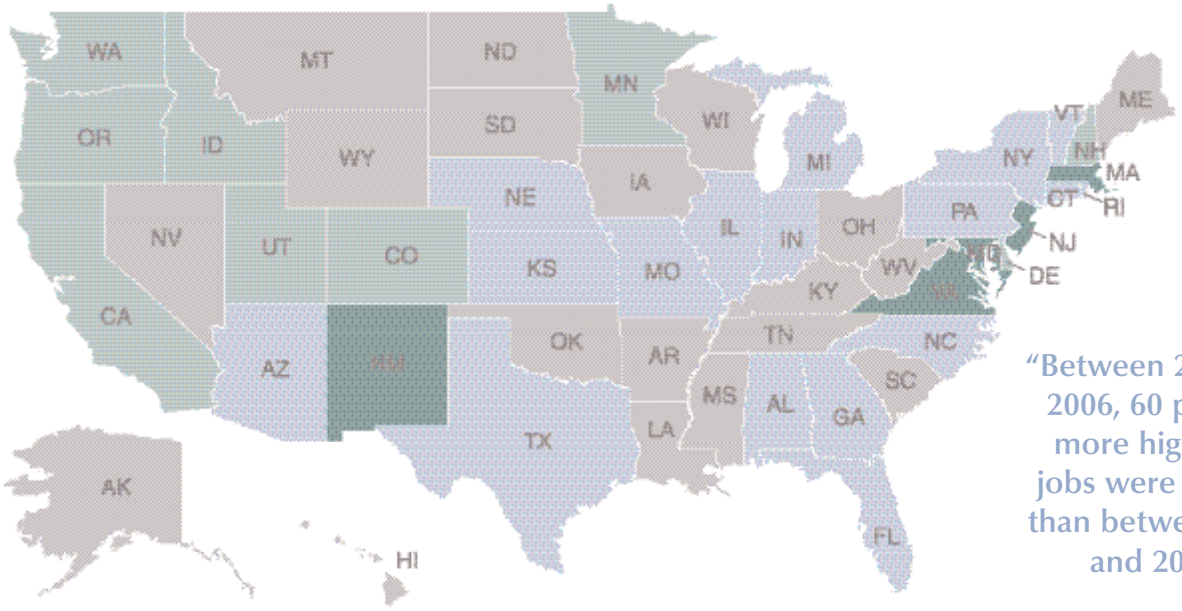
The Rankings: High-tech specialization of states varies significantly, from a high of 7.3 percent of the workforce in Massachusetts to 1.4 percent in Wyoming. While all states have high-tech jobs, the leaders tend to be in the Northeast, the Mountain states, and the Pacific region. High-tech occupations often are concentrated in particular regions of a state: information technology in southern New Hampshire, software around Provo, Utah, and Seattle; semiconductors in Boise, Idaho; Internet, telecommunications and biotechnology in the Washington, D.C., region; telecommunications in Denver; semiconductors in Albuquerque; and a broad mix of technologies in Silicon Valley and Los Angeles. States with lower rankings tend to be natural-resource-dependent states (e.g., Alaska, Montana, Wyoming,) or southern states with more branch-plant traditional industries (Mississippi, Louisiana, Kentucky).

The Top Five		High-tech jobs as a percentage of all jobs
1	Massachusetts	7.3%
2	New Mexico	6.6%
3	Virginia	6.3%
4	Maryland	6.1%
5	New Jersey	5.9%
	U.S. Average	**4.0%**

Source: AeA, 2007 data, and Bureau of Labor Statistics (for biomedical sectors), 2006 data.

The Top Five Movers		2002 Rank*	2008 Rank	Change '02-'08
1	New Mexico	26	2	↑24
2	Delaware	32	12	↑20
3	Michigan	34	17	↑17
4	Maryland	12	4	↑8
5	Alaska	45	38	↑7

* 2002 state ranks have been revised for data comparability.[96]



"Between 2005 and 2006, 60 percent more high-tech jobs were created than between 2004 and 2005."

SCIENTISTS AND ENGINEERS

Scientists and engineers as a percentage of the workforce.[97]

Why Is This Important? ? In the New Economy, the key engines of growth, technology, and research-based companies are fueled by a large and high-caliber scientific and engineering workforce. In addition, in spite of the concern about "brain drain" of newly minted scientists and engineers to other states, the correlation between the number of employed PhD scientists and engineers, and PhD degrees in science and engineering from universities in the state is remarkably high (0.97). So growing or attracting a high-quality scientific workforce is critical to continued economic growth. These workers enable more innovation in state economies (in both new products and production processes) and, in so doing, lead to higher value-added and higher-wage jobs.

The Rankings: States with the highest rankings tend to be high-tech states such as Massachusetts, Virginia, and Colorado; states with significant corporate R&D laboratory facilities (such as Delaware, Connecticut, New Jersey, New York, and Vermont); or states with significant federal laboratory facilities (like Maryland, New Mexico, and Rhode Island). In addition, many of these states have robust science and engineering higher-education programs. States that lag behind have few high-tech companies or labs, and relatively limited science and engineering higher-education programs.

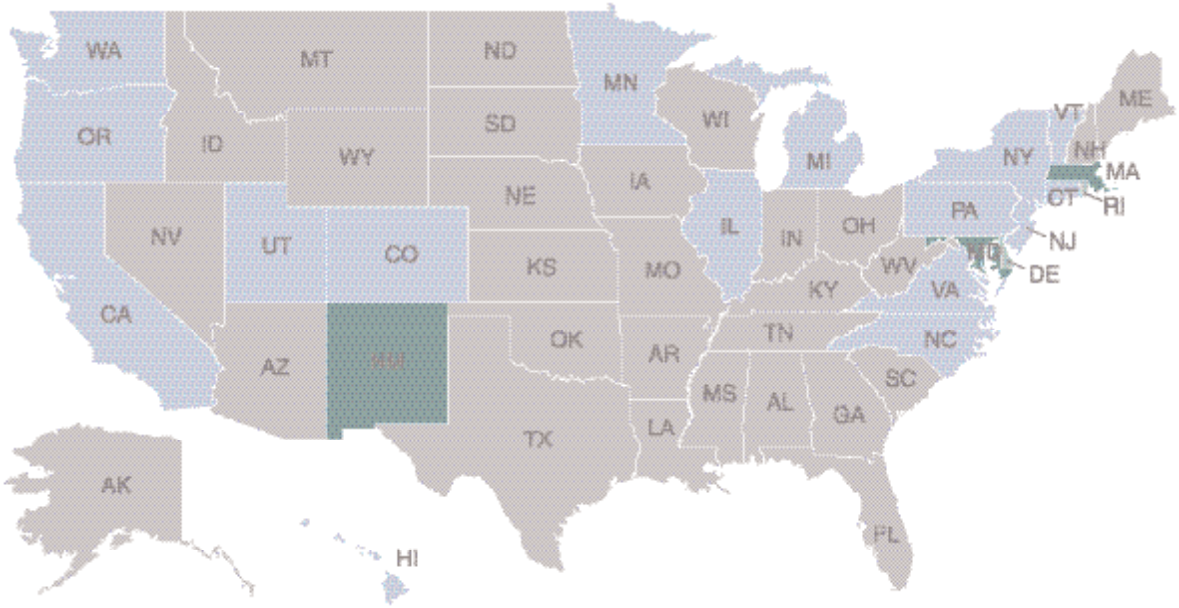
The Top Five		Scientists and engineers as a percentage of the workforce
1	Massachusetts	0.77%
2	Maryland	0.77%
3	New Mexico	0.75%
4	Delaware	0.57%
5	Rhode Island	0.49%
	U.S. Average	**0.34%**

Source: National Science Foundation, 2007 data.

The Top Five Movers		2002 Rank*	2008 Rank	Change '02-'08
1	Tennessee	37	28	↑9
1	South Carolina	44	35	↑9
3	Michigan	26	20	↑6
4	Washington	12	7	↑5
4	Idaho	28	23	↑5

* 2002 state ranks have been revised for data comparability.

"In 2006, the unemployment rate among scientists and engineers was nearly half the national average."



PATENTS

The number of patents issued to companies or individuals per 1,000 workers.[98]

Why Is This Important? The capacity of firms to develop new products will determine their competitive advantage and ability to pay higher wages. One indicator of the rate of new product innovation is the number of patents issued. As technological innovation has become more important, patents issued per year have grown from 40,000 in 1985 to 79,000 in 2007.

The Rankings: States with an above-average share of either high-tech corporate headquarters or R&D labs tend to score the highest. Idaho's extremely high patent ratio—more than 3.5 times the national average—is likely owed to the presence of Micron, a major semiconductor firm located in a relatively small state. Colorado has a strong telecommunications and technology industry base. Oregon's electronic and high-tech manufacturing sector has helped move it up the rankings. Many Northeastern states, as well as West Coast high-tech states, like California and Washington, also score high.

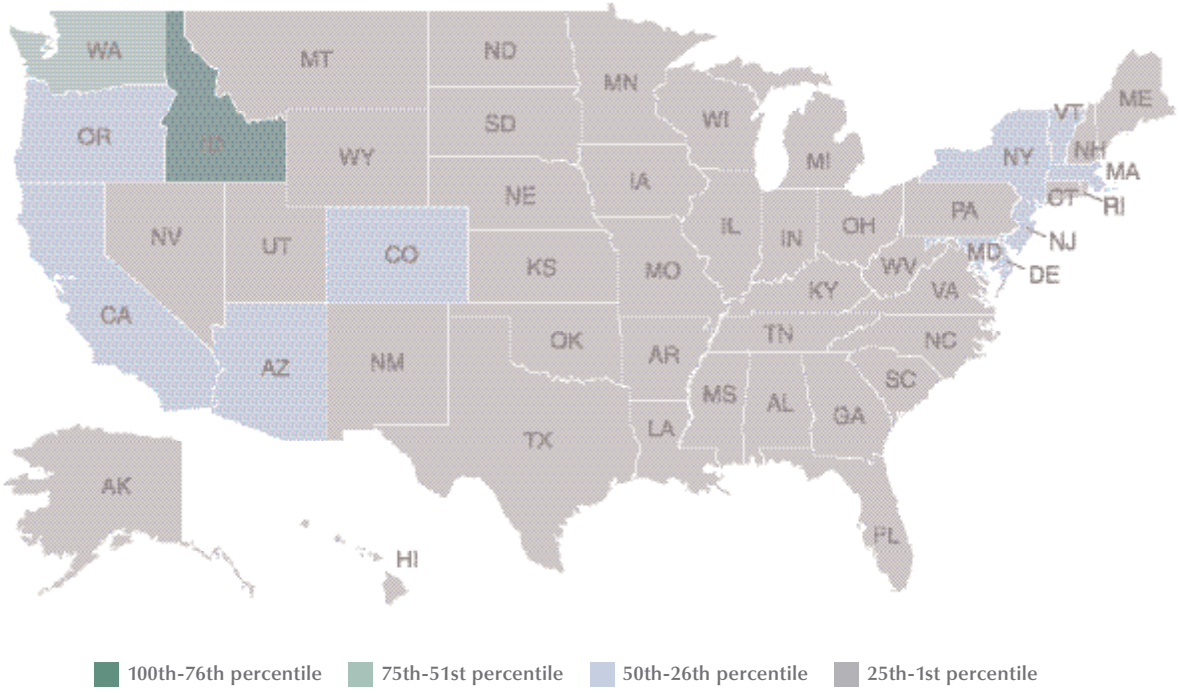
The Top Five		Adjusted patents per 1,000 workers
1	Idaho	2.66
2	Washington	1.71
3	California	1.35
4	Colorado	1.26
5	Delaware	1.22
	U.S. Average	**0.74**

Source: U.S. Patent and Trademark Office, 2005, 2006, and 2007 data.

The Top Five Movers		2002 Rank*	2008 Rank	Change '02-'08
1	Massachusetts	17	7	↑10
1	Maine	42	32	↑10
3	Washington	10	2	↑8
4	South Dakota	48	41	↑7
4	Kansas	38	29	↑7

* 2002 state ranks have been revised for data comparability.[99]

"Patents issued have increased from 40,000 in 1985 to 79,000 in 2007."



INDUSTRY INVESTMENT IN R&D

Industry-performed research and development as a percentage of total worker earnings.[100]

Why Is This Important? Research and development, which yields product innovations and adds to the knowledge base of industry, is a key driver of economic growth. Business provides just under two-thirds of all R&D funding. After steadily rising in the 1980s and falling in the early 1990s, business-funded R&D as a share of GDP climbed to its highest point ever in 2000. A slight decline followed, but it has remained at a level higher than any year before 1999, with R&D as a share of GDP growing again in 2004; and, between 2005 and 2006, industry R&D spending grew by 9 percent.[101]

The Rankings: Delaware and Michigan rank first and second, respectively, in R&D intensity. DuPont and other R&D-intensive chemical and pharmaceutical firms are responsible for Delaware's top rank, while much of Michigan's success is due to its auto industry. Rhode Island may score so well because a number of defense electronics and biotechnology firms operate there, and the fact that it instituted the nation's most generous R&D tax credit several years ago. In general, states with significant corporate R&D laboratory facilities or a large number of high-tech firms score well. Washington's significant improvement—from thirty-first in 2007 to fifth in 2008—may or may not be significant. Because a large share of Washington's industry R&D comes from Boeing, even after controlling for R&D in aerospace production, shifts one way or another in the aerospace industry's national propensity for R&D has a significant impact on Washington's relative score.

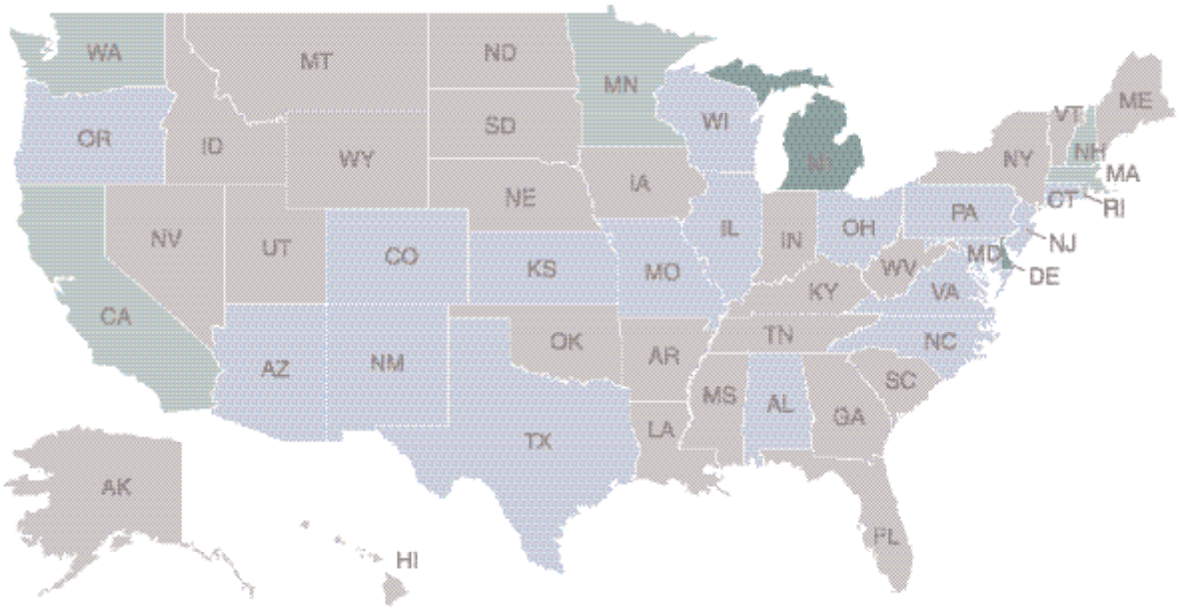
"Industry spending on R&D increased by 9 percent between 2005 and 2006."

The Top Five		Adjusted R&D as a percentage of worker earnings
1	Delaware	7.37%
2	Michigan	5.70%
3	Rhode Island	5.23%
4	Massachusetts	5.10%
5	Washington	4.61%
	U.S. Average	**3.31%**

Source: National Science Foundation, 2006 data.

The Top Movers		2002 Rank*	2008 Rank	Change '02-'08
1	Alabama	39	23	↑16
2	Oregon	23	11	↑12
3	Michigan	13	2	↑11
4	Minnesota	14	6	↑8
4	New Hampshire	16	8	↑8
4	South Carolina	36	28	↑8
4	Virginia	27	19	↑8
4	Wisconsin	25	17	↑8

*2002 state ranks have been revised for data comparability.[102]



NON-INDUSTRY INVESTMENTS INTO R&D

Non-industrial research and development as a percentage of GSP.

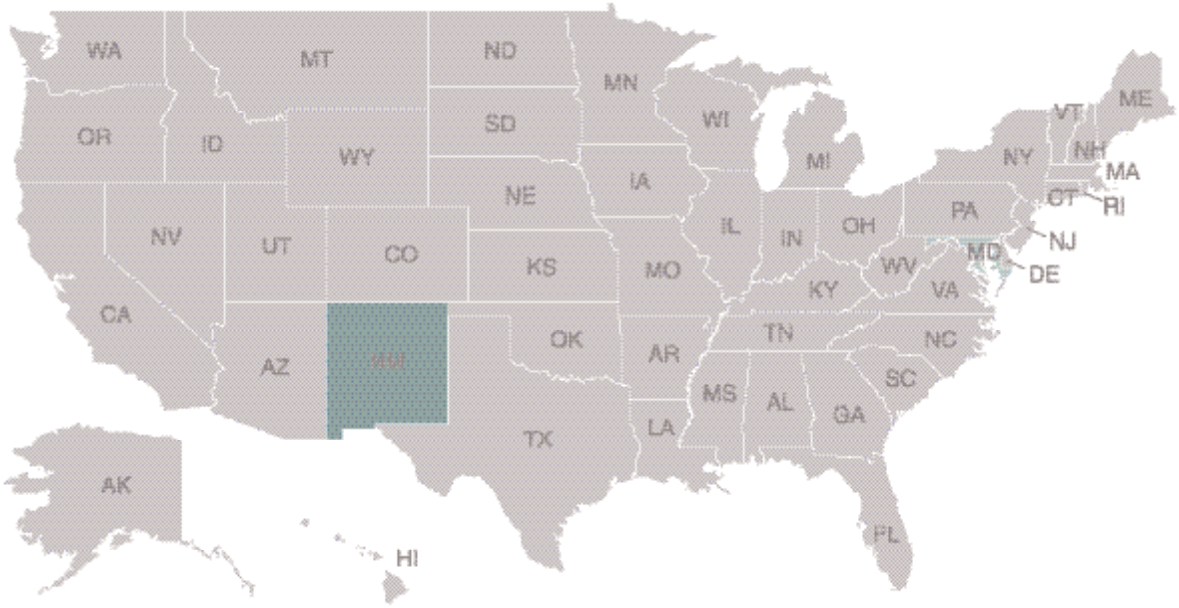
Why Is This Important? While non-industry investment in R&D is only about one-third as large as industry R&D, federal, state, university, and nonprofit investments in R&D have had a substantial impact on innovation. For example, in 2006, seventy-seven of the eighty-eight U.S. companies that produced award-winning innovations were beneficiaries of federal funding.[103] Moreover, non-industry R&D helps lay the foundation for profitable future private-sector research.

The Rankings: With Los Alamos and Sandia National Laboratory accounting for more than 80 percent of New Mexico's non-industry R&D, the state far exceeds any other state in non-industry R&D as a share of GSP, at ten times the national average. Maryland ranks second, with six times the national average, building on DOD laboratories and NASA's Goddard Space Flight Center.[104] Other states with large federal facilities, such as Alabama, Rhode Island, and Virginia, also score well. The challenge for these states is to continue to find ways to translate these inputs into commercial outputs in their states. In addition, states with strong research universities, such as Massachusetts and California, also score high.

The Top Five		R&D as a percentage of GSP
1	New Mexico	7.33%
2	Maryland	4.57%
3	Massachusetts	1.34%
4	Rhode Island	1.24%
5	Alabama	1.09%
	U.S. Average	**.70%**

Source: National Science Foundation, 2007 data.

"In 2006, seventy-seven of the eighty-eight U.S. companies that produced award-winning innovations were beneficiaries of federal funding."



MOVEMENT TOWARD A GREEN ECONOMY

The change in energy consumption per capita and the change in renewable energy consumed as a percentage of total energy.

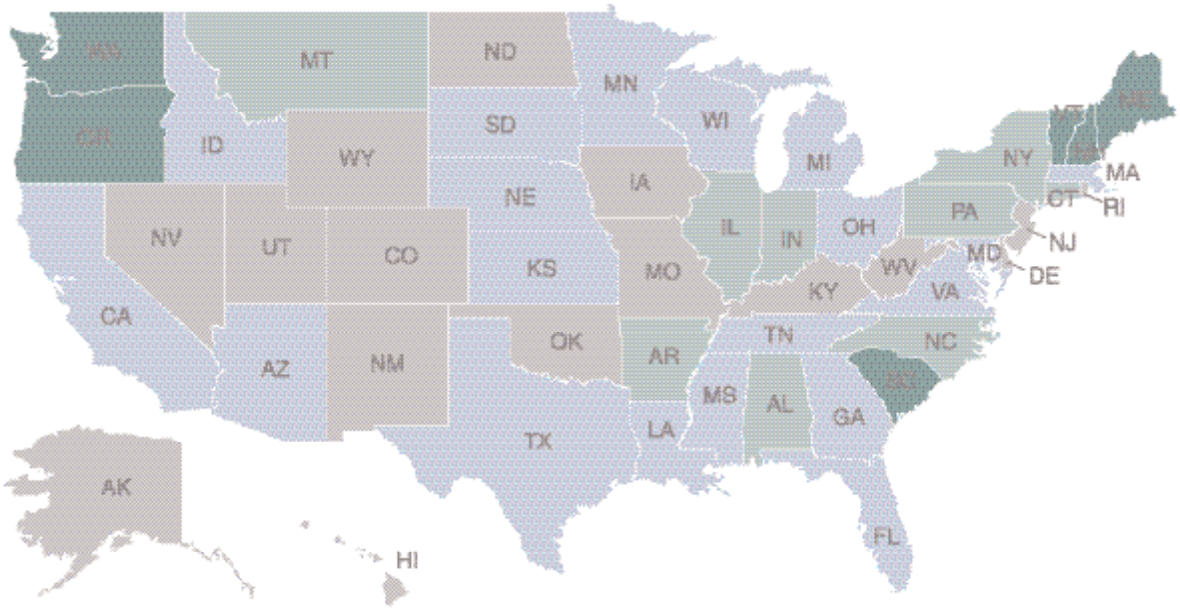
Why Is This Important? Beyond being good for the planet, reduced consumption of carbon-intensive energy sources is an important emerging component of economic vitality. With oil costs showing no signs of decreasing significantly, increasing energy efficiency can lead to lower costs for businesses, governments, and residents, making the state a more attractive place in which to live and do business. Indeed, technology is at the forefront of these savings: From 1996 through 1999, the United States experienced a 3.2 percent annual reduction in energy intensity (energy used per unit of gross domestic product)—four times the rate of the previous ten years.[105] Furthermore, since 1980, household energy consumption has declined by nearly one-third.[106] By 2010, the U.S. market for green technology is expected to grow by $82 billion. In addition, given the likelihood of some kind of CO^2 emission charges being imposed nationally, states with lower-carbon electricity-generating systems (e.g., nuclear and renewables) could be better positioned economically going forward.

The Rankings: Washington's top score is due in part to its strong reduction in energy consumption throughout its transportation, commercial, and industry sectors, as well as its reliance on hydroelectric power—which accounts for close to one-third of its energy consumption. In the top six states—Vermont, New Hampshire, Oregon, Maine, and South Carolina—renewable energy accounts for more than one-third of their total energy consumption. Like its Northwest neighbor, Oregon relies on hydroelectric power for 30 percent of its energy and, on the opposite coast, Maine is one of the largest users of biomass, accounting for one-third of its energy consumption. Vermont, New Hampshire, and South Carolina all have used nuclear power for at least one-third of their energy use in order to reduce their carbon footprint. Other states near the top of the rankings, such as New York, have decreased their energy consumption, which has reduced industry energy consumption by 25 percent. Some states rank well for energy savings but have not done as good a job relying on renewable energy. For example, Louisiana is first in the nation for reduction in energy consumption but ranked thirtieth for renewable energy use; this discrepancy mostly likely is explained by Louisiana's economic slowdown that has reduced production and, therefore, total energy use.

"The U.S. market for green technology is expected to grow to $82 billion by 2010."

The Top Five		Combined score
1	Washington	7.96
2	Vermont	7.48
3	New Hampshire	7.42
4	Oregon	7.12
5	Maine	6.93
	U.S. Average	**5.00**

Source: Energy Information Administration, data 2000, 2006.



VENTURE CAPITAL

Venture capital invested as a share of worker earnings.[107]

Why Is This Important? Venture capital is an important source of funding for new, fast-growing entrepreneurial companies. In effect, venture capitalists identify promising innovations and help bring them to the marketplace. Venture-backed firms are also an important source of job growth, adding 600,000 jobs between 2000 and 2003 (an increase of 6.5 percent), while overall employment at private firms actually decreased by 2.3 percent.[108] At $20 billion, venture capital investments in 2005 represent a slight increase over the two previous years (in constant 2000 dollars). While significantly less than at the height of the Internet bubble ($104 billion disbursed in 2000), venture capital remains large by historical standards. In fact, in 2007, venture capital was one-third larger than in 2005.

The Rankings: Venture capital is getting more diverse geographically; within the last two years, median venture capital across the states has increased by 14 percent. But still, 64 percent of the venture capital was invested in just three states. California, for example, receives four times more venture capital as a share of gross state product than the national average. The states at the top generally have strong university engineering and science programs and an existing base of high-tech companies, both of which can be the source of entrepreneurial startups or spinoffs. There is also considerable continuity over the last few years: Four of the top five states have been within the top six states in the 2002 and 2007 indexes.

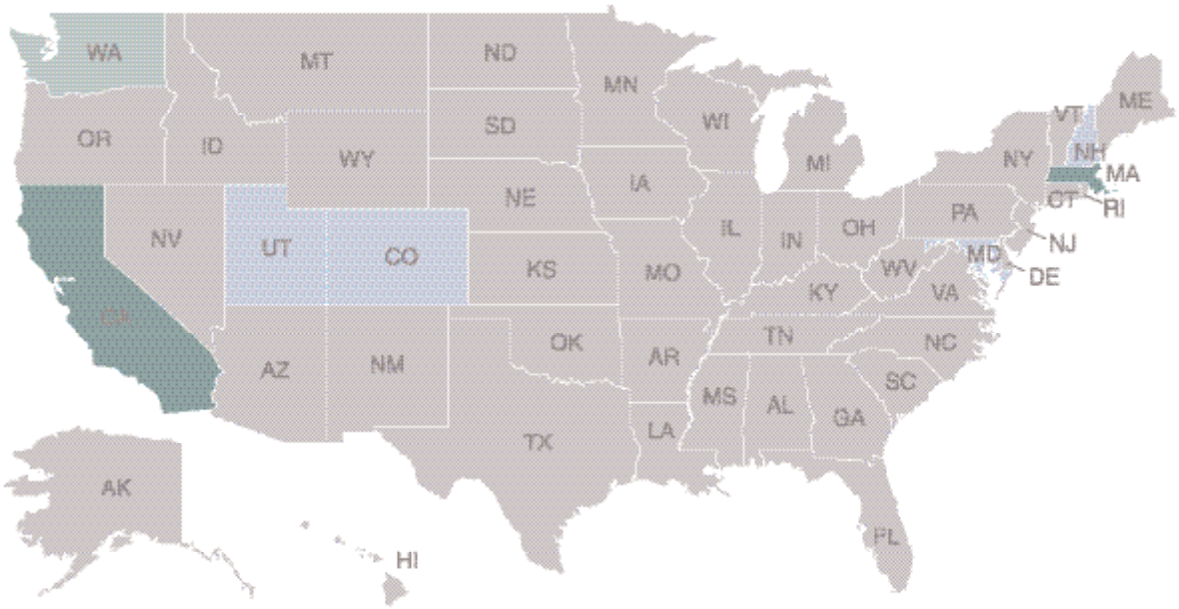
"In 2007, venture capital was one-third larger than in 2005."

The Top Five		Venture capital as a percentage of worker earnings
1	California	1.5%
2	Massachusetts	1.4%
3	Washington	.8%
4	Colorado	.6%
5	Maryland	.4%
	U.S. Average	**.2%**

Source: PricewaterhouseCoopers/Venture Economics/NVCA, 2007-2008 data.

The Top Five Movers		2002 Rank*	2008 Rank	Change '02-'08
1	New Mexico	44	8	↑36
2	Vermont	29	15	↑14
3	Tennessee	37	25	↑12
4	Mississippi	43	33	↑10
5	Oklahoma	39	30	↑9

* 2002 state ranks have been revised for data comparability.[109]



ECONOMIC DEVELOPMENT STRATEGIES FOR THE NEW ECONOMY

States face a new imperative to boost the competitiveness of their economies not just relative to each other, but to other nations. To succeed in the New Economy, states will need to overhaul their familiar approaches to economic development. But, before state officials look to develop more innovative and creative approaches to economic development—which all could benefit from—they should start by first adopting an "innovation economics" framework to guide their economic development policymaking and, second, should base their policies on sound economic development fundamentals.

FOUR COMPETING ECONOMIC DEVELOPMENT DOCTRINES

In the last decade, all fifty states have put in place new economic development policies and programs focused on productivity, innovation, and entrepreneurship. But this change has not come without struggle and, despite making inroads, this is still not any state's predominant approach to economic development.

A major reason for this is because many policymakers and economic development officials still believe that the conventional economic development approaches of deal-based "smokestack chasing" is the source of a strong economy. Others, particularly conservative, free-market groups, see the royal road to prosperity as stemming from widespread reductions in taxes and regulations. Still others, particularly civic activists and representatives from organized labor, believe that the best approach to economic development is to craft policies that directly help workers. All three groups base their views and recommendations on distinct doctrines, and all three doctrines under-value the importance of innovation and entrepreneurship. Indeed, while the U.S. economy has been transformed by the forces of technology, globalization, and entrepreneurship, the doctrines guiding state economic policymakers have not kept pace and continue to be informed by 20th century conceptualizations, models, and theories.

Indeed, virtually all individuals involved in state economic development policy—whether steeped in economics or not, whether in government or not—hold beliefs or economic doctrines that profoundly shape how they view the economy, what they see as important and not important, and, most importantly, what they believe is, and is not, the correct economic development policy. The doctrines or frameworks guide their thinking and deliberations, and help them make sense of an incredibly complex economy that is changing rapidly. Indeed, as John Maynard Keynes once stated, "Practical men, who believe themselves to be quite exempt from any intellectual influences, are usually the slaves of some defunct economist."[110]

Today, four main economic doctrines compete for the attention and allegiance of state policymakers: the conventional economic development doctrine whose guiding philosophy might be boiled down to, "shoot anything that flies, claim anything that falls;" the neo-classical economics paradigm that eschews economic development incentives and programs in favor of just having low taxes on business and few regulations to create a good business climate; the populist neo-Keynesianism doctrine that advocates for polices to directly improve the lives of workers through measures such as more progressive taxes, higher minimum wages, and public investment; and, finally, innovation economics, with its focus on spurring innovation and growth from within.

Conventional Economic Development Doctrine: Developed largely after World War II when the competition between states for increasingly mobile economic assets (usually branch plants of factories) began to heat up,[111] the conventional economic development doctrine (CED) is based on the idea that the best way to grow the economy is to attract (or retain) capital (usually establishments of big, multi-state firms) by making specific deals that include tax breaks, loans, and grants. The idea is that these mobile establishments are seeking the lowest costs, and the job of a state is to put forth the best package to attract them. While CED has evolved in the last two decades to encompass a broader array of concerns, such as workforce development and infrastructure, at its core, it's still largely about the art of the low-cost deal.

The Neo-Classical Business Climate Doctrine: Both conservative and moderate neo-classical economists are skeptical of the government's ability to pick winners and believe that the best way to grow a state's economy is by a tax code with low rates and few distortions. and a regulatory code with as few burdens on industry as possible.[112] Like holders of the CED, they see competitive advantage as largely based on

costs, but they generally look askance at traditional economic development efforts and, instead, favor eliminating firm-specific subsidies and using the savings to cut taxes for all firms.

Unlike holders of the CED, who see some firms and industries as more important to a state economy than others, holders of the neo-classical business climate doctrine (NCBC) believe that state economic policy should not favor any one firm or sector over another, but should support a good overall business climate. Conservative holders of the NCBC doctrine define that as taxes and regulation.[113] Liberal holders of the NCBC doctrine usually also oppose firm-specific deals and, instead, favor using the money to pay for expanded public investments, such as K-12 education.

Both the CED and NCBC doctrines provide some useful insights. The CED doctrine is right in that, ultimately, if states are to succeed, they have to care about their economies' sectoral compositions, and targeting assistance to particular sectors and firms can be a key component of increasing a state's wealth—in this case, firms that export their products and services out of the state. Likewise, the NCBC doctrine is right in that states whose taxes and/or regulatory burdens are very high, and who do not at least offset these burdens with world-class public goods (e.g., education system, transportation, natural resources, etc.) face a disadvantage relative to other states that, in the long run, will hurt their economic success.

Notwithstanding these positive contributions, in many areas the doctrines serve as a flawed guide to economic policy in the new global, innovation-based economy. First, in the new global economy where routinized economic activities now can be done in other nations with dramatically lower cost structures than even the lowest-cost U.S. state, it makes little sense for states to chase the low-cost tiger. In the neo-classical economics paradigm, most firms were seen as having stable production functions and were seeking to produce at the lowest possible cost by reducing the price of factor inputs (e.g., land, materials, labor, and taxes). Accordingly, firms, markets, and entire economies were seen as existing in a rough equilibrium, albeit one occasionally upset by marginal changes in input prices. If, for example, labor costs increased in a region because of stronger demand, labor-intensive production processes would move to regions with lower labor costs until equilibrium was regained. Because firm decisions were seen as highly responsive to marginal changes in prices, the role for state policy was to keep costs low, including by subsidizing business costs. But, in the New Economy, an increasing share of firms' production functions are anything but stable and routine. Rather, they are characterized by innovation and change. In this environment, firms are looking more to adapt and keep at the leading edge, than simply eking out a few dollars in production costs by moving a routine facility yet again.

Moreover, low costs—especially if they come at the expense of the factors that enable firms to innovate and learn: a good education system, research universities, robust broadband telecommunications, a good quality of life to attract and retain knowledge workers, and a dynamic transportation network—are not enough to create competitive advantage. This is not to say that states can blithely ignore costs and put up with inefficient bureaucracies, unreasonable regulations, and very high levels of taxes. But to believe that low costs, not controlling for public services, are the major driver of economic wellbeing is to miss the realities of the New Economy.

Second, the NCBC and CED both premise their views on the fact that the most important goal in economic development is attracting out-of-state business establishments. As such, they give short shrift to helping existing firms grow and helping new firms start up. But in the New Economy, entrepreneurship is much more important than firm attraction is to economic success. Consider the fact that the number of industrial manufacturing relocations and significant expansions fell from an average of 5,139 per year for 1995-2000 to 3,162 in 2005.[114] Assuming that each of these establishments creates 100 jobs, this means that, in any year, they were responsible for creating around 316,000 new jobs. In contrast, small firms (with fewer than 100 employees) created three times as many (946,000) jobs in 2005.[115]

Finally, in a world where competitive advantage is created, not inherited, simply reducing the burden of taxes and regulations provides no assurance that a state's economic structure will evolve in ways that provide it with sustainable advantage. Indeed, there is a very slight negative correlation (-0.04) between the increase in per-capita income growth between 1990 and 2005 and overall tax burden as measured by the Tax Foundation.[116] In other words, overall state tax climate had no effect on per-capita income growth.[117]

Neo-Keynesian Populism: Ultimately, the goal of economic development is not to help business, it is to help state residents, including workers. Helping business is the means by which to accomplish this goal. However, for holders of the neo-Keynesian populist doctrine, helping workers directly is not only the goal, it's the means. Holders of this doctrine worry

less about business climate or competitiveness, and focus more on making sure that the wealth generated in a state goes to the people that need it most. They see most economic development issues as boiling down to a question of who gets the benefits: working people, or rich people and corporations. As such, they favor policies such as making the state tax code more progressive, expanding unemployment insurance, and funding affordable housing. To the extent that they promote policies to improve economic development directly, they tend to be focused on policies that achieve progressive ends, such as expanding human capital (e.g., universal pre-K, making college more affordable, and workforce training), spurring "green" infrastructure, investing in transit and high-speed rail, and limiting corporate tax giveaways.[118] To the extent they support business development, it's often with a focus on micro-enterprise support, minority- and women-owned businesses, and green businesses.

The neo-Keynesian populist doctrine also provides some useful insights. Holders of the doctrine are right to call attention to the real goal of economic development—helping workers—and right to criticize economic development practices that lose sight of that. Likewise, they are right to ensure that business incentives be focused on creating good jobs and right to note that workforce development, infrastructure, and quality of life are key components of economic development.

Notwithstanding these positive contributions, in many areas the doctrine serves as a flawed guide to economic policy. Most importantly, as much as they might want to believe otherwise, states are in competition for economic activity, not just with each other but with other places around the world. As such, this new competition imposes practical limits (what Tom Friedman once called "golden handcuffs") on how far states can go in redistributing wealth before they reduce their attractiveness for private-sector growth. Second, while neo-Keynesian populists are right to call for greater accountability for corporate incentives, not all corporate incentives are the same. There is a significant difference between a tax break given to a low-wage retail firm and an R&D tax credit used by high-tech firms employing high-wage workers making products exported outside the state. The former is usually a waste of public monies, while the latter is a public investment that generates real economic benefits.[119] Finally, neo-Keynesians put the cart before the horse, forgetting the fact that the main job of economic development is to help the private sector be prosperous in ways that create good jobs, so that social policy can later redistribute some of these gains.

Innovation Economics: Holders of the innovation economics doctrine believe that, ultimately, what determines a state's economic success is the ability of all institutions (private, nonprofit, and government) to innovate and change. Because of this, innovation economics (IE) focuses less on issues such as taxes and regulation or the number of firm-specific deals, and more on policies that can spur firm learning and innovation through more generally positive business environments. As a result, when examining how the economy creates wealth, innovation economics focuses on a different set of questions:

- Are entrepreneurs taking risks to start new ventures?
- Are workers getting skilled and are companies organizing production in ways that utilize those skills?
- Are companies investing in technological breakthroughs and is government supporting the technology base (e.g., funding research and the training of scientists and engineers)?
- Are regional clusters of firms and supporting institutions fostering innovation?
- Are research institutions, such as universities, transferring knowledge to companies and individuals?
- Are trade policies working to ensure a level playing field for domestic companies?
- Are policymakers avoiding imposing protections for companies against more innovative competitors?
- Do individuals and firms have the right incentives and tools to adequately invest in and commercialize new ideas?
- Are policies supporting the ubiquitous adoption of advanced information technologies and the broader digital transformation of society and the economy?
- And, are state and local economic development efforts organized in ways that fit these new realities?

Moreover, adherents of innovation economics do not believe that low costs alone are enough to drive growth or innovation. Instead, they recognize that low costs can come at the expense of public investments in factors like research universities, infrastructure, and worker skills, ultimately leading to less, not more, wealth generation. In addition, because innovation is so important, particularly in export-based firms, they believe that government has a role in targeting policies toward innovation (such as R&D tax credits, technology-focused university-industry research centers, and sector-based regional skills alliances). As such, "distorting" the "free market," when done in these innovation-promoting and growth-promoting ways, is an appropriate use of public action.

Building on the IE doctrine, a new model of economic development has emerged within the last decade, focusing

less on attracting routinized branch-plant production facilities to states through targeted tax incentives and more on growing entrepreneurial and innovation-based firms in the state through targeted support for innovation. While this new approach to economic development encompasses "technology-based economic development" (TBED), it also goes significantly beyond it to integrate a focus on innovation into all economic development activities, including support for manufacturing, skills, industrial recruitment, etc.

In short, the new economic development model recognizes the fundamental insight that innovation and entrepreneurship are keys, and that both take place in the context of institutions. This means that the new economic development focuses much more extensively on promoting technological innovation, supporting dynamic acquisition of workforce skills, spurring entrepreneurship, supporting industry cluster and knowledge networks, and lowering business costs, but in ways that, at the same time, boost quality of life.

Innovation economics shift the focus of economic policy toward creating an institutional environment that supports technological change, entrepreneurial drive, and higher skills. This is not to say that some of the insights generated by the other three doctrines are not important. Nor is it to say that simply creating science and technology programs is enough to succeed. It is to say, though, that, ultimately, states will do better if their policies are guided by an innovation economics doctrine, since it better suits the new economic realities faced by states.

While some may dismiss this discussion of doctrines as ethereal and irrelevant, getting the underlying doctrine or world view is, in fact, critical to getting the right policies and programs in place. For, while the coach may call the plays, the playbook lays out his choices. And the current playbooks in states now limit the plays that the coach (economic policymakers) can call. What is particularly alarming is that the policymaking community in many other countries across the globe have not only recognized the primacy of innovation, but have developed

TABLE 1: ECONOMIC DEVELOPMENT DOCTRINES AND STATE ECONOMIC DEVELOPMENT POLICIES

	Conventional Economic Development	Neo-Classical Business Climate	Neo-Keynesian Populist	Innovation Economics
Source of growth:	Capital investment	Capital investment	Worker incomes	Innovation and organizational learning
Principal Economic Development Means:	Drive down costs through firm-specific subsidies	Drive down costs through lower taxes and reduced regulations	Drive up wages and benefits, and foster more progressive taxes and public spending	Spur firm innovation through targeted support (e.g., research, financing, skills, etc.) and incentives for firms to produce these themselves
Object of Policy:	Recruitment of out-of-state firms	Recruitment of out-of-state firms	Small business and socially-conscious business	High-growth entrepreneurs and existing firms
Quality of Life:	Minor importance	Not important	High importance	Moderately important to attract and retain knowledge workers
Goal:	Get big	Get big	Get fair	Get more prosperous

a rich and nuanced set of institutions and policies to make their economies innovation-based. Not only do they have the coach, they also have the right playbook.[120]

CRAFT ROBUST TECHNOLOGY- AND ENTREPRENEURSHIP-BASED ECONOMIC DEVELOPMENT POLICIES

A key component of economic developments strategies naturally will include a strong focus on technology and entrepreneurship. Both play a key role in boosting state per-capita incomes. For example, states with a higher share of employment in knowledge-based industries have higher incomes.[121] Porter found that differences in patenting intensity account for 30 percent of the variation across regions in the average wage.[122] Likewise, Goldstein finds that business patenting and R&D expenditures support greater gains in regional per-worker earnings.[123]

To effectively spur technology- and entrepreneur-led growth, states need to put in place a portfolio of efforts focused on the key building blocks—financing, workforce skills, and technology—and customize these efforts to their own unique situations. There are a number of steps states can take, including:

Invest in Innovation

Use targeted investments in knowledge infrastructure as an incentive. In many cases, the most important incentives at states' disposal are not tax breaks or other firm-specific incentives, but public investments that not only support a state's knowledge infrastructure but also provide key inputs for targeted firms and/or industries. Perhaps the best example of this approach was Texas' $300 million investment in the engineering program at the University of Texas, used to help induce Texas Instruments to build their next-generation chip fabrication facility in Texas. Not only did the state benefit by capturing a $3 billion high-tech investment, but TI benefited by gaining access to a world-class electrical engineering department. Moreover, this infrastructural investment benefited other high-tech firms in the region, as well.

Support statewide broadband promotion organizations. Broadband can help state economies grow.[124] For that reason, a number of states have developed organizations to promote broadband deployment and take-up throughout their states.[125] North Carolina's e-NC initiative focuses on using the Internet as a tool for helping people in rural North Carolina to improve their quality of life. For example, e-NC Telecenters are driving technology-based economic development in seven rural North Carolina communities. They provide businesses, local governments, and community organizations with the most current technology resources and services, including high-speed Internet access, and business services and support (including business incubation, training programs, and public access computers), as well as opportunities for telecommuting and e-work. In Kentucky, ConnectKentucky, a public-private

BOX 3: GREEN TECH: THE NEXT BIG THING?

With growing concerns about global warming and our dependency on high-priced foreign oil, it is likely that, over the next decade, cleaner energy will become a growth industry. Indeed, venture capital investments in green technology worldwide grew from around $1.3 billion in 2004 to $6 billion in 2007.[127] The U.S. market for green technology is expected to grow to $82 billion by 2010.[128] But, before states jump on this bandwagon, they should consider several things. First, much of this market will involve existing industries making cleaner products. For example, it is unlikely that significantly cleaner vehicles (hybrids, hydrogen, or electric) will be made by companies other than the current major global automakers. Second, states that are likely to emerge as leaders in this industry are those that already have an existing industrial base related to the technologies in question. For example, many of these technologies require significant manufacturing capability in related areas, such as electronics, plastics, and metal. As a result, while this does not mean there will not be some greenfield, entrepreneurial opportunities, states would be well advised not to pursue a "field of dreams" strategy, as some have done in other technologies such as biotechnology and nano-technology. As with all TBED strategies, states should start from a careful analysis of their existing capabilities and strengths and build on those.

States are pursuing two different, but sometimes complementary, strategies regarding green technology. First, many states are trying to reduce the consumption of carbon-rich fuels by

partnership, focuses not just on assessing where broadband is and is not present, but also helps spur demand for broadband in communities where it is economically feasible.[126]

Help Companies Be More Innovative

Create a Statewide Commercialization and Entrepreneurship Organization. Commercialization and entrepreneurship are keys to success. To maximize both, there should be at least one organization in a state that has enhancing both as its mission. One model is Oklahoma's nonprofit i2E organization. Through its various programs, i2E helps Oklahoma companies with strategic planning assistance, networking opportunities, and access to capital. i2E's Oklahoma Technology Commercialization Center assists researchers, inventors, entrepreneurs and companies to turn advanced technologies and high-tech startup companies into growing companies. It also runs an annual entrepreneurship competition open to all faculty and students at Oklahoma universities.[129] Likewise, Pennsylvania's Ben Franklin Technology Partners have, over their twenty-five-year history, evolved to serving as a statewide resource for technology commercialization for entrepreneurs.

government, residents, and businesses. For example, the Connecticut Innovations Clean Energy Fund offers loans and grants for a variety of clean energy research and installation projects, including rebates for photovoltaic system installation and funding of on-site clean energy power generation. Legislation in New Mexico requires that at least 15 percent of an electric utility's power supply come from renewable sources by 2015—increasing to 20 percent by 2020. Likewise, Colorado legislation sets the same goal for 2020.

Second, many states are working to take advantage of the move to green technology to help promote the industry in their states. Iowa has established a $100 million Iowa Power Fund to make grants and loans that will accelerate in-state R&D and knowledge transfer, and will improve the economic competitiveness of the state's renewable energy industry. The Massachusetts Technology Collaborative operates the state's Renewable Energy Trust, which manages several programs that support alternative energy R&D and entrepreneurship, including a $15 million Green Energy Fund to equity investments in renewable energy companies within the Commonwealth. Ohio's Third Frontier Program administers the state's Fuel Cell Grant Program, which supports the growth of Ohio's fuel-cell industry by funding R&D projects. Michigan supports renewable energy startups through the state's NextEnergy Center, which provides facilities for research and businesses, and administers several awards programs for energy entrepreneurs. Pennsylvania's Ben Franklin Partnership program received a special one-time allocation of $40 million for a clean energy initiative.

Catalyze and empower industry clusters. In many states, clusters of similar firms exist, but have little formal interaction with each other. States can help by organizing roundtables to bring industry leaders together to talk about common challenges facing their industry and the steps the state can take to help boost the cluster's competitiveness. They can provide small matching grants to help clusters establish industry self-help associations, either at the state level or regional level. For example, as part of its efforts to create a statewide strategic economic plan, the Rhode Island Economic Policy Council brought together leaders from the state's software companies. With the help of a small state startup grant, the companies formed an industry association that works to help all firms in the cluster become more competitive.

Use Web 2.0 Tools to Support Open Innovation. As described in Box 4, an increasing number of companies are moving to open-innovation models. States and regions need to do the same, not just to help companies in their regions better execute open innovation strategies but also to link together all economic development players in Web-based, open-innovation models. With regard to the former, state and regional economic development officials can assist as companies increasingly look for innovation outside their organizations, by helping to make matches and build networks. To date, few states and regions have done this, but many are beginning to consider it.

Second, states and regions should use Web 2.0 tools to build better-functioning economic development networks. As Ed Morrison argues, "Regions with thick, open networks will be more prosperous. They will learn faster. They will spot opportunities faster. They will align their resources faster, and they will act faster."[130] A few places have begun to do this. For

example, the Hershey (Pa.) Center for Advanced Research developed its KnowledgeMesh online community to provide a platform and environment for life sciences and high technology professionals who represent industry, academia, government, investment, workforce, and support organizations to have quality interactions, thereby advancing R&D in the global community. HCAR developed this to build awareness about the Hershey Center for Applied Research with the ultimate goal of encouraging new companies and research organizations to collaborate with the research park. Other regions have developed similar tools, with a wide array of applications.[131] The state of Delaware worked with Dupont

BOX 4: OPEN INNOVATION AND STATE ECONOMIC DEVELOPMENT

The concept of open innovation holds that, in a world characterized by widely distributed knowledge, companies cannot afford to rely entirely on their own research, development, innovation, and commercialization efforts, but should complement internal innovation by partnering with other organizations to leverage their expertise or intellectual property. Open innovation leverages external sources of technology and innovation to drive internal growth, and also includes the spin-off or outsourcing of unused intellectual property within a firm. Open innovation activities may take the form of membership in industry consortia, such as Dossia, a group of firms including AT&T, BP, Intel, and Wal-Mart that have joined forces to mutually develop portable electronic medical records for their employees,[132] open-source development models, such as in the software industry where firms like EA Electronics invite gamers to co-design new video games alongside the firm, or traditional co-development or joint venture partnerships.

However, practiced fully, a strategy of open innovation moves beyond isolated co-development, partnership, or joint venture relationships a company may undertake to a coherent strategy that seeks to leverage external resources to complement internal research, development, and product commercialization efforts. Open innovation helps companies partner to contribute expertise in their specific disciplines, to share cost and risk, to define problems more broadly, to take advantage of the "practice of combinatorial play" that Einstein identified as the very heart of innovation, and to scale up successful innovations to commercialization far more rapidly.

The concept of open innovation was popularized by Berkeley professor Henry Chesbrough, who argues that, "Competitive advantage now often comes from leveraging the discoveries of others."[133] Open innovation recognizes that "not all the smart people work in your company" and that "no one is as smart as everyone," and confronts the "not invented here" philosophy held for many years by large corporate research labs. Since a tremendous amount of invention and innovation occur outside a company's walls—much of it in venture-capital-funded entrepreneurial startups aiming to leverage breakthrough technologies and disrupt established business models—organizations ignore external ideas at their peril.

No corporation has implemented the principles of open innovation more aggressively or successfully than Procter & Gamble, whose CEO A.G. Lafley articulated an open-innovation strategy called "Connect & Develop," which mandated that 50 percent of innovation at P&G come from, or be developed, outside the organization. P&G's focus on open innovation has helped P&G achieve double-digit sales growth, at profit margins in excess of 50 percent, even as it enhanced the cost efficiency of its R&D investments, decreasing R&D spending as a percentage of sales from 4.8 percent in 2000 to 3.4 percent in 2005.[134]

New companies have emerged that leverage information technology tools to facilitate open innovation. NineSigma and InnoCentive's online portals outsource challenges posed by businesses to hundreds of thousands of external problem solvers. Companies are leveraging "idea" or "prediction markets," such as a mock stock market used by IT/defense company RITE-solutions, to let employees invest money in fantasy stocks—technologies, products, and cost-saving measures—they think the company should focus on. Best Buy has found that the collective wisdom of its employees is a more accurate predictor of the marketplace success for its innovation initiatives than the expectations of its senior managers.

The open-innovation trend is global in scale. The percentage of revenues of the 1,000 largest firms attributable to strategic alliances has grown from 2 percent in 1980 to 18 percent in 1997.[135] The number of inter-firm worldwide research partnerships increased ten-fold, from 200 to 2,000, between 1980 and 1999.[136] Companies no longer can afford to innovate in isolation; they must maximize the value of scarce resources through smart partnerships that leverage their best abilities and those of partners to deliver leading-edge products to demanding customers.

Corporation to have them donate unused patents to the state, which then would help find partners to commercialize that intellectual property in the state.

Use Tax Policy to Spur Innovation

Extend sales tax parity for manufacturing purchases of computers and IT equipment. A wide array of economic studies point to the importance of IT in driving productivity, and many studies find that IT investments have a larger economic impact than investments in non-IT equipment.[137] Yet, most states are still stuck in the old economy when it comes to their tax incentives for manufacturers. Most states provide a sales tax exemption for manufacturers for equipment purchased in the manufacturing process, and some even provide tax credits for the purchase of manufacturing equipment. But few extend this exemption (or credit) to computer and other IT equipment used in the rest of the plant, even though, from a productivity and competitiveness standpoint, it can have an even bigger impact than a traditional piece of machinery. For example, Washington state's rules governing its manufacturing sales tax exemption state that manufacturing computers qualify only if the computers "direct or control machinery or equipment that acts upon or interacts with tangible personal property" or "if they act upon or interact with an item of tangible personal property." Many other states have similar restrictions.[138] States should simply eliminate this requirement and allow any IT equipment, software, or devices purchased by manufacturers to be exempt from state sales taxes.

Align state R&D tax credits with the new federal R&D tax credit. Studies show that the research and development tax credit is an effective way of stimulating private-sector R&D.[139] Moreover, state R&D tax credits appear to be even more effective than the federal credit. A recent study of the California R&D tax credit found that it stimulated considerably more R&D than the federal credit did, in part because it not only induced firms to perform more R&D, but also induced them to relocate R&D to California.[140] Another study by Yonghong Wu from the University of Illinois at Chicago concludes that state R&D tax credits have "significant and positive effects" on the number of high-tech establishments in a state.[141]

Approximately thirty-eight states have R&D tax credits.[142] Approximately half of these states link to the federal R&D credit, which allows firms to take a credit of 20 percent on increases in R&D over a fixed-base period. However, because of these limitations with the regular credit, in 2006 Congress created a new Alternative Simplified Credit (ASC) that let companies receive a credit of 12 percent of the amount of qualified expenses that exceed 50 percent of the average qualified research expenses for the preceding three years. States that link to the federal credit may need to revise their statutes to let companies taking the ASC to explicitly qualify for state R&D credits, the same way that some states (e.g., Delaware) let companies taking the Alternative Increment Research Credit (AIRC) explicitly qualify for state credits.

Facilitate Entrepreneurship[143]

Provide digital tools that make it easy to start a new business. Starting a new business is usually not easy, as would-be entrepreneurs must usually file an array of forms with local, state, and federal agencies. States could ease new-firm formation by providing an online software tool to guide individuals starting new businesses (or nonprofit organizations) through the complex process of filing local, state, and federal forms. Ideally, states collectively would partner with third-party software providers to do this.[144]

Benchmark state procedures for starting a business. Given the importance of entrepreneurship in economic development, states should do everything they can to reduce barriers to starting a business. One way to do this is for states to benchmark themselves related to the procedures, days, and cost for opening a new business, and then develop and implement strategies for minimizing the procedures, days, and cost while achieving their missions.

Support angel capital networks. Angel capital, the capital invested by (usually) wealthy individuals in a region's businesses, is as important as venture capital in supporting entrepreneurship.[145] States can play a key role by helping to link angels and entrepreneurs.[146] For example, the Wisconsin Angel Network (WAN) represents more than 200 individual investors and helps match them with startup and young companies. Similarly, Pennsylvania's Ben Franklin Investment Partners (BFIP) guarantees up to 25 percent of any loss experienced by a qualified private investor who makes an investment in a qualifying southeastern Pennsylvania emerging technology enterprise. A number of states also provide a modest tax credit to angel investors for investing in an in-state firm.

Link together the array of information resources for entrepreneurs. Information and technical assistance can help entrepreneurs be more successful, and an array of information resources exist for entrepreneurs' use. However, finding and gaining access to the right information and help can be difficult. Indeed, to be effective, entrepreneurship support efforts must be more user-driven, engaging entrepreneurs in

peer-to-peer learning and networks, with very case-specific and hands-on learning. A number of efforts try to do this. The Kauffman Foundation has funded KC Source Link, an online network of 140 nonprofit resource organizations in the eighteen-county Kansas City region that provide business-building services for small businesses. It facilitates the linking of these resource organizations to one another and to established, emerging, and startup small businesses.[147] Similarly, the Kentucky Entrepreneurial Coaches Institute focuses on nineteen rural Kentucky county economies by identifying and training community citizens from across the region that are willing to work with current and potential entrepreneurs to encourage the development of new business ideas and ventures.[148]

Expand entrepreneurship training. While successful entrepreneurs appear to have particular skills and attitudes, this does not mean that steps cannot be taken to help more people become successful entrepreneurs. One is to expand entrepreneurial education programs. A number of colleges and universities have created entrepreneurial education programs, often within their business schools. Some universities are going even farther and integrating entrepreneurship training throughout their curriculum. At MIT, more than 1,300 students take courses involving entrepreneurship. George Mason University's Mason Enterprise Center is developing entrepreneurship curriculum designed to be integrated into every school and major. States should support the creation of these kinds of programs. But states also should support non-college-based entrepreneurial training programs. One model is the FastTrac training program, provided by partner organizations in forty-nine states. Established by the Kaufman Foundation, more than 95,000 participants have completed FastTrac classes in the United States since 1993. Likewise, Technology 2020 is a public-private partnership whose mission is to grow new businesses and high-quality jobs by capitalizing on the unique technology resources of the Tennessee Valley Corridor.

BOX 5: FOSTERING IMMIGRANT ENTREPRENEURSHIP

High-skilled immigrants have played a key role in technology entrepreneurship. A study by Analee Saxenian showed that Chinese and Indian computer scientists and engineers were running one-quarter of Silicon Valley's high-tech firms in 1998. In that year alone, these firms accounted for nearly $17 billion in sales and more than 58,000 jobs.[149] Another study by Vivek Wadhwa and Analee Saxenian showed that, of engineering and technology companies started in the United States from 1995 to 2005, in 25.3 percent of these companies, at least one key founder was foreign-born. States with an above-average rate of immigrant-founded companies include California (39 percent), New Jersey (38 percent), Georgia (30 percent), and Massachusetts (29 percent). Nationwide, these immigrant-founded companies produced $52 billion in sales and employed 450,000 workers in 2005.[150] Another study found that, over the past fifteen years, immigrants have started 25 percent of venture-backed U.S. public companies.[151] The concentration is even higher in manufacturing, with more than half of the employment generated by U.S. public venture-backed, high-tech manufacturers coming from immigrant-founded companies. Likewise, immigrant entrepreneurs have played significant roles in the Los Angeles and New York City regions.[152] Studies by the Brookings Institution show that there is a positive correlation between the number of foreign-born residing in a U.S. city and that city's economic vibrancy.[153] Moreover, these trends could continue or even increase, as 50 percent of all new U.S. PhDs in engineering are immigrants, as well as 45 percent of all U.S. PhDs in life sciences, physical sciences, and computer sciences, and more than 40 percent of all U.S. master-degreed computer scientists, physical scientists, and engineers.

As a result, states and regions should work to ensure that they are attractive locations for high-skill immigrants. Because universities and colleges are the "feeder system" for the vast majority of future immigrant-tech workers, states and regions can help form collaborations among colleges and universities to jointly attract, integrate, and retain international students. States can develop initiatives that welcome and help immigrants coming to a region. For example, the Welcoming Center for New Pennsylvanians, based in Philadelphia, connects newly arrived individuals from around the world with the economic opportunities they need to succeed in the region.[154] Cleveland recently initiated a region-wide initiative, the Talent Blueprint Project, which seeks to transform Cleveland into a preferred destination for foreign-born scientists and technologists.[155]

DON'T FORGET INSTITUTIONAL INNOVATION

Almost eighty years ago, Justice Brandeis wrote that states were the laboratories of innovation. Today, the need for states to reassert that role has never been greater. For, while the U.S. economy has undergone a revolution to a technology-driven, global new economy, many of our institutions and governing structures have not. This is not unique. Throughout America's history, in each transition period there is a lag between the speed of technological transformation and the corresponding institutional, cultural, political, societal, and individual transformation. Scientists, engineers, and entrepreneurs often are driven to change the world through rapid development of new technologies and development of new business models. The rest of society takes longer to catch up, being committed to old ways of doing things, old investments, old skills, old institutional arrangements, and old attitudes. As a result, during the periods when a new techno-economic system is emerging, organizations, institutions, laws, governments, the built environment, and attitudes and culture lag behind. Christopher Freeman notes, for example, that, as the new technology system emerges, it produces "major structural crises of adjustment, in which social and economic changes are necessary to bring about a better match between the new technology and the system of social management of the economy."[156] Or, as UK Prime Minister Gordon Brown puts it, "In each decade, the relationship between individuals, markets, and communities will evolve as technology and rising expectations challenge each generation's vision of what is possible and best."[157]

Moreover, in the face of change, some individuals and organizations do not just passively wait; many actively resist the change as it threatens entrenched methodologies and established economic positions. And old economy stakeholders, whether in business and government, or as consumers and workers, usually have more power than innovators do. That is why transitional periods bring forth strong debates and arguments about the future and what kind of society is desirable. Usually, these debates are between those who view the new order with fear and trepidation, and seek to hold onto an idyllic past, and those who embrace the changes and promote the future. As noted urbanist Lewis Mumford once stated, "Traditionalists are pessimists about the future and optimists about the past."

But, in order to succeed in the New Economy, particularly as the competition is coming from across the globe, states cannot be content with stasis, or even with modest rates of change. Rather, states need to shake off complacency, move beyond partisan gridlock and ideological rigidity on both sides of the aisle, and approach the task at hand with the same urgency that some of America's leading companies, such as Apple and IBM, have done when faced with crises.

The scope for such far-reaching and fundamental innovation is wide-ranging, including areas such as transportation, health care, land-use planning and zoning, regulation, transportation, and the organization of local government. However, one place to start is with regard to the states' education and training systems.

Create Different and Better K-12 Schools

States have been focusing on improving K-12 education now for more than two decades. Yet, the results have been largely disappointing. High schools are unable to retain as many as one in four students to graduation. And nearly half of the dropouts point to boredom and lack of interest in classes (no small surprise; most students have little choice in what they learn, since the system is designed for standardization and must, by its nature, ignore the individual needs of each student.[158] Moreover, even the students who do graduate are not well prepared. In one survey, firms reported that 60 percent of applicants with a high school degree or GED were poorly prepared for an entry-level job.[159] Respondents to a Conference Board survey rated high school graduates as "deficient" in ten skills (including written communications, critical thinking, and team work) and excellent in none.

Perhaps it should not be surprising that K-12 "reform" has fallen short of expectations, given that most of it has not so much been about reform; rather, it has been about doing the same, but more of it. Most of the efforts to date have been to get traditional school to do better, usually by making them more rigorous: more core courses, more standards, more high-stakes tests, more hours in the school year, more homework, more teachers getting more pay, and better textbooks. And this all takes place within a K-12 framework premised on standardized curricula, little choice for students, and a focus on being taught particular academic subjects (some with dubious relevance to actual careers).

So long as this is the principal strategy, there is little room for innovation; for testing and developing new forms of school and schooling. Rather, schools need to move to student-centered, customized learning with a focus on skills, rather than on mastering any particular academic content. Success now depends on finding new forms of school and schooling

and, in particular, shifting education away from its mass-production model to a mass-customization model.

This means that states will need to take a risk on embracing more fundamental innovation or, in the words of Harvard Business School's Clayton Christensen, policymakers will need to embrace disruptive innovation. Given the largely poor experience of incumbent businesses at responding to innovation, the likelihood of the existing education sector embracing disruptive innovation is not great. As a result, it's time for states to focus on creating real alternatives. As Ted Kolderie, a founder of the national charter school movement and leader of Education Evolving, argues, "If the district sector does not—cannot or will not—produce the schools we need, then the states will have to get somebody else who will.[160] In other words, states need to not only work to improve existing schools, but also establish new entities that will create different and better schools. In short, a one-bet strategy that only tries to change existing schools will not work.

While there are new models popping up that present an alternative to conventional schools, the trend is actually the other way, with all schools becoming more alike, all following the academic instruction, test-based model. As a result, states need to aggressively work to provide a wide array of educational options: career academies in high schools, charter schools, vouchers, specialty math and science high schools, entrepreneurial education,[161] and project-based-learning high schools. One promising approach, which not only more closely resembles the real work life, but also is often more intrinsically interesting to students, is project-based learning. Rather than focusing on "teaching" every child the exact same information, the focus would be organized around project-based learning and on letting students learn in areas that interest them. Perhaps the leading example of this today is Minnesota's New Country School, a public charter school that describes itself the following way:

> The school is "based upon the idea that students will be most engaged in the learning process when they have a personal interest in what they are learning. Instead of sitting in a teacher-driven classroom all day long, students learn through the exploration of topics that interest them on their own terms, and largely at their own pace. Each student is a member of a team of twelve to twenty students, managed by an adult advisor who helps to facilitate the learning process. Instead of grades, students receive credit for their work … The process is completely flexible, and can be tailored toward specific learning styles, prior student knowledge, student motivation, etc.[162]

But this is just one type of institutional learning innovation. Another example is Project Lead the Way, which offers engineering and biomedical science curricula in more than 1,500 high schools, often through career and technical-education programs.[163] The program focuses on these two substantive areas, but also on learning how to work as a contributing member of a team; lead a team; use appropriate written and/or visual media to communicate with a wide variety of audiences; speak publicly; listen to the needs and ideas of others; think and problem-solve; manage time, resources, and projects; conduct research, and collect and analyze data; and go beyond the classroom for answers.

Another approach is to establish high schools with an emphasis on mathematics, science, and technology. A number of states have developed such schools, such as the North Carolina School for Science and Mathematics, the Illinois Mathematics and Science Academy, and the Thomas Jefferson High School in Virginia. Texas' T-STEM initiative seeks to create specialty STEM high school academies throughout the state. These schools are a powerful tool for producing high school graduates with a deep knowledge and strong passion for science and math that translates into much higher rates of college attendance and graduation in scientific fields.[164]

The point is that, if states are to make real progress in education, it's time to fundamentally rethink the current model and provide a wide array of types of schools and learning environments. Doing so will take leadership and vision on the part of state policymakers.

Shift the Focus of Post-Secondary Education More Toward Acquiring Skills

The idea that virtually all kids should go to college has taken on a "motherhood-and-apple-pie" quality, now being one of those issues that "everyone" knows is true and every political leader supports. There's only one problem: It's not true, and implementing it likely would not help society nor the individuals involved. As the Wharton School's Peter Capelli reports, 30 percent of working adults have education levels that exceed the requirements for the current job, a figure that has gone up over time as more people have gone to college. And trends for the future portend the same. According the Bureau of Labor Statistics projections, 40 percent of all job openings in the next decade will require short-term, on-the-job training, while only 22 percent will require a bachelor's degree or higher.

Moreover, it's not clear that, as currently structured, higher education is best positioned to provide work-related skills, at least for a significant share of the population. As Capelli notes, "Beyond a basic level, well below what we typically think of as post-secondary education, what matters to job performance is not generic education, but education specific to the performance of particular jobs.[165] Moreover, classroom education does not teach many skills needed to do well at work, including how to acquire and evaluate information, to participate effectively on a team, to listen and communicate with customers and supervisors, to apply technology to relevant tasks, and even to think critically.[166] According to one survey, only 9 percent of workers used the capabilities learned in basic algebra, while only 13 percent of workers below the upper white-collar job level ever write anything five pages or longer.[167]

Moreover, increasingly, college does not even impart basic literacy and numeracy skills. As the recent Spellings Commission report on the future of higher education noted, "There are also disturbing signs that many students who do earn degrees have not actually mastered the reading, writing, and thinking skills we expect of college graduates. Over the past decade, literacy among college graduates has actually declined."[168]

It would be one thing if higher education were not succeeding in preparing people for work, but employers were compensating with their own efforts. But, unfortunately, employers are cutting back on work-based education programs, leaving traditional classroom education as having to fill in the gap. One reason is that workers are increasingly mobile. In fact, a study by Watson Wyatt showed the people who have recently received training are the most likely to leave a company.[169] Indeed, why should individual firms develop training programs when their competitors will just take the talent? Perhaps not surprisingly, with greater workforce turnover and more competitive markets, corporate expenditures on workforce training as a share of GDP have fallen almost in half in the last fifteen years.[170]

As a result, instead of just reflectively spurring more enrollment in higher education, states should focus their efforts much more on expanding apprenticeship programs, school-to-work programs, industry-skills alliances, tax credits for employer-based training, and employer-community college partnerships. A number of states have moved in this direction. Wisconsin and Georgia have strong youth apprenticeship programs. A number of states and local school districts have established career academies within high schools. A number of states have established regional skills alliances—industry-led partnerships that address workforce needs in a specific region and industry sector.[171] Michigan has provided competitively awarded startup grants and technical assistance to twenty-five industry-led regional skills alliances. Pennsylvania's $15 million Industry Partnerships program brings together multiple employers, and workers or worker representatives when appropriate, in the same industry cluster to address overlapping human capital needs. In addition, Pennsylvania has supported a number of specialized industry-led training institutes, such as the Precision Manufacturing Institute,[172] the Advanced Skill Center,[173] and New Century Careers.[174] Other states have established tax credits for company investments in workforce development. California has a deduction for training expenses if a company has spent a certain share of sales on training. Firms in Rhode Island can deduct up to 50 percent of training costs on their corporate income taxes.[175]

And, to the extent that states focus on higher education itself, they should work to increase higher education quality. One way to do this is to focus on greater transparency. One easy step states could take is to require any higher education institution getting state support to participate in the National Survey of Student Engagement (NSSE) and to make the results public. The NSSE, initially launched with support from The Pew Charitable Trusts, is designed to obtain, on an annual basis, information from scores of colleges and universities nationwide about student participation in programs and activities that institutions provide for their learning and personal development, including their views on the quality of teaching.[176] The results provide an estimate of how undergraduates spend their time and what they gain from attending college. Survey items reflect behaviors by students and institutions that are associated with desired outcomes. Yet, what is remarkable about the survey is that participating institutions generally do not release the results so that parents and students can benchmark them against other universities and colleges. Requiring that this information be made public would put pressure on colleges and universities to improve their undergraduate teaching. States should also require state-supported colleges and universities to report the completion rate and time to degree for each degree program, disaggregated by gender, race, and ethnicity.

Take Industry-University Partnerships to a New Level

A key part of a state's innovation infrastructure is its colleges and universities. In an economy more dependent on innovation, universities and colleges are playing a more active role in spurring innovation and commercialization. Between

1991 and 2004, the number of patent applications filed by United States universities increased from 13.7 applications per institution to 57.8, licensing income increased from $1.96 million per university to $7.06 million, and new university-based startups increased from 212 in 1994 to 462 in 2004.[177]

Yet, notwithstanding this improvement, much more needs to be done. While increased state investments in universities are a step in the right direction, simply giving universities and colleges more money and hoping for the best is not enough. As a result, without more strategic state policies, universities are just as likely to specialize in early-stage basic research with few commercial benefits or in areas with little alignment with the state's industrial clusters. In neither case is strong in-state commercialization likely. Even if there is a strong overlap between universities' research and education programs with the state's key sectors, there is no guarantee of results. Without strong leadership or strong state incentives, or both, most universities will do what comes naturally: focus on research and teaching of interest to faculty. One reason for this is that faculty are rewarded more for publishing than for working with industry or commercializing discoveries.[178] Some states are lucky to have one or more universities with leaders who view the university as a key partner with industry and government in creating and growing the knowledge economy. For example, the Texas A&M university system recently voted to allow commercialization of faculty research to be considered in the granting of tenure to faculty.[179] But most universities are more traditional.

Many states reinforce these practices by seeing their role as simply to pour additional money into the "research machine" with effectively no incentive for application. Or they target it for politically attractive, "me-too" research areas that may not represent a true state strength. As a result, really practical, applied research targeted to less-exciting industries or research areas is ignored and under-funded. And the way most university research is funded, there is little incentive to collaborate with industries.

In response to this challenge, people have proposed a number of reforms worth pursuing, including letting faculty bypass tech transfer offices, letting faculty entrepreneurship count toward their service requirements, and letting successful patent applications count as publications for tenure review purposes.[180] While these and other ideas may be useful steps, it is important to do more. It's time for states to tie a portion of their higher education funding to the success of individual institutions at meeting the state's economic development goals. These goals might include doing research related to key industry clusters, providing technical assistance to companies in the state, and transferring technology to companies in the state. Universities and colleges that did well in meeting these goals relative to others would receive a larger share of state funding.

The advantage of a performance-based approach is that it would be up to universities and colleges to figure out the best way to be more relevant to the state's economy. Universities might establish external advisory councils made up of industry leaders to provide insight into research trends and entrepreneurial activities. They might make it easier for faculty to work with industry or start new companies. They might streamline intellectual property procedures to make it easier to commercialize innovations. But the bottom line is that universities and colleges would have a much stronger motivation to be more effective economic development partners.

At least one state has moved in this direction. Texas has created a $100 million incentive fund for higher education. The Governor's Economic Development Council's report recommended that Texas go even farther and use incentive funding to reward higher education alignment with clusters and technology commercialization activities.[181]

While such steps would help universities restructure themselves to be more open to engagement with the commercial world, states need to go further and provide greater incentives for business to take advantage of higher education resources. One way to do this is to create or increase tax credits for research investments at universities. Because the result of company-funded research at universities is shared, the benefits are less likely to be fully captured by an individual firm. As a result, firms will under-invest in this kind of extramural research. As a result, states should institute more generous tax credits for company expenditures on research at universities or federal labs. At least one state, Massachusetts, has done this, by establishing a 15 percent credit for basic research expenditures at universities, compared to its regular 10 percent credit.

CONCLUSION

Perhaps the most distinctive feature of the New Economy is its relentless levels of structural economic change. The challenges facing states in a few years could well be different than the challenges today. But, notwithstanding this, the keys to success in the New Economy now and into the future appear clear: supporting a knowledge infrastructure (world-class education and training); spurring innovation (indirectly through universities and directly by helping companies); and encouraging entrepreneurship. In the past decade a new practice of economic development focused on these three building blocks has emerged, at least at the level of best practice, if not at the level of widespread practice. The challenge for states will be to adopt and deepen these best practices, continue to generate new-economy policy innovations, and drive the kinds of institutional changes needed to implement them. And it's this last challenge that is key. Success in the New Economy requires that a whole array of institutions—universities, school boards, firms, local governments, economic development agencies—work in new and often-uncomfortable ways. At the end of the day, this is a challenge of leadership. States with leaders who challenge their institutions and businesses and who follow through with bold new policies focused on innovation, learning, and constant adaptation will be the ones that succeed and prosper.

Data Sources

Page 19

Indicator: Information Technology Jobs

IT Occupations: U.S. Department of Labor, Bureau of Labor Statistics, *May 2007 Occupational Employment Statistics* (2008). www.bls.gov/oes.

IT Industry Employment: U.S. Department of Labor, Bureau of Labor Statistics, *2006 Quarterly Census of Employment and Wages* (2007). www.bls.gov/cew.

Total Employment: U.S. Department of Commerce, Bureau of Economic Analysis, *2006 Regional Economic Accounts* (2007). www.bea.gov/bea/regional/data.htm.

Page 20

Indicator: Managerial, Professional, and Technical Jobs

IT Occupations: Managerial, Professional, and Technical Jobs: U.S. Department of Labor, Bureau of Labor Statistics, *May 2007 Occupational Employment Statistics* (2008). www.bls.gov/oes.

Total Employment: U.S. Department of Commerce, Bureau of Economic Analysis, 2006 Regional Economic Accounts (2007). www.bea.gov/bea/regional/data.htm.

Page 21

Indicator: Workforce Education

U.S. Census Bureau, American Community Survey (2006). www.census.gov/acs.

Page 22

Indicator: Immigration of Knowledge Workers

U.S. Census Bureau, American Community Survey (2006). www.census.gov/acs.

Page 23

Indicator: U.S. Migration of Knowledge Workers

U.S. Census Bureau, American Community Survey (2006). www.census.gov/acs.

Page 24

Indicator: Manufacturing Value-Added

U.S. Census Bureau, "Geographical Area Statistics: 2006,"Annual Survey of Manufacturers (May 2006). www.census.gov/mcd/asmhome.html.

Page 25

Indicator: High Wage-Traded Services

U.S. Department of Labor, Bureau of Labor Statistics, Quarterly Census of Employment and Wages (2006). www.bls.gov/cew.

Page 27

Indicator: Export Focus of Manufacturing

Manufacturing Exports: U.S. Department of Commerce, International Trade Administration, Office of Trade and Industry Information (2007). ita.doc.gov/td/industry/otea/index.html.

Service Exports and Employment: U.S. Census Bureau, 2002 Economic Census (2002). www.census.gov/econ/census02.

Manufacturing Employment: U.S. Department of Labor, Bureau of Labor Statistics, Quarterly Census of Employment and Wages (2006). www.bls.gov/cew.

Page 28 **Indicator: Foreign Direct Investment**

Foreign Employment: Thomas W. Anderson and William J. Zeile, "U.S. Affiliates of Foreign Companies: Operations in 2006," Survey of Current Business (August 2006). www.bea.gov/bea/pubs.htm.

Total Employment: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts (2006). www.bea.gov/bea/regional/data.htm.

Page 30 **Indicator: "Gazelle" Jobs**

Gazelles: National Policy Research Council (2007).

Employment: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts (2006). www.bea.gov/bea/regional/data.htm.

Page 31 **Indicator: Job Churning**

U.S. Department of Labor, Bureau of Labor Statistics, 2006 Business Employment Dynamics (2007), http://www.bls.gov/bdm.

Page 32 **Indicator: Fastest-Growing Firms**

Fast 500: Deloitte, "2007 Deloitte Technology Fast 500," www.public.deloitte.com/fast500.

Inc. 500: *Inc.* Magazine, "2008 Inc. 500 List." www.inc.com/resources/inc500/2008.

Total Firms: U.S. Small Business Administration, Office of Advocacy, "The Small Business Economy, 2006." www.sba.gov/advo/research/sb_econ2006.pdf.

Page 33 **Indicator: Initial Public Offerings**

State IPO Totals: Renaissance Capital's IPOHome.com. www.ipohome.com.

Worker Earnings: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts (2006). www.bea.gov/bea/regional/data.htm.

Page 34 **Indicator: Entrepreneurial Activity**

Entrepreneurs: Robert W. Fairlie, "Kauffman Index of Entrepreneurial Activity 1996-2007," *Ewing Marion Kauffman Foundation* (2008). www.kauffman.org/pdf/KIEA_state_052206.pdfwww.entrepreneurship.org/uploadedFiles/KIEA%202008.pdf.

Page 35 **Indicator: Inventor Patents**

Patents: U.S. Patent and Trademark Office, "Independent Inventors by State by Year: Utility Patents Report" (March 2007).

Workforce Age Population: U.S. Census Bureau, "PUMS," American Community Survey (2007). www.census.gov/acs.

Page 37 **Indicator: Online Population**
Households Online: U.S. Department of Commerce, National Telecommunications and Information Administration, *Networked Nation: Broadband in America 2007* (2008). www.ntia.doc.gov/reports/2008/NetworkedNation.html.

Page 38 **Indicator: Domain Name Registrations**
Registrations: Matthew Zook, University of Kentucky (July 2007).

Total Firms: U.S. Small Business Administration, Office of Advocacy, "Small Business Economic Indicators, 2006."

Page 39 **Indicator: Technology in Schools**
Education Week, "Technology Counts 2006" (May 2008). www.edweek.org.

Page 40 **Indicator: Digital Government**
Center for Digital Government, The Digital State 2006. www.centerdigitalgov.com/surveys.php?survey=states. Data made available by Paul W. Taylor.

Darrell M. West, "State and Federal E-Government in the United States, 2007," Taubman Center for Public Policy (August 2007). www.insidepolitics.org/egovt06us.pdf.

Page 41 **Indicator: Internet Use by Farmers**
U.S. Department of Agriculture, "Farm Computer Usage and Ownership" (August 2007). usda.mannlib.cornell.edu/usda/current/FarmComp/FarmComp-08-12-2005.pdf.

Page 42 **Indicator: Broadband Communications Use**
Broadband Lines: Federal Communications Commission, "High-Speed Services for Internet Access: Status as of June 30, 2008" (March 2008).

Households: U.S. Census Bureau, American Community Survey (2006). www.census.gov/acs.

Average Download Speed: "Speed Matters: A Report on Internet Speeds in All 50 States," Communication Workers of America (August 2008). http://www.speedmatters.org/document-library/sourcematerials/cwa_report_on_internet_speeds_2008.pdf

Page 43 **Indicator Health IT**
E-prescriptions: SureScripts, "National Progress Report on E-Prescribing" (December 2007). www.surescripts.com/Safe-Rx/default.aspx.

Page 45 **Indicator: High-Tech Jobs**
High-Tech Jobs: AeA, Cyberstates 2008 (Washington DC: 2008) and U.S. Department of Labor, Bureau of Labor Statistics, Quarterly Census of Employment and Wages (2006). www.bls.gov/cew.

Total Employment: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts (2006). www.bea.gov/bea/regional/data.htm.

Page 46 **Indicator: Scientists and Engineers**

Scientists and Engineers: National Science Foundation, Science and Engineering State Profiles 2005-2007 (May 2008). www.nsf.gov/statistics/nsf06314.

Total Employment: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts (2006). www.bea.gov/bea/regional/data.htm.

Page 47 **Indicator: Patents**

Patents: United States Patent and Trademark Office, Patent Counts by Country/State and Year: Utility Patents (2007).

Employment: U.S. Department of Labor, Bureau of Labor Statistics, Quarterly Census of Employment and Wages (2005). www.bls.gov/cew.

Page 48 **Indicator: Industry Investment in R&D**

Industry R&D: National Science Foundation, *InfoBrief* (2007).

Employment: U.S. Department of Labor, Bureau of Labor Statistics, Quarterly Census of Employment and Wages (2006). www.bea.gov/bea/regional/data.html.

Employment Compensation: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts (2006). www.bls.gov/cew.

Page 49 **Indicator: Non-Industry R&D**

State-based data—National Science Foundation, State Agency Research and Development Expenditures: Fiscal Year 2006 (May 2008). www.nsf.gov/statistics/nsf08310/content.cfm?pub_id=3850&id=2.

Non-state-based data: National Science Foundation, National Patterns of R&D Resources: 2004 (September 2007). http://www.nsf.gov/statistics/nsf07331/content.cfm?pub_id=3829&id=2.

Page 50 **Indicator: Movement Toward a Green Economy**

Energy Consumption 2005: Energy Information Administration, "Annual Energy Review 2007" (June 2008). www.eia.doe.gov.

Energy Consumption 2000: Energy Information Administration, "Annual Energy Review 2002" (June 2003). www.eia.doe.gov.

Page 51 **Indicator: Venture Capital**

Venture Capital: PricewaterhouseCooper/Venture Economics/NVCA MoneyTree Survey (2008).

Worker Earnings: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts (2007). www.bea.gov/bea/regional/data.htm.

Appendix: Weighting Methodology

Raw scores were calculated for each state for each indicator. In the composite analyses, the indicators are weighted according to their relative importance and so that closely correlated ones do not bias the results. In addition, to measure the magnitude of differences between states and not just their ranks, in each indicator, scores were based on the standard deviation of each from the mean score of all of the states.

Weighting factors for final score:

KNOWLEDGE JOBS	**Weight**
IT Professionals	0.75
Professional and Managerial Jobs	0.75
Workforce Education	1.00
Immigration of Knowledge Workers	0.50
U.S. Migration of Knowledge Workers	0.50
Manufacturing Value-Added	0.75
Traded-Services Employment	0.75
Total	**5.00**
GLOBALIZATION	
Export Focus on Manufacturing and Services	1.00
FDI	1.00
Total	**2.00**
ECONOMIC DYNAMISM	
Gazelles	1.00
Job Churning	1.00
IPOs	0.50
Entrepreneurial Activity	0.75
Inventor Patents	0.50
Fastest-Growing Firms	0.75
Total	**4.50**
DIGITAL ECONOMY	
Online Population	0.50
Domain Names	0.75
Technology in Schools	0.50
Digital Government	0.50
Farms and Technology	0.50
Broadband	1.00
Health IT	0.50
Total	**4.25**
INNOVATION CAPACITY	
High-Tech Employment	0.75
Scientists and Engineers	0.75
Patents	0.75
Industry R&D	1.00
Non-industry R&D	0.50
Green Economy	0.50
Venture Capital	0.75
Total	**5.00**

ENDNOTES

1 The first two were written by one of the authors when he was with the Progressive Policy Institute. Robert D. Atkinson and Randall Court, *The 1999 State New Economy Index*, Progressive Policy Institute, Washington, D.C., 1999; and Robert D. Atkinson, *The 2002 State New Economy Index*, Progressive Policy Institute, Washington, D.C., 2002. www.neweconomyindex.org.

2 U.S. Bureau of Labor Statistics. www.bls.gov.

3 Based on currency purchasing-power-parity measurement.

4 John Haltiwanger, "Entrepreneurship and Job Growth" (cited in Council on Competitiveness, 2006). "Competitiveness Index: Where America Stands" (Council on Competitiveness, November 14, 2006: 76).

5 Robert D. Atkinson and Andrew S. McKay, *Digital Prosperity: Understanding the Economic Impact of the IT Revolution*, (Washington, D.C.: Information Technology and Innovation Foundation, 2007). www.itif.org/files/digital_prosperity.pdf (accessed July 27, 2008).

6 Atkinson and McKay, 2007, op. cit.

7 For example, Oliner and Sichel found that the use of computers and the production of computers added two-thirds of the 1 percentage point step-up in productivity growth between the first and second half of the decades. Steven D. Oliner and Daniel E. Sichel, "The Resurgence of Growth in the Late 1990s: Is Information Technology the Story?" *FEDS Working Paper* 2000-20 (Social Science Research Network, March 17, 2000).

8 For more information, see Atkinson and McKay, 2007, op. cit.

9 For example, Apple's decision to roll out its new video iPod was a decision that was largely enabled by the rapid fall in price and expansion in capacity of digital storage. As technology continues to improve, it will enable improvements in a wide array of areas, such as better voice, handwriting and optical recognition; better intelligent agents that routinely filter and retrieve information based on user preferences; and expert systems software to help make decisions in medicine, engineering, finance, and other fields. Moreover, new software applications, such as service-oriented architecture and Web services, allow organizational functions to be broken down into standard, re-usable components, significantly improving efficiencies.

10 "Comparative Estimates: Broadband Households in the U.S., 2004-2010," in *Worldwide Online Access: 2004-2010* (eMarketer.com, May 1, 2006).

11 Robert D. Atkinson and Daniel Castro, *Digital Quality of Life: How IT is Producing a Better Quality of Life*, (Washington, D.C.: Information Technology and Innovation Foundation, 2008).

12 See Robert D. Atkinson, *The Past and Future of America's Economy: Long Waves of Innovation that Power Cycles of Growth* (Northampton, MA: Edward Elgar, 2004).

13 Robert D. Atkinson, "Deep Competitiveness," *Issues in Science and Technology* (National Academies, January 2007).

14 Carnegie Mellon, The Robotics Institute Web site, www.ri.cmu.edu/ (accessed September 17, 2008).

15 Frederic M. Scherer, *New Perspectives on Economic Growth and Technological Innovation* (Washington, D.C.: Brookings Institution Press, 1999), 119.

16 A more accurate measure that omits computers which, because of the way BEA accounts for increases in processing power and price declines, account for 96 percent of the increase in durable goods output since the early 1990s.

17 The Baltic Exchange, "Baltic Exchange Capesize Index." www.balticexchange.com/default.asp?action=article&ID=561&IndexGroupID=1.

18 Population Profile of the United States, U.S. Census Bureau, "National Population Projections." www.census.gov/population/www/pop-profile/natproj.html.

19 Joel Kotkin and Delore Zimmerman, "Rebuilding America's Productive Economy: A Heartland Development Strategy," New America Foundation, Washington, D.C., October 2006. www.newamerica.net/files/NAF_HeartlandReport_F.pdf.

20 For example, with the 2000 Lisbon Proclamation, Romano Prodi, President of the European Commission, committed the European Union to becoming the world's innovation leader to ensure prosperity and a high standard of living in the EU. Similarly, in 2006, the National Governors' Association in the United States named innovation as the number one priority in its mandate for *Innovation America*.

21 For example, some states appear to report wireless broadband services (e.g., their "Blackberry" account) their employees use as business broadband lines while others don't.

22 This is done by measuring the overall propensity to export (or patent or invest in R&D) of each industry sector, and multiplying the number of jobs in each sector for each state by that sector's national propensity to export factor. These were summed to create an adjusted total number of jobs for each state. A ratio was calculated comparing the unadjusted to the adjusted. If the ratio was larger than one, the state's industrial mix was slanted toward industries that tend to export less. If it was smaller than one, the state had more jobs than the national average in industries that export more. The total value of exports was multiplied by the ratio for a final adjusted score.

23 To control for the fact that IT workers are heavily employed in IT sectors, such as software, computer and office equipment, and computer-related services, which are measured in the High-Tech Jobs indicator, this indicator estimates the number of IT jobs in IT sectors and subtracts this number from the total number of workers in IT occupations in a state. This enables a more accurate picture of the extent to which non-IT industries (e.g., other than software) employ IT professionals.

24 Moreover, this does not account for the fact that improved technology allows the same number of workers today to manage more IT than they could even a few years ago.

25 AeA, *Virginia Now Has the Highest Concentration of Technology Workers in the Nation*, *AeA Says: Second Straight Year of Fast Job Growth Vaults Virginia Past Colorado*, (Washington, D.C., April 24, 2007). www.aeanet.org/pressroom/prjj_cs2007_virginia.asp.

26 To count overall state employment, the 2007 Index uses BEA employment data, which includes full-time and part-time workers in all sectors, including agriculture and government. A more narrowly defined measure of total employment was used for many indicators in the 2002 Index. These have been revised in order to make them comparable, resulting in some small changes in state ranks. It is noted throughout the Index where such changes have been made. Still, because industry employment in the 2002 IT Jobs indicator was compiled with SIC classification and the 2007 data is tallied with NAICS, some small differences in industry employment counts between years may exist, rendering the measures from the two years not completely comparable.

27 Managerial and professional jobs were calculated from twenty-five separate Bureau of Labor Statistics Occupational Employment Statistics codes.

28 Each state's population, aged twenty-five years or older, was classified by educational attainment. The percentage of the population with less than a high school degree was weighted with a multiplier of -.5. Residents with some college (at least a year) but no degree were weighted with a multiplier of 0.25. Those possessing associate's degrees were given a weight of 0.5. The multiplier for the percentage of residents with a bachelor's degree was 1.0, and the multiplier for master's and professional degrees was 1.5. Doctorates received a weight of 2.0. The weighted percentages for each state's population were added to find each state's total score. In other words, a state where 15 percent of the residents had some college but no degree (earning a weighted score of 3.75), 10 percent held an associate's degree (a weighted score of 5), 20 percent held a bachelor's degree (a weighted score of 20), 10 percent held a master's or professional degree (a weighted score of 15) and 1 percent held a doctorate (a weighted score of 2), would earn a total score of 45.75.

29 Stuart A. Rosenfeld and Robert D. Atkinson, "Engineering Regional Growth," *Growth Policy in the Age of High Technology*, Jurgen Schmandt and Robert Wilson eds. (Boston, MA: Unwin Hyman, 1990).

30 U.S. Census Bureau, "Residence One Year Ago by Educational Attainment in the United States," *2005 American Community Survey*. http://www.census.gov/acs.

31 This indicator classifies by years of education each state's residents, aged twenty-five years or older, who had lived abroad one year prior. Because the available data categories for educational attainment of migrants are imprecise, the numbers of years assigned to them are estimates. For example, those with high school degrees are estimated to have spent twelve years in school, those with some college or an associate's degree, fourteen years, and bachelor's degrees, sixteen years. Postgraduate degrees were assigned a value of 18.95 years, based on the overall average number of years of schooling of the U.S. population of graduate, professional, and doctorate holders. Those with less than a high school degree were given a score of zero. Each state's final score is the average of its migrants' average years of education.

32 David Hart, "Global Flows of Talent: Benchmarking the United States," Information Technology and Innovation Foundation, Washington, D.C., November 2006. www.itif.org/files/Hart-GlobalFlowsofTalent.pdf.

33 Paula E. Stephan and Sharon G. Levin, "Exceptional Contributions to U.S. Science by Foreign-Born and Foreign-Educated," *Population Research and Policy Review* 20:59-79 (2000).

34 Ewing Marion Kauffman Foundation, "Entrepreneurship," 2008. www.kauffman.org/items.cfm?itemID=1036 (accessed September 23, 2008).

35 The methodology for this indicator is identical to the indicator classifying education attainment of foreign immigrants.

36 CNN.com/Transcripts, "Why Do Americans Move So Often?" aired August 5, 2001. transcripts.cnn.com/TRANSCRIPTS/0108/05/sun.10.html.

37 There is a strong correlation between a state's per-capita income and its ability to attract knowledge workers (0.69). Also, see Paul D. Gottlieb and Michael Fogarty, "Educational Attainment and Metropolitan Growth," *Economic Development Quarterly* 17 (4): 325-336 (2003). edq.sagepub.com/cgi/content/abstract/17/4/325.

38 There is a 0.63 correlation between employment in managerial, professional, and technical jobs and immigration of knowledge workers.

39 The correlation between workforce education and immigration of knowledge workers is quite high (0.87).

40 Nationally, each NAICS three- and four-digit manufacturing sector's value-added was divided by the number of production hours worked to obtain an average value-added per production hour worked. The same was done at the state level, and the state and national figures were compared for each sector in each state. The number of employees per state sector was multiplied by the value-added per-production hour worked for that state sector as a percent of that sector's national average of value-added per-production hour.

41 Of eighty-eight four- and five-digit NAICS-traded service sectors, fourteen IT sectors were removed in order to avoid redundancy, as their employment is measured by the High-Tech Jobs indicator. Among the remaining seventy-four traded-service sectors, thirty-five pay average wages above the overall median for traded-service sector average wages. Employment in these thirty-five sectors was tallied for each state, and measured as a share of each state's total service sector employment.

42 Earl H. Fry, *The North American West in a Global Economy* (Los Angeles, CA: Pacific Council on International Policy, 2000). www.pacificcouncil.org/pdfs/fry%20report%20final.final.pdf.

43 *Business Week*, August 28, 2000: 200.

44 Data for exports by state are available for all manufacturing industries, but only four service industries: publishing industries (except Internet); telecommunications; professional, scientific, and technical services; and administrative and support, and waste management and remediation services.

45 To better measure the propensity of all companies to export, export scores are calculated by controlling for the overall industrial mix in each state. Service exports account for only 6 percent of total exports analyzed, due to the limitations in available service export data. For a list of services measured see endnote 61.

46 J. Bradford Jensen, "Business Service Exporters," *Peterson Institute Working Paper*, 2007.

47 Because 2002 scores reflect only manufacturing exports, they are not completely comparable. 1999 scores are not adjusted for industrial mix, and so are not included in the comparison.

48 Lawrence R. McNeil, "Foreign Direct Investment in the United States," *Survey of Current Business* (June 2006).

49 The measured period of growth spans from January 1, 2002, to January 1, 2006.

50 Erkko Autio, "High-Expectation Entrepreneurship 2005," *Global Entrepreneurship Monitor*, 2005. www.gemconsortium.org/document.asp?id=444.

51 To counteract any potential anomalies, the number of business startups and failures were measured for two years, 2006 and 2007, and averaged.

52 U.S. Census Bureau, "Statistics of U.S. Businesses 2002-2003." This is the latest data available.

53 There is a correlation of 0.38 between churning and job growth from 2002 to 2006.

54 Because of some anomalies within the most recent Small Business Administration's job opening and closing data, the *2008 Index* draws from the Department of Labor's establishment data. To better account for annually volatility, data for firm openings and closing are taken from 2006 and 2007 and averaged.

55 The numbers from the Fast 500 and the Inc. 500 represent data from both 2006 and 2007 surveys. To qualify for the Fast 500, a company must a) own proprietary intellectual property or technology, b) be incorporated for a minimum of five years, and c) have operating revenues in a base year of $50,000 and current-year operating revenues exceeding $5 million. To qualify for the Inc. 500, a company must be privately held and in operation for a minimum of four years with at least $600,000 in revenues in the base year. The Fast 500 is selected through research and a nomination process and open to firms in North America, while the Inc. 500 list is chosen on an application basis and open only to U.S. firms.

56 INC.5000, INC.com Web site. images.inc.com/inc5000/hub/2008/pdfs/500spots.pdf.

57 The IPO measure is a weighted measure of the sum of the standard deviations for the number of IPOs as a share of worker earnings and the total value of IPOs as a share of worker earnings. Because the number of deals in many states is relatively small, a single large deal can have an enormous impact on the value measure for that year. To mitigate this volatility, combined figures from the three most recent years were used (2004-2006), and greater weight was assigned to the number of deals (a weight of 0.7) than the value (a weight of 0.3).

58 PriceWaterhouseCoopers, "After A Record Year of U.S. IPO Activity In 2007, 2008 Is Off to a Sluggish Start," 2008. www.pwc.com/extweb/ncpressrelease.nsf/docid/595A78775ABD5DCB852574320071A8CA.

59 PriceWaterhouseCoopers, "After A Record Year of U.S. IPO Activity In 2007, 2008 Is Off to a Sluggish Start," 2008. www.pwc.com/extweb/ncpressrelease.nsf/docid/595A78775ABD5DCB852574320071A8CA.

60 The 2002 Index measured IPOs as a percentage of GSP, while the *2007 Index* measures them as a share of worker earnings.

61 Compiled by Robert Fairlie, the "Kauffman State Index of Entrepreneurial Activity," used in this indicator, measures the total number of entrepreneurs to start new employer and non-employer firms in a year, as a share of each state's total population. His results for 2006 and 2007 were averaged, and then adjusted to account for differing growth rates, because fast-growing states offer more opportunities for local-serving entrepreneurial activity than do states without such rapid population and employment growth and, as a result, tend to score better. To account for this, the rate of aggregate personal income growth over a four-year span was calculated for each state and the standard deviation taken. For every standard deviation above the national average in income growth, a state would see its index score reduced by 10 percent. The opposite was true for states below the national average in income growth. For example, a state with an average entrepreneurial index score of 0.30 percent, but with an income growth rate 0.5 standard deviations below the national average, would receive an adjusted score of 0.315 percent.

62 Erkko Autio, 2005, op. cit.

63 Population for this indicator is the number of people of workforce age, which is considered to be those between ages eighteen and sixty-four. Patents counted here also are counted in the Patents indicator, which measures the total number of patents. In the final state scores, the relative weight of the Inventor Patents indicator has been reduced accordingly.

64 The correlation is 0.40.

65 Atkinson and McKay, 2007, op. cit., 29.

66 Industry Analysis and Technology Division, Wireline Competition Bureau, U.S. Federal Communications Commission, "High Speed Services for Internet Access: Status as of June 30, 2007," Table 13 (March 2008).

67 Indeed, economists estimate that all of the increase in productivity growth rates of the last decade was a result of the IT revolution.

68 Thomas Hubbard, "Information, Decisions, and Productivity: On-board Computers and Capacity Utilization in Trucking," *The American Economic Review* 93 (2003): 1328.

69 Pew Internet & American Life Project, "Internet Adoption: Usage Over Time," 2006. www.pewinternet.org/trends.asp#adoption.

70 Pew Internet & American Life Project, "Generations Online," January 2006. www.pewinternet.org.

71 State scores for online population are correlated with workforce education (0.64) and per-capita income levels (0.52).

72 Of the total number of registered .com, .net, and .org domain names measured, approximately 80 percent are commercial (.com), and this proportion is relatively consistent across states. It also should be noted that the number of commercial domains registered in a state is not an exact measure of the number of businesses with Web sites for a number of reasons. First, not all registered domains are actually in use. (Sometimes organizations register names they think they might use. And some domain names are held by speculators hoping to sell them.) Secondly, many domain names are registered by individuals for non-commercial purposes, to create personal Web pages, fan sites, and the like. And, of the domains registered to businesses, not all of them are for commercial purposes, per se. (Some companies create rudimentary Web pages simply to make sure they're on the map, just as they might place an ad in the Yellow Pages. Others invest hundreds of thousands or millions of dollars building elaborate e-commerce systems in order to sell to markets around the world.) Nonetheless, these factors will be true across all states, and thus should cancel each other out.

73 Matthew Zook, University of Kentucky.

74 Factors used in this indicator were students per instructional computer (2006), students per high-speed Internet-connected computer (2006), and students per Internet-connected computer in the classroom (2006). These received weights of 0.2, 0.5, and 0.3., respectively.

75 Cathy Ringstaff and Loretta Kelley, *The Learning Return on Our Educational Technology Investment* (San Francisco, Calif.: WestEd, 2002). www.WestEd.org/online_pubs/learning_return.pdf.

76 "Technology Counts 2006: The Information Edge," *Education Week* (May 2006). www.edweek.org.

77 To calculate the final scores for this indicator, the standard deviation scores of each study's final scores were combined and then divided by two. *Digital State* scores were provided by Paul Taylor at the Center for Digital Government. Because *Digital State 2006* scores for six states were not available (Alaska, Florida, Indiana, New Jersey, New Mexico, and West Virginia), their *Digital State 2004* scores were used, after adjustment by the overall average percent change in score from 2004 to 2006. Scores for Alaska and New Mexico represent average scores between 1999-2004, after adjustment. It also should be noted that the two studies that constitute the Digital Government indicator are highly correlated.

78 Robert D. Atkinson, "Turbo Government: A Bold New Vision for E-government," Information Technology and Innovation Foundation, Washington, D.C., June 2006, www.itif.org/files/turbogov.pdf.

79 Darrell M. West, *State and Federal E-Government in the United States* (Providence, R.I.: Brown University, Taubman Center for Public Policy, August 2007): 4. www.insidepolitics.org/egovt07us.pdf.

80 The standard deviations of the two percentages were combined for each state's final score. Because data are not available for Alaska and Hawaii, they have been assigned scores equivalent to the national median.

81 U.S. Department of Agriculture, "Farm Computer Usage and Ownership," (2005). usda.mannlib.cornell.edu/usda/current/FarmComp/FarmComp-08-12-2005.pdf.

82 In several cases, USDA reports farm computer and Internet usage for multiple states with a single overall average score. This is the case for Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.

83 The 2008 Index does not contain information on business lines because the FCC counts cell phones as business lines in some states, which weakens the value of those states' figures. Also, in order to better capture a state's broadband capabilities, the 2008 Index weighs a state's median download speed with the number of residential lines. The standard deviation of the two measures was combined for a final score.

84 Industry Analysis and Technology Division Wireline Competition Bureau, Federal Communications Commission, "High-Speed Services for Internet Access: Status as of December 31, 2007," (July 2008).

85 John B. Horrigan, "Home Broadband Adoption 2006: Home broadband adoption is going mainstream and that means user-generated content is coming from all kinds of Internet users," Pew Internet and American Life Project, Washington, D.C., May 2006. www.pewinternet.org/pdfs/PIP_Broadband_trends2006.pdf.

86 U.S. Census, American Fact Finder 2007.

87 RAND researchers estimate, for example, that the annual savings from health IT for the United States could average almost $81 billion. Federico Girosi, Robin Meili, and Richard Scoville, E*xtrapolating Evidence of Health Information Technology Savings and Costs* (Santa Monica, CA: RAND Corporation, 2005). rand.org/pubs/monographs/ 2005/RAND_MG410.pdf (accessed July 23, 2008). Other researchers have estimated national savings for the United States of $78 billion per year. Jan Walker et al. "The Value of Health Care Information Exchange and Interoperability," *Health Affairs* (Web exclusive, posted January 19, 2005). content.healthaffairs.org/cgi/content/full/hlthaff.w5.10/DC1 (accessed July 23, 2008).

88 The Henry J. Kaiser Family Foundation, "Health Care Spending in the United States and OECD Countries," January 2007. www.kff.org/insurance/snapshot/chcm010307oth.cfm.

89 SureScripts, "National Progress Report on E-Prescribing," December 2007. www.surescripts.com/pdf/National-Progress-Report-on-EPrescribing-1.pdf.

90 John Halamka, Jerilyn Heinold, Gail Fournier, Diane Stone, and Kate Berry, "E-Prescribing in Massachusetts: Collaboration Leads to Success," *Patient Safety and Quality Health Care (PSQH) e-Newsletter* (September/October 2006). www.psqh.com/sepoct06/e-prescribing.html.

91 Rhode Island Quality Institute, "E-Prescribing." www.riqi.org/matriarch/MultiPiecePage.asp_Q_PageID_E_24_A_PageName_E_StrategicInitTTCEPrescribing (accessed September 23, 2008).

92 Peter J. Klenow and Andres Rodriguez, "The Neoclassical Revival in Growth Economics: Has It Gone Too Far?" *NBER Macroeconomics Journal* 12 (1997): 73-103.

93 This indicator includes the NAICS codes from the AeA definition, found in "Cyberstates," plus the following biomedical industries: NAICS codes 32541, 333314, 33911, 5417, and 62151. Altogether, this includes computer and office equipment, consumer electronics, communications equipment, electronic components and accessories, semiconductors, industrial electronics, photonics, defense electronics, electro medical equipment, pharmaceuticals, optical instruments and lenses, navigational, medical, measuring and control instruments, medical equipment and supplies, scientific R&D services, medical and diagnostic laboratories, communications services and software, and computer-related services. Employment in these industries is measured as a share of each state's overall employment.

94 Atkinson and McKay, 2007, op. cit. See note 5.

95 AeA, *Cyberstates 2006* (Washington, D.C.: 2006), and Atkinson and McKay, 2007, op. cit.

96 There are slight methodological differences between the 2002 and 2007 scores in the calculation of biomedical sector employment. The 2002 scores have been modified to be comparable.

97 Scientists and engineers include only those who have attained a doctorate in their fields. They are measured as a share of each state's total workforce.

98 To better measure the propensity of all companies to patent, patent scores are calculated by controlling for the overall industrial mix in each state.

99 1999 scores are not adjusted for industrial mix, and so are not included in the comparison.

100 To better measure the propensity of all companies to invest in R&D, R&D scores are calculated by controlling for the overall industrial mix in each state.

101 National Science Foundation, Industrial Research and Development Information System Web site, 2006. www.nsf.gov/statistics/iris/.

102 The *2002 Index* measured industry R&D as a percentage of GSP, while the *2008 Index* measures it as a share of worker earnings. The 2002 scores have been recalculated for comparability. 1999 scores are not adjusted for industrial mix, and so are not included in the comparison.

103 Fred Block and Matthew R. Keller, "Where do Innovations Come From?: Transformations in the U.S. National Innovation System, 1970-2006," Information Technology and Innovation Foundation, Washington, D.C., July 2008. www.itif.org/files/Where_do_innovations_come_from.pdf.

104 Federal Research and Development in Maryland, "Chapter 21: Discovery and Innovation." www.rand.org/pubs/monograph_reports/MR1194/MR1194.chap21.pdf.

105 Joseph Romm, "The Internet and the New Energy Economy," *Proceedings of the E-Vision 2000: Key Issues That Will Shape Our Energy Future Conference—Supplementary Materials: Papers and Analyses*, CF-170/1-1-DOE (Arlington, Virginia: RAND, 2001): 137. www.rand.org/scitech/stpi/.

106 Energy Information Administration, U.S. Department of Energy, "Annual Energy Review 2007," Table 2.4: 87. tonto.eia.doe.gov/FTPROOT/multifuel/038407.pdf.

107 Venture capital investment is measured over the course of 2007 and the first quarter of 2008.

108 Global Insight, "Venture Impact 2004: Venture Capital Benefits to the U.S. Economy," National Venture Capital Association, Washington, D.C., July 2004. www.planotecnologico.pt/document/venture_impact_2004.pdf.

109 The *2002 Index* measured venture capital as a percentage of GSP, while the *2007 Index* measures venture capital as a share of worker earnings. The 2002 scores have been recalculated for comparability.

110 John Maynard Keynes.

111 Randall L. Patton and David B. Parker, *Carpet Capital: The Rise of a New South Industry* (Athens, GA: University of Georgia Press, 1999), 63.

112 As the Tax Foundation notes, "Good state tax systems levy low, flat rates on the broadest bases possible, and they treat all taxpayers the same. Variation in the tax treatment of different industries favors one economic activity or decision over another." Chris Atkins and Curtis S. Dubay, *Background Paper: State Business Tax Climate Index* (fourth Edition), Washington, D.C.: Tax Foundation, October 2006. www.taxfoundation.org/research/show/78.html.

113 Small Business and Entrepreneurship Council, Small Business and Entrepreneurship Council Web site. www.sbsc.org/home/index.cfm. See also Atkins and Dubay, 2006, op. cit.

114 "Year-to-Date New Plant Report," (Conway Data, Inc, 1991-2005).

115 Bureau of Labor Statistics, Business Employment Dynamics.

116 The actual correlation is positive, but a high score on the Tax Foundation index represents low taxes and vice versa. In this regard, there is a negative correlation between per-capita income growth and low taxes.

117 Perhaps one reason for this result is that the Tax Foundation index does not measure actual tax burden, but rather measures like tax rate. In other words, it simply assumes that states with higher rates but more deductions (for example, the R&D credit) are worse than states with lower rates and no deductions. But, from the perspective of the firm, they are the same in terms of amount of taxes paid.

118 Economic Analysis and Research Network, "Economic Development." www.earncentral.org/economic-development.htm (accessed September 23, 2008).

119 Robert D. Atkinson, "The Research and Experimentation Tax Credit: A Critical Policy Tool for Boosting Research and Enhancing U.S. Economic Competitiveness," Information Technology and Innovation Foundation, Washington, D.C., September 2006. www.itif.org/files/R&DTaxCredit.pdf.

120 See for example, OECD Science, Technology and Industry Scoreboard 2007: Innovation and Performance in the Global Economy (Paris: OECD, 2007).

121 Donald Grimes and Lou Glazer, "A New Path to Prosperity? Manufacturing and Knowledge-Based Industries as Drivers of Economic Growth," (Ann Arbor, Mich.: Michigan Future Inc. and University of Michigan, 2004).

122 Porter, op. cit., 553.

123 Harvey A. Goldstein, "Estimating Universities' Contributions to Regional Economic Development: The Case of the U.S.," (with Catherine S. Renault) in G. Maier, ed., *Spillovers and Innovations: City, Environment and the Economy* (Vienna, Austria: Springer-Verlag, 2004).

124 Another study that took telecommunications as its independent variable was Yilmaz & Dinc, 2002. Their research involved the relationship between "telecommunications investment" and output growth in the service sector at the state level. Their findings suggested that telecommunications investment (determined at the state level) is positively related to output growth in the service sector. Serdar Yilmaz and Mustafa Dinc, "Telecommunications and regional development: Evidence from the U.S. States," *Economic Development Quarterly*, 16 (3) (2002): 211-228.

125 "State Broadband Initiative," A Joint Report of The Alliance for Public Technology and the Communications Workers of America, July 2008. www.apt.org/publications/reports-studies/state_broadband_initiatives.pdf. See also Ryan Miller, "Issue Brief: State Efforts to Expand Broadband Access," NGA Center for Best Practices, Washington, D.C., 2008. www.nga.org/Files/pdf/0805BROADBANDACCESS.PDF.

126 See ConnectKentucky.org, Message From Our Steering Committee Chairman: "More impressive than the positive publicity generated by ConnectKentucky are the nonprofit group's results that have sparked a technology and economic development turn-around for the Commonwealth. ConnectKentucky connects people to technology in a way that helps improve their lives. Previously declining Kentucky communities are now connected to high-speed Internet (broadband) and it is making a difference." John R. Hall, "Message From Our Steering Committee Chairman," ConnectKentucky Web site. www.connectkentucky.org/about_us/Message_from_Our_Steering_Committee_Chairman.php.

127 Cleantech, "Cleantech Cash: Cleantech Venture Investment in North America, Europe, China, and India." media.cleantech.com/3070/cleantech-cash.

128 CleanEdge, "Clean Tech: Profits and Potential." www.cleanedge.com/reports/reports-profits.php.

129 The Great Lakes Entrepreneur's Quest, a program in Michigan, is similar. Its organizers represent Michigan's entrepreneurial community: academics, investors, lawyers, CPAs, corporate executives, and other entrepreneurs. Competitors have a chance to win seed capital and valuable services (e.g., legal, accounting, and consulting), and other opportunities to help entrepreneurs launch or grow a business.

130 Institute for Open Economic Networks, Institute for Open Economics Web site. http://www.i-open.org/.

131 For example, see defragohio.net/wiki/show/participate.

132 Jeneanne Rae, "A Ripe Time for Open Innovation," *BusinessWeek Online*, March 19, 2008. www.businessweek.com/innovate/content/mar2008/id20080319_656312.htm.

133 Henry Chesbrough, *Open Innovation: The New Imperative for Creating and Profiting from Technology* (Boston, Mass.: Harvard Business School Press, 2003).

134 Michael Docherty, "Primer on 'open innovation': Principles and Practice," *PDMA Visions* Vol. XXX, No. 2 (April 2006): 13-17. www.venture2.net/clientuploads/Visions_April06_Docherty.pdf.

135 Marina N. Whitman, *New World, New Rules: The Changing Role of the American Corporation* (Boston, Mass.: Harvard Business School Press, 1999).

136 Organization for Economic Co-Operation and Development (OECD), *Science, Technology, and Innovation in the New Economy* (Paris: OECD, 2000).

137 See Atkinson and McKay, 2007, op. cit.

138 Oklahoma Department of Commerce, "2008 Oklahoma Incentives and Tax Guide," updated February 21, 2008. staging.okcommerce.gov/test1/dmdocuments/2008_Oklahoma_Business_Incentives_Tax_Information_Guide_210208170.pdf#page=28. See also Illinois: www.iltax.com/taxforms/Sales/st16c.pdf.

New Jersey provides a tax credit on manufacturing equipment purchases, but only for machinery, apparatus, or equipment that is directly used in production and only when used to initiate, sustain, or terminate the transformation of raw materials into finished products. www.nj.gov/treasury/taxation/pdf/other_forms/cbt/2007/07305.pdf.

139 Atkinson, September 2006, op. cit.

140 Lolita Paff, "State-Level R&D Tax Credits: A Firm-Level Analysis," *Topics in Economic Analysis and Policy* 5 (2005). Indeed, a San Francisco Federal Reserve Bank study found that state R&D tax credits stimulated a relocation of R&D from states with less-generous credits to states with more generous ones. Daniel J. Wilson, "Beggar Thy Neighbor? The In-State, Out-of-State, and Aggregate Effects of R&D Tax Credits," *FRBSF Working Paper Series* (Federal Reserve Bank of San Francisco, April 2006).

141 Yonghong Wu, "State R&D Tax Credits and High-Technology Establishments," *Economic Development Quarterly* 22 (2008): 136-148.

142 For a list of states with credits, see Angela Gullickson and Amy Rehder Harris, "Iowa's Research Activities Tax Credit Tax Credits Program Evaluation Study," Tax Research and Program Analysis Section, Iowa Department of Revenue, January 2008: 37. www.iowa.gov/tax/taxlaw/IDRTaxCreditEvalJan2008.pdf.

143 For a comprehensive review of how state and local governments can provide entrepreneurial support, see a report from the Kauffman Foundation and the International Economic Development Council, "Entrepreneurial Support: Executive Summary. http://www.kauffman.org/pdf/entrepreneurshipsummitpaper9-03.pdf.

144 Robert D. Atkinson, "Turbo Government": A Bold New Vision for E-government," op.cit.

145 In 2005, angel investors actually invested more ($23.1 billion) than did venture firms ($22.4 billion). State venture capital programs invested about a tenth of this amount ($2.2 billion). Source: "Competitiveness Index, Where America Stands" (Council on Competitiveness, 2006).

146 "State Policies for Supporting Angel Investing," (National Governors' Association, 2007).

147 KCSourceLink, "A Program of the Institute for Entrepreneurship & Innovation at the University of Missouri-Kansas City," www.kcsourcelink.com.

148 Kentucky Entrepreneurial Coaches Institute. kybizcoach.blogspot.com/.

149 AnnaLee Saxenian, *Silicon Valley's New Immigrant Entrepreneurs* (San Francisco, Calif.: Public Policy Institute of California, June 1999). www.ppic.org/main/publication.asp?i=102.

150 Vivek Wadhwa, AnnaLee Saxenian, Ben Rissing, and Gary Gereffi, *America's New Immigrant Entrepreneurs* (Master of Engineering Management Program, Duke University; School of Information, U.C. Berkeley, January 4, 2007). www.kauffman.org/pdf/entrep_immigrants_1_61207.pdf.

151 Stuart Anderson and Michaela Platzer, *American Made: The Impact of Immigrant Entrepreneurs and Professionals on U.S. Competitiveness* (Arlington, Va.: National Venture Capital Association, November 15, 2006). www.nvca.org/pdf/AmericanMade_study.pdf.

152 Jonathan Bowles and Tara Colton, *A World of Opportunity* (New York, N.Y.: Center for an Urban Future). http://www.nycfuture.org/images_pdfs/pdfs/IE-final.pdf.

153 Audrey Singer, *The Rise of New Immigrant Gateways* (Washington, D.C.: Center on Urban and Metropolitan Policy, The Brookings Institution, February 2004). www.brookings.edu/urban/pubs/20040301_gateways.pdf.

154 Welcoming Center for New Pennsylvanians, Welcoming Center for New Pennsylvanians Web site. www.welcomingcenter.org/about/mission.php.

155 Tom Breckenridge, "Talent Blueprint Project Promotes Bringing In Foreign-Born Business Talent," The Plain Dealer blog, Cleveland.com Web site, posted July 7, 2008. blog.cleveland.com/business/2008/07/talent_blueprint_project_promo.html.

156 Freeman and Perez (1988), 47.

157 Brown (2003).

158 Clayton M. Christensen, Curtis W. Johnson, and Michael B. Horn, *Disrupting Class: How Disruptive Innovation Will Change the Way the World Learns* (New York: McGraw Hill, 2008).

159 Lerman, 67.

160 Ted Kolderie, *Creating the Capacity for Change: How and Why Governors and Legislatures are Opening a New-Schools Sector in Public Education* (Education Week Press, 2004).

161 The National Foundation for Teaching Entrepreneurship, The National Foundation for Teaching Entrepreneurship Web site. www.nfte.com/whatwedo/programs/ (accessed September 23, 2008).

162 Minnesota New Country School, Minnesota New Country School Web site. www.newcountryschool.com/ (accessed September 23, 2008).

163 Project Lead the Way, Project Lead the Way Web site. www.pltw.org/index.cfm (accessed September 23, 2008).

164 Robert D. Atkinson, Dennis Lundgren, Martin J. Shapiro, Jerald Thomas, and Janet Hugo, "Addressing the STEM Challenge by Expanding Specialty Math and Science High Schools," Information Technology and Innovation Foundation, Washington, D.C., March 2007. www.itif.org/files/STEM.pdf.

165 Peter Cappelli, "Schools of Dreams: More Education Is Not an Economic Elixir," *Issues in Science and Technology* (2008): 61.

166 Lerman, 66.

167 Lerman, 67.

168 Spellings Commission, op. cit.

169 Peter Capelli, *Talent Management for the Twenty-first Century* (Boston, Mass.: Harvard Business Review, March 2008), 4.

170 In 1988, training expenditures by organizations in the United States was about 0.82 percent of GDP. See Robert D. Atkinson, *The New Economy Index* (Washington, D.C.: The Progressive Policy Institute, 1998). www.neweconomyindex.org/index_nei.html. By 2007, training expenditures had declined to 0.42 percent of GDP. Source: ManageSmarter, "Training Magazine's 2007 Industry Report," August 18, 2008. www.trainingmag.com/msg/content_display/publications/e3ib4fbcf3a3d03c749c530aa54043278f5.

171 "State Sector Strategies: Regional Solutions to Worker and Employer Needs," NGA Center for Best Practices, Washington, D.C., 2006.

172 Precision Manufacturing Institute, Precision Manufacturing Institute Web site. www.pmionline.edu/.

173 Advanced Skill Center, William F. Goodling Regional ASC Web site. www.advskills.org/index.html.

174 New Century Careers, New Century Careers Web site. www.ncsquared.com/.

175 Rhode Island Economic Development Corporation, "Workforce Development." www.riedc.com/riedc/business_services/6/.

176 National Survey of Student Engagement, National Survey of Student Engagement Web site. nsse.iub.edu/index.cfm.

177 AUTM U.S. *Licensing Survey: FY 2004* (The Association of University Technology Managers, 2004): 16, 24, 28. www.autm.org/events/File/04AUTMSurveySum-USpublic.pdf.

178 For example, Dean Richard Schmalensee of MIT's Sloan School of Management writes that, "Unfortunately, under the current academic reward system, what matters most is having an impact among peers, mainly by getting specialized research published in influential journals. The [university] system isn't designed to evaluate or reward someone who invests significant time in the field learning about industry X and working on its problems, even though that investment may produce a superb observer of what's happening in the field who then brings that direct knowledge to bear on both their teaching and research," *BusinessWeek Online,* November 27, 2006. www.businessweek.com.

169 Tina Evans, "Regents Approve Patents and Commercialization of Research As New Consideration For Faculty Tenure," *A&M SystemWide Research News*, Texas A&M University, May/June 2006. www.tamus.edu/systemwide/06/05/research/tenure.html.

180 Robert E. Litan, Lesa Mitchell, and E.J. Reedy, "Commercializing University Innovations: Alternative Approaches," *Working Paper Series, Last Revised August 19, 2008* (Social Science Research Network, May 16, 2007). papers.ssrn.com/sol3/papers.cfm?abstract_id=976005.

181 Governor's Competitiveness Council, "Council's Report to the Governor," July 2008. governor.state.tx.us/files/gcc/Councils_Report_to_the_Governor.pdf.

About The Authors

Dr. Robert D. Atkinson is president of the Information Technology and Innovation Foundation. As former director of the Progressive Policy Institute's Technology and New Economy Project, executive director of the Rhode Island Economic Policy Council, and project director of the Congressional Office of Technology Assessment, he has conducted groundbreaking technology policy research, advised policymakers, and written and spoken extensively on technology issues. He is the author of *The Past and Future of America's Economy: Long Waves of Innovation that Power Cycles of Growth* (Edward Elgar: 2005).

Scott Andes is a research assistant at the Information Technology and Innovation Foundation, and a graduate of The London School of Economics.

Acknowledgements

We would like to thank our colleagues Priscilla Jang and Stephen Ezell at the Information Technology and Innovation Foundation for their editorial support.

We also would like to thank those who provided data and background information for the Index, including Robert Fairlie, University of California, Santa Cruz; Paul Taylor, Center for Digital Government; Spencer Tracy, National Policy Research Council; and Matthew Zook, University of Kentucky.

Finally, we want to express our gratitude and appreciation to those who provided valuable input, including Joe Cortwright, Diane Palmintera, Andrew Reamer, E.J. Reedy, Marsha Schatel, Philip Singerman, John Thomasian, and Mary Jo Waits.

It is not the strongest of the species that survive,
nor the most intelligent,
but the ones most responsive to change.

— Charles Darwin

www.innovationpolicy.org/07index

Information Technology and Innovation Foundation, 1250 I Street, NW · Suite 200 · Washington, D.C. 20005
email: mail@itif.org · Telephone (202) 449-1351