



Innovation America

Innovation America: A Final Report



Founded in 1908, the National Governors Association (NGA) is the collective voice of the nation's governors and one of Washington, D.C.'s most respected public policy organizations. Its members are the governors of the 50 states, three territories, and two commonwealths. NGA provides governors and their senior staff members with services that range from representing states on Capitol Hill and before the Administration on key federal issues to developing and implementing innovative solutions to public policy challenges through the NGA Center for Best Practices. For more information, visit www.nga.org/center/innovation.

Preface

The National Governors Association's *Innovation America* initiative focused on strengthening our nation's competitive position in the global economy by improving our capacity to innovate. The goal was to give governors the tools they need to improve math and science education, better align postsecondary education systems with state economies, and develop regional innovation strategies.

To guide the *Innovation America* initiative, we assembled a bipartisan task force of governors, corporate CEOs and university presidents. Working with the NGA Center for Best Practices, this task force provided valuable advice on innovation strategies in general and assisted in the development of the initiative's reports and forums. Through a variety of events and publications, we collected and shared best practice information to ensure that every state—and the nation—is equipped to excel in the global economy.

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Innovation America Task Force

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About This Report

This report summarizes what we have learned in the course of the *Innovation America* initiative, paying special attention to the role of governors in establishing best practices. In collaboration with leading experts, the NGA Center for Best Practices produced several reports expanding on *Innovation America's* three core strategies: improving science, technology, engineering, and mathematics (STEM) education; improving the alignment of the postsecondary system with state economies; and encouraging regional economic growth. This final report:

- Highlights strategies and best practices around those three themes, stressing the importance of innovation and the governors' role in advancing and encouraging it
- Spotlights key findings from an NGA-commissioned survey that gauged Americans' "innovation attitude," conducted by noted researcher Dr. Frank Luntz, who uncovered the ways in which governors can inspire citizens to embrace a successful innovation agenda
- Looks ahead to sustaining the innovation agenda in the future and provides best practices around the three *Innovation America* themes, with illuminating snapshots from Governor Napolitano's site visits to state innovation hubs in Philadelphia, Pennsylvania; Cupertino, California; and Woodbury, Minnesota

Detailed resource information from the entire body of knowledge gathered during this yearlong effort is included at the end of the report, where we acknowledge the many authors, organizations, and institutions that helped make *Innovation America* a resounding success.

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Foreword



Governor Janet Napolitano, Arizona
National Governors Association Chair (2006–2007)
Innovation America Task Force Co-Chair

As current chair of the National Governors Association, and co-chair of the *Innovation America* Task Force, I'm pleased to present this final report, a culmination of our yearlong *Innovation America* initiative, premised on the notion that states can and should lead the country as it responds to fast-moving changes in the global economy. This national initiative is about enacting real, tangible statewide solutions to enhance the economic capacity of states—and the nation.

This report is not only for, but is also about, our states—places where promising innovation policies are taking root, growing, and gathering momentum. It's about Pennsylvania's *Classrooms for the Future* and Minnesota's *Math and Science Academy*, and about all the other pioneering state innovations emerging from coast to coast.

As governors, we know that skills and talents must be nurtured to foster growth, and we are in the best position to advocate for and effect changes that spark innovation. Governors can work in unison with the federal government to spend vital national investments wisely and to promote a flexible regulatory structure that furthers innovation opportunities in the states. We can partner with the private sector to leverage resources and advance entrepreneurship to benefit our businesses, our institutions, and our people.

Governors have led the way in improving our country's position in the new knowledge-based world economy by boosting science, technology, engineering, and math (STEM) standards in the early grades; making critical investments in postsecondary education; and enacting policies that combine resources, talent, institutions, and infrastructure to create strong regional economic hubs with global competitive potential.

The 2006–2007 NGA *Innovation America* initiative has, through research and reports, spotlighted the best state strategies and practices of a comprehensive innovation policy. This compendium captures that information and also offers critical advice for governors to advance the innovation agenda and to sustain it in the years ahead.

Like Arizona, the majority of states are redirecting their economies toward high-tech, knowledge-based industries so that our young graduates continue to have quality job opportunities and so that America remains competitive in a dynamic and increasingly interconnected world. I invite you to review this report—and all of our efforts over the past year—as you continue to lead the way to *Innovation America*.

“UNITED STATES
 ECONOMIC GROWTH IN
 THE 21ST CENTURY WILL BE
 DRIVEN BY OUR NATION'S
 ABILITY TO INNOVATE.”

— ARIZONA GOVERNOR
 JANET NAPOLITANO

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Chapter 1 — A Call to Action

Innovation (in-*ub-vey-shuh* n, noun)

1: the introduction of something new

2: a new idea, method, or device

Introduction to *Innovation America*

The word innovation calls to mind novel inventions, processes, and systems that alter our lives and help us progress in modern society.

For governments, however, innovation must encompass even more than individual devices or steps; rather, innovation must be seen as a process by which new ideas enter the economy and change what is produced, how it is produced, and the way production itself is organized.

Innovation is a hallmark of a successful economy, and it drives economic growth and the creation of new jobs.

Moreover, innovation offers a means—perhaps the only means—by which a high-skill, high-wage economy can successfully compete with high-skill, lower-wage economies without reducing its standard of living. Low-wage countries are themselves investing in education, research, and business innovation, so the challenge for the United States is to innovate at a faster rate and more effectively than its rivals.

Competitiveness for the United States—particularly in today’s “flatter” world with its inherent and emerging global competitive challenges—depends on the rate at which we innovate. The process that creates innovation is multifaceted and goes far beyond invention alone.

Governments at all levels have a responsibility to accelerate the rate of innovation, but the role of states is critical. States fund the lion’s share of kindergarten through grade 12 (K–12) and postsecondary education, build much of the physical infrastructure, and establish the business environment through tax and regulatory policies and support services.

Competition and the Role of Innovation

The powerful forces that drive today’s economy come with few instructions on how to harness them. Policymakers need to understand how competitiveness occurs, produces jobs and higher wages, and relates to innovation, and states need to foster

competitiveness by adopting regional and economic growth policies within their borders.

Much has been said—and even more has been written—about the paradox of today’s U.S. economy. It has grown at an average of 3 percent annually since the bottom of the 2001 recession, a reasonable rate by historical standards. The economy created two million new jobs in 2004 and 2005 and more than 2.2 million in 2006. Yet many—if not most—American families are concerned about the economy and their futures.

“Everything is changing and it will continue to change. And the change is accelerating. If people aren’t able to see the change that’s coming and position their states to take advantage of it, it’s going to be devastating. That’s why these forward-looking public policies around innovation are so critically important.”

— *Minnesota Governor Tim Pawlenty*

Reports abound of stagnating median earnings; a vast and growing labor market divide between the earnings of those with postsecondary education and those with less educational attainment; a diminishing supply of U.S.-produced engineers even as countries like India and China produce ever-growing numbers of high-tech workers; and finally, a yawning trade deficit that ballooned to \$867 billion in 2006.

Anxiety about the state of the American economy only grows when it’s learned that China, by the end of 2006, will have amassed one trillion dollars in reserves and, with it, the ability to exert considerable influence over the course of U.S. and world economies.

Even more alarming to the citizenry is the growing practice of American companies outsourcing high-wage U.S. jobs in the financial services and other sectors to developing countries—India being the most prominent example. These countries possess a ready supply of qualified workers who make a fraction of U.S. salaries.

So even as new information technologies create products and services unimaginable a generation ago, they have also linked the world in unanticipated ways. These changes have brought many American families uncertain job prospects and stagnant incomes, even as they help the economy grow. And the fact remains that in many respects U.S. educational systems are not adequately preparing our children to compete internationally.

The Economy Today

As America works to find its place in today's global economy—rooted in information technology and driven primarily by “knowledge workers” and entrepreneurs—states must develop and adopt new and better institutions, products, processes, and business models that take into account the economic dynamics converging worldwide.

Although some firms have long had global links, globalization is now pervasive, as more nations join the marketplace, more goods and services are traded, and more of the production process is interconnected in a worldwide supply web. Since 1980, global trade has grown 2.5 times faster than global gross domestic product (GDP). Recent estimates put today's world exports at \$12.5 trillion, nearly 20 percent of world GDP.

In addition to being global, today's economy is also knowledge dependent. It's true that managers and so-called “knowledge workers” have always been part of the economy, but by the 1990s, they became the largest occupational category. Managerial and professional jobs increased as a share of total employment from 22 percent in 1979 to 34.8 percent in 2003. At the same time, the knowledge and skill requirements within occupations are rising. Even for the one in seven jobs still held by production workers in manufacturing, knowledge and continual skills enhancement are becoming more important.

Math and science are central to this new economy, yet U.S. eighth and 12th graders do not do well by international standards, ranking below average in both grades. The results from the Organisation for Economic Co-operation and Development (OECD) Program for International Student Assessment (PISA), for example, last taken by 15-year-olds in the United States in 2003, are telling. In mathematics literacy and problem-solving, U.S. students had an average score higher than just five countries out of the 30 OECD nations whose students participated in PISA. As other nations continue to move up in the rankings, the U.S. continues to lag behind in economic competitiveness due in part to poor rankings in education.¹

What state policies can lead to world-class educational systems? How do states create a high-skilled labor force and good jobs? How do governors promote growth in their local and regional economies? In short, how can states improve the United States' overall competitiveness in today's interconnected, information-centric world?

The answer: innovation.

The Keys to Innovation

While competition is sometimes viewed as between nations, it is really between high-performing economic regions throughout the world. States that effectively grasp the magnitude of the country's competitive challenges and proactively and aggressively respond can lead the way through this morass of uncertainty by adopting a comprehensive innovation agenda that combines human, intellectual, and financial capital in ways that strengthen their relative competitiveness worldwide.

THE FEDERAL ROLE

The federal government provides a basic structure on which to build and support state innovation. It sets fiscal and monetary policies that create macroeconomic balance (such as low inflation, stable growth, and adequate savings); ensures the integrity of capital markets; promotes free and open trade; provides funding for basic research and development; and makes small but influential investments in K–12 education and in higher education grants and loans.

THE STATE ROLE

But states are pivotal in driving innovation forward—they set the educational policies and make the decisions that lead to success. States fund the core of the educational system from kindergarten through college. They also provide the majority of dollars for workforce training; play a central role in the provision of infrastructure, including broadband technology; and shape the business climate through policies and investments.

States understand their economic strengths and are deeply familiar with their industries, resources, and markets. They are attuned to their real and potential human talent pool and have the policy tools to foster its growth to meet workforce demands.

Many states have adopted effective innovation practices—if not yet a comprehensive innovation agenda—by making investments in K–12 education and raising science, technology, engineering, and math (STEM) standards; using their role as the main funders of higher education to improve these institutions' production of math and science-related degrees; and linking research and development to key industrial, economic, and labor and skills targets.

States have also expanded junior and community college systems to provide workforce training to meet the needs of growing, innovative industries, and established regional councils and other networks to understand and support business needs.

¹ *The Global Competitiveness Report 2006–2007*. World Economic Forum, 2006.

Conclusion

It is clear that, given the dynamics of today's economy, this nation can ill-afford to wait to innovate. States can and should lead the way by strengthening the innovative processes within their boundaries and staying ahead of the global competition unleashed by the computing and communications revolution.

States know they must raise educational systems so they meet international benchmarks and provide children with the 21st century skills that students need to succeed in the knowledge economy. They must also create entrepreneurial economies that can compete in the new innovation-based global marketplace.

While acknowledging the federal role in providing the framework for innovation, states hold most of the keys to innovation. An effective innovation agenda hinges on their willingness to assess their competitive strengths and weaknesses in concrete and realistic terms. Governors must identify their states' competitive advantages and build specific, targeted policies around them.

Developing a comprehensive innovation agenda is a challenging mission, but it's an imperative—and one that governors and states are well-equipped to take on.

Chapter 2 — Governors’ Role in Accelerating Innovation

Governors understand the global economic challenges facing the nation, confronting their citizens, and bearing down on their economies. Governors know that U.S. children must be at least as educated as students from other countries, with equal or better skills in mathematics, computers, and problem solving. They experience firsthand the fallout when a factory closes, or when a set of jobs is outsourced to another country. And they hear directly from industry leaders who want to hire homegrown talent for global high-tech operations, but must draw from a dwindling pool of skilled workers—or recruit from overseas.

“We are no longer just competing for jobs with other states but instead are up against workers from around the globe. All states must make an effort to ensure that their students are well versed in the subjects of math and science that are critical for their success in our global economy.”

— *Missouri Governor Matt Blunt*

Because governors deal with these and other policy realities daily, they are uniquely suited to create a unified vision for innovation in education and the economy. They can use the bully pulpit to advocate for a comprehensive innovation agenda and persuade citizens and legislators of its importance. Governors can work in tandem with the private sector and federal government to explore practices that address key national priorities and bring financial, educational, and stakeholders to the policymaking table. And as chief executives, governors can take executive action to implement the state’s innovation agenda.

Governors can use effective communication to talk about innovation in ways that inspire people by tapping into their aspirations and linking the innovation agenda to clear outcomes and practical achievements.

As leading advocates, governors are agents of change and the driving force for innovation in their states and in the national arena.

Innovation Tools

Governors have the best view of how to approach innovation in K–12 STEM, postsecondary education, and regional or cluster economic development, and can draw on a number of cross-cutting strategies and policy options to foster competitiveness locally, regionally, and nationally.

But exactly how can governors promote innovation? The list below—illustrative but surely not exhaustive—describes the tools that governors have at their disposal to dramatically expand innovation in ways that position their people, their economies, and their states to more effectively compete in the global economy.

UNDERSTANDING ECONOMIC ASSETS

Governors are well-positioned to commission and interpret analyses of their state’s economic assets, including its industries, educational and research institutions, natural resources, markets, human talent pool, and areas of potential business growth. They also can form business councils and convene stakeholders to better understand how these assets come together in a comprehensive strategy.

ALIGNING POLICIES WITH STRENGTHS

Governors can provide the leadership needed to set standards and develop assessments and accountability systems for elementary and secondary schools, including in math and science. They can also establish workforce strategies that contribute to economic innovation, including funding high-wage, high-tech job skills initiatives. They can set tax policies that contribute to regional innovation, such as research and development tax credits or tax incentives for businesses that provide industry-specific worker training. Governors can advance innovation policy goals through appointments to important boards, commissions, councils, and committees.

MAKING STRATEGIC INVESTMENTS

Smart, strategic investments in the human capital, research and development (R&D), and physical infrastructure can propel innovation, and governors can use fiscal policies and budget leverage to boost the innovation agenda. Fundamental support for the innovation economy is provided through investments in K-12 STEM, higher education, and the workforce. Governors can make strategic investments in education by linking their education and economic goals. Governors also ensure that the physical apparatus—roadways and transit systems—can rapidly get workers to and from jobs, both now and over the long term. They help fund the development of fast, secure broadband networks that support business innovation in today’s technology-based economy. Governors can encourage research and development through direct investments or challenge grants, or match federal research funding in areas important to regional business development. They can also create large, multiyear “innovation” funds to underwrite research in targeted areas fundamental to a region’s economic development.

USING THE BULLY PULPIT

Governors can use the bully pulpit to talk up the importance of innovation in state and regional economic development in local public forums and when conducting trade and business expansion visits. By doing so, governors can play a major role in convincing businesses, investors, and skilled workers that their states are serious about supporting their strategic growth industries. Governors who are knowledgeable about their state's economic strengths—or “clusters of innovation”—show investors that they care about nurturing these emerging and growing sectors and can help bring capital and talent to the regions. Using the bully pulpit also means aggregating economic information to track and report on cluster performance. But perhaps most importantly, governors can use their stature as leaders to convince the public at large about the need for and importance of innovation.

CONVENING

A major tool for promoting innovation is bringing private sector leaders together with public leaders, including elected officials, education leaders, and even nongovernmental entities. The governor's office is the most effective entity to ensure that all the key organizations are brought to the table, and it can be instrumental in brokering partnerships and networks, and in pointing out synergies. Governors also can appoint special liaisons to work with specific clusters, thus building the capacity to understand their needs and challenges.

STREAMLINING REGULATIONS

To support business innovation, governors can ensure that the state employs a streamlined regulatory policy that is tailored, flexible, and responsive. The use of technology, such as online filing, can simplify the administrative burden of regulations; such streamlining can be particularly helpful to small and start-up firms. Occasionally, regulatory choices can directly spur industry creation. For example, California's strict environmental regulations and incentives have helped catalyze a significant concentration of environmental technology firms there.

IMPROVING ACCESS TO SEED AND VENTURE CAPITAL

Most private seed and venture capital is concentrated in just a few areas of the country. To counter this, states can improve access to early stage capital by starting their own funds, investing state dollars in a larger fund that serves the area, or providing tax credits

and other measures that stimulate “angel” investments. Although most state programs do not target clusters, venture capital funds can be specialized to seed the development of investments in areas such as biotechnology or software.

Communication

Communication is perhaps a governor's most valuable device for advancing the innovation agenda among the broadest possible audience and is a key component of the bully pulpit and convening tools described above. After all, who is better at communicating in a bipartisan way the value of innovation than the elected chief executive—the person who has been to all corners of the state, met with all the key constituencies, and articulated a vision for governing?

In 2006, NGA commissioned Dr. Frank Luntz, chairman and CEO of Luntz, Maslansky Strategic Research, to assess Americans' innovation attitudes and help governors “talk innovation.” (The information was gathered from two instant response dial sessions and a nationwide public opinion survey of 750 people, which had an error rate of ± 3.7 percent.)

Luntz found that even in these days of political polarization, innovation is applauded and embraced by just about everyone. A stunning 88 percent of Americans polled said they support a nationwide innovation effort. The desirability of innovation is expressed by people of all political persuasions and across all demographic, geographic, and attitudinal subgroups. Luntz found that survey respondents:

- **Understand** that innovation is about everyone and grasp the consequences—on an individual, community, and national level—of the failure to modernize
- **Think** that governors—no matter which party they represent—should encourage school and economic innovation in partnership with others, but led by the governors
- **View** state-coordinated national innovation as an “American” solution and an initiative that transcends politics
- **Know** that real innovation—from medical breakthroughs to state-of-the-art teaching strategies—can lead to tangible, specific benefits and is a way to make America more efficient, effective, and better equipped now and in the future

USE OPTIMISTIC, SPECIFIC, AND ACTION-ORIENTED LANGUAGE

Luntz advises governors to eschew negativism, generalities, and open-ended statements in favor of inspirational language tied to specific examples that lead to clear annual and longer-term benchmarks.

Innovation, he argues, is best described not in dire language—“we’ve fallen behind, we’re going to keep losing out to China, India, and Korea,” etc.—but in hopeful terms that encourage citizens to visualize the future with actual, tangible, real-life examples.

Luntz suggests that governors employ these communications strategies:

1. Using applicable terms and examples for their particular state or region, governors should exhort citizens to *imagine* American schools leading the world in science math rankings again and to *visualize* every student competing in the 21st century global marketplace.
2. Then provide specific examples of innovation in action—in education, in higher education, in crucial industries like health care and public safety—that have a palpable impact on lives. These are innovation practices the public will come to see as successful, sensible, and worth sustaining and even expanding.
3. And finally convey the consequences of failing to innovate by citing facts and figures that are important to the citizenry—too-low literacy or graduation rates, for instance—without resorting to exaggeration or melodrama, which are notorious turn-offs.

Americans’ competitive spirit and self-reliance can be *challenged* to support innovation, Lutz says, especially when actions are tied to specific benchmarks in educational attainment, workforce development, and job and opportunity growth.

Governors do well when they *don’t* talk about job losses, but *do* talk about economic development through career improvement; when they *don’t* talk about competition, but *do* talk about universal opportunity; and when they *don’t* talk about other countries, but they *do* talk about preparing Americans for the future.

Conclusion

Governors have a highly important role to play in advancing a comprehensive innovation agenda in education and business development and a multitude of tools at their disposal to carry it out.

Governors who are mindful of Luntz’s maxim—“it’s not what you say, it’s what they hear”—will be most effective in rallying citizens and stakeholders to support the policy changes required to achieve significant innovation goals.

Governors can stimulate widespread support for their innovation agenda by conveying its benefits in optimistic, specific, and action-oriented language. Governors’ inspiring words will motivate citizens and policy, educational, and institutional partners alike to join the call for innovation in education and economic development and help make it happen.

Chapter 3 — A Comprehensive Innovation Policy

As we've seen, states have enormous power to drive the adoption of a comprehensive innovation policy in K–12 science, technology, engineering, and math (STEM), higher education, and economic development.

“Parents can play a role in making sure their children are prepared for the world of the future, too. They can demand that the schools offer a different kind of curriculum, and insist that tax dollars create jobs and opportunities so that their kids can continue to learn and grow.”

— *Kansas Governor Kathleen Sebelius*

Through elementary and secondary education—and state colleges, universities, and technical schools—state and local governments are funding the overwhelming percentage of these investments.

States also fund the physical infrastructure—roads, bridges, ports, and transit—that fast-growing businesses rely on. And states often have jurisdiction over the rights of way for high-speed broadband networks, which are a must for modern companies.

In addition, governors can propose, implement, and generate support for public policies that stimulate quality research, promote technology transfer and the diffusion of ideas, create strong entrepreneurial networks, and foster human talent.

But what specific strategies are being engaged to resolve public policy issues in STEM, postsecondary education, and regional innovation? What are some of the best practices being implemented by states?

Here we take a closer look at each of the three areas to get a clearer sense of innovation in action.

Building STEM Capacity

We know that K–12 education that meets high standards in STEM fields is the critical foundation driving innovation capacity in the states. Accordingly, the goals of the STEM agenda are relatively straightforward: The K–12 education system must ensure that (1) all students graduate from high school with STEM competencies; and (2) a greater number of students graduate from high school as potential professionals in STEM fields. A comprehensive STEM agenda (**see Table 1**) should include these components:

- Rigorous and relevant K–12 STEM education requirements aligned to the expectations of postsecondary education and the workplace
- A statewide capacity for improved K–12 STEM teaching and learning to achieve the aligned standards
- An ongoing commitment to increasing students' access to real-world experiences in STEM through partnerships with scientific organizations
- A commitment to support new models that focus on rigor *and* relevance to ensure that every student is STEM literate upon graduation from high school and that a greater number of students move on to postsecondary education and training in STEM disciplines

The aim is to create STEM literacy—scientific literacy, technological literacy, engineering literacy, and mathematical literacy—that allows students to succeed in a knowledge-based workplace and community.

Innovation in Action **In Philadelphia, Classrooms for the Future**

Realizing the goals of the postsecondary and workforce innovation agenda depends on early science and technology learning opportunities.

Classrooms for the Future—a \$200 million, three-year initiative launched recently by Pennsylvania Governor Ed Rendell at Philadelphia's Upper Darby High School and other high schools across the state—is one example of how jurisdictions are aligning educational and academic goals to the workplace needs of the 21st century economy.

All 611 state high schools will eventually participate in *Classrooms for the Future*. (Learn more at www.pde.state.pa.us/ed_tech/cwp/view.asp?a=169&q=118828.)

Table 1. K–12 Education Innovation in the States

Issue	Strategy	Policy Examples	State Best Practices
International competitiveness	Align state STEM standards and assessments to international benchmarks	Participate in the Program for International Student Assessment (PISA) and/or the Trends in International Math and Science Study (TIMSS)	IL – School districts participate in First in the World Consortium with the goal of being first in the world in math and science. Ongoing data analysis is used to improve policies and programs that address identified weaknesses.
Work and college readiness	Align STEM expectations with postsecondary pathways for knowledge-based economy	College preparatory curriculum has strong STEM component	<p>AK – All students must complete Smart Core curriculum, which has rigorous math and science components.</p> <p>TX – Students must have four years of science (biology, chemistry, physics, and one elective, including engineering) to graduate from high school.</p> <p>MI – Michigan Merit Exam, which combines ACT college-readiness exams, WorkKeys, and a series of subject tests developed in collaboration with state universities.</p>
Align K–12 STEM education	Align STEM expectations at elementary, middle, and high school levels	Coursework preparation in math and science	<p>MA – Engineering is Elementary: Engineering and Technology Lessons for Children curriculum, developed by the National Center for Technological Literacy and the Boston Museum of Science.</p> <p>DE – Delaware Science Coalition, a state, school, and business partnership working to improve the teaching and learning of science.</p>
Develop alignment strategies	Align educators, policymakers, and the private sector to improve STEM education	Examination of current and future workforce needs	<p>AZ – P-20 Council, a governor-led coalition of educators, businesses, and policymakers, presented with report, <i>From Education to Work: Is Arizona Prepared?</i>, examining high school graduation expectations in light of state and national workforce and postsecondary demands.</p> <p>VA – P-16 Council, which is defining college readiness and creating a P-16 longitudinal data system, and will provide data on first high school cohort in 2008.</p>

Table 1. (continued)

Issue	Strategy	Policy Examples	State Best Practices
Track student progress	Develop statewide K–16 data systems to measure STEM prep of K–12 students for postsecondary pathways and to improve instruction	Data quality initiatives	FL – Currently only state with longitudinal data system with all 10 essential elements identified by the Data Quality Campaign, a national effort to encourage states to improve education data collection and implement data systems to improve student achievement.
Create accountable STEM teaching programs	Develop accountability measures for providers of STEM teacher preparation and training	Teacher-training institutions meet quality standards	<p>AL – One of eight states holding teacher-prep programs accountable through report cards that assess how well they meet three standards identified by <i>Education Week's</i> annual Quality Counts effort.</p> <p>LA – Teacher-prep programs assigned a performance score (based on these standards) designed to improve teachers' scores in STEM content areas. Institutions may receive financial and other assistance to address problems.</p>
Recruit a qualified STEM teaching force	Create new models to recruit, prepare, and retain STEM teachers	Specialized campaigns to attract and retain teachers	<p>FL – Used federal Education Department dollars to focus on recruitment, alternative certification, and retention of career-changing STEM professionals.</p> <p>NJ – Alternative Route Program, which attracts career changers and top college graduates.</p> <p>CA – Marshalling state and private resources, governor is supporting joint effort by the two university systems to significantly increase math and science teachers over the next five years; university systems have pledged to more than double the number of credentialed math and science teachers.</p>
Retain a qualified STEM teaching force	Formulate market- and performance-based compensation for STEM teachers	Differentiated compensation schedules for STEM teachers, particularly in underserved schools	<p>TX, FL, CO – School districts establish performance-based compensation systems for teachers in all content areas, including math and science.</p> <p>FL – Links teacher raises and bonuses to students' standardized test scores.</p> <p>NY, CA, IL – Jurisdictions offer teachers in high-need content areas, including math and science, a \$14,600 housing subsidy.</p>

Table 1. (continued)

Issue	Strategy	Policy Examples	State Best Practices
Build statewide capacity in STEM	Create STEM centers to improve teaching and learning across the state and between the states	Systemic changes align STEM education and policy	<p>TX – T-STEM, a public-private partnership that created six STEM centers—located at universities, regional service centers, and other nonprofits—to support 35 specialized STEM academies.</p> <p>NC – North Carolina New Schools Project, a public-private partnership to create small high schools with an economic development theme and a focus on STEM fields; 10 schools opened in 2005, with concentrations in growth areas, such as health and life sciences, engineering, biotechnology, and information technology.</p>
Stimulate interest in STEM	Support STEM education outside the classroom	After-school and summer STEM learning initiatives	<p>AZ – The Arizona State University Women in Science and Engineering (WISE) program.</p> <p>MA – The Smith Summer Science and Engineering Program (SSSEP), a precollege program for young women.</p> <p>NH, HI – Engagement with informal science organizations, like FIRST Robotics, sponsor of an annual competition to drum up students’ interest in science, technology, and engineering.</p>
Increase the overall number of STEM professionals	Establish and expand specialty STEM in middle and high schools; “early colleges;” and in charter, district, and other models	Whole-school STEM changes	<p>TX – T-STEM forms 35 specialized STEM academies that are a mix of charters, traditional schools, and early college high schools.</p> <p>GA, OH – Early College High School initiative to build a new model of high school that includes college courses.</p> <p>NC – “Learn and earn” early college high schools, which allow students to graduate in five years with a diploma and associate’s degree and/or two years of college credit.</p>

Table 1. (continued)

Issue	Strategy	Policy Examples	State Best Practices
Expose students to technology and engineering	Support emerging work on standards, assessments, and curriculum on the “T” and “E” of STEM	“T” and “E” learning components revised	<p>MA – By 2010, all students must pass Massachusetts Comprehensive Assessment System (MCAS) in Science and Technology/Engineering to graduate.</p> <p>NH (and 36 states) – At various stages of work with Boston Museum of Science to develop “T” and “E” standards.</p> <p>MN – Governor partners with PTC, a global software company; the University of Minnesota; and the Minnesota High-Tech Association to design and establish Global Engineering Education program.</p>
Promote a rigorous STEM curriculum	Develop a high-quality STEM curriculum, aligned to state standards and assessments	Standards adjusted upward	<p>WA – Comprehensive and comparative review to align state’s K–10 math standards with international benchmarks.</p> <p>GA – New math standards using “optimal teaching sequences.”</p>
Engage in work-force readiness	Establish rigorous and relevant Career Technical Education (CTE)	CTE integrated into overall academic framework	<p>ME – Regional CTE centers emphasize numeracy and literacy; pilot co-location of two high schools, the CTE center, a community college, and a university.</p> <p>IN – State Department of Education and the National Aeronautics and Space Administration support Project Lead the Way, a four-year program of study to introduce high school students to engineering.</p> <p>KY – Interdisciplinary CTE courses.</p>
Establish public-private partnerships	Build a STEM agenda	Business, academic, and policy partnerships	<p>IL – P-20 Commission at Northern Illinois University releases Illinois STEM Education Report—funded by the Illinois Business Roundtable—which becomes key part of the Keeping Illinois Competitive initiative linking STEM to state global competitiveness.</p> <p>NJ – Merck Institute for Science Education (MISE), founded by Merck & Co., Inc., focuses on forming partnerships between educators, parents, employees, and policymakers through policy work at the state level and intensive school reform at the district level.</p>

See this report for detailed reference information (online at www.nga.gov/center/innovation): *Building a Science, Technology, Engineering and Math Agenda*. By Charles N. Toulmin and Meghan Groome, senior policy analysts with the Education Division at the NGA Center for Best Practices.

Innovation in Action **Woodbury, Minnesota—Producing World-Class K–12 Students**

Minnesota’s Math and Science Academy (MSA) is a public charter school located in the city center neighborhood of Woodbury, Minnesota. The grades 6–12 program—whose challenging curriculum is intensely focused on math and science, balanced with strong humanities and arts components—is a prime example of the ways schools can prepare kids for challenging careers in the innovation economy.

On a recent tour of the academy with *Innovation America* Co-Chair and Minnesota Governor Tim Pawlenty, educational, government, and business leaders discussed the need for more STEM-focused schools, for a greater number of well-trained math and science teachers, and for the integration of technology into instruction. A key partner of MSA—and the Minnesota Department of Education—is the Minnesota High Tech Association, which hosted a statewide “STEM Summit” to raise awareness about STEM deficiencies in schools and encourage more students to take STEM courses and pursue STEM careers. (Learn more at <http://mnmsa.org>.)

Innovation in Action **Elevating the Issue**

Governors—especially when they team up with their colleagues—can nationalize the issue of innovation and drive the agenda forward in important ways. More than 30 governors did just that in May 2007 during “*Innovation America Week*,” which was coordinated by NGA.

Through gubernatorial proclamations, radio addresses, guest columns, and state events, these governors dedicated a week to the importance of innovation.

Missouri Governor Matt Blunt promoted the state’s Math, Engineering, Technology and Science initiative as well as new fiscal 2008 funding that will create 100 technology classrooms in 100 schools, after-school programs geared toward math and science, and incentives for more students to take Advanced Placement courses in math and science. In addition, Michigan Governor Jennifer M. Granholm gave a radio address on state funding to encourage innovation.

Aligning Postsecondary Systems to Support the Economy

America’s postsecondary institutions have long been considered the envy of the world. But these institutions are no longer always meeting the demands of the 21st century world economy or competing with educational systems in other countries.

The good news is that governors play a key role in helping postsecondary education meet the economic needs of the state. These needs include the development of skills and competencies critical to competitive state economies and the recruitment of a well-qualified teacher corps, especially in STEM disciplines. Governors also facilitate the creation of new knowledge by investing in

“You can’t compete in the new economy with people who are not well-skilled, who are not well-educated, and who don’t prize innovation and technology, engineering, math, and those kinds of disciplines. We have to be smartest in education, smartest in skill development, and smartest in invention.”

— *Pennsylvania Governor Ed Rendell*

research and development (R&D) and by establishing policies that translate innovative new ideas into products, processes, and services.

To bring about innovation, a postsecondary system must:

- Focus on developing the skills needed to compete in the international marketplace
- Link with the needs of the state, its economy, its people, its workforce, and its regional industries
- Offer courses, research, and training that equal to best in the world
- Be collaborative, transparent, and open to maximize the rate of innovation
- Make innovation a priority in R&D investments
- Be adaptable, flexible, and market-driven to respond quickly to the needs of the marketplace
- Be entrepreneurial in terms of partnerships with the private sector and nonprofits

- Be accessible in terms of affordability
- Represent a system of institutions that is cooperative and coordinated in a way that benefits the state economy and advances its innovation goals
- Be accountable for meeting defined educational, workforce, and economic objectives

The Postsecondary Compact

The *Innovation America* initiative broke new ground by introducing a vehicle—the postsecondary education compact—to realize these goals. Through the compact, state governments, the postsecondary education system, the Boards of Regents, and the private sector collaboratively embrace a public agenda to align higher education policies, programs, curricula, and resources with current, emerging, and future economic realities.

The compact is based on a clear understanding of both the economic needs of the state and the related outputs of the postsecondary education system. The compact involves establishing—

- **Goals.** The compact sets long-term goals to address a state’s major economic challenges—typically based on the results of a comprehensive audit—and outlines specific strategies to resolve them. Its aim is to hold institutions accountable for meeting these goals in exchange for a state’s commitment to stabilizing the higher education budget, rewarding good performance, and providing autonomy through deregulation.

- **State Responsibilities.** The state and postsecondary education roles within the compact are then negotiated. The state provides clear direction as to its expectations and priorities for the postsecondary education system. Furthermore, states establish budget stability and structure tied to incentives (or penalties) based on how well the system meets the goals set forth in the compact. States in turn give more autonomy to postsecondary education—such as reducing regulations and reporting requirements—so that institutions have maximum flexibility to meet the compact’s ambitious goals.

- **Mutual Accountability Processes.** Once all the stakeholders agree on the roles and deliverables, an accountability system ensures that there are tools to enforce the compact on both sides. Tools include transparency, rewards, and penalties or sanctions for failing to meet expectations. The compact is underpinned by a robust longitudinal data system so that stakeholders can track the long-term performance of students and assess their gains according to agreed-upon postsecondary education metrics. Timely and relevant data—whose integrity and privacy is protected—is the foundation of a robust accountability compact. Well-honed data systems can eventually be used to gauge postsecondary performance in a number of other areas, including deregulation, rewards, and possibly, sanctions.

Finally, the compact presents goals and challenges from a statewide point of view and identifies challenges and opportunities as the compact matures and, if necessary, is renegotiated.

The various elements of the compact are shown in **Table 2**.

Table 2. Aligning Postsecondary Systems to Support the Economy
The Postsecondary Education Compact

Element	Action	State Best Practices
Involve stakeholders	<p>Attract and retain relevant stakeholders to the compact process to ensure maximum buy in and effectiveness, including representatives from:</p> <ul style="list-style-type: none"> • Postsecondary education (institutions’ presidents and some deans) • Public interest (state government leaders) • Governing boards (state and institutional board members) • Private sector (key state business leaders) 	<p>ND – The Higher Education Roundtable, a standing committee of state leaders from industry, postsecondary education, and government, aligns postsecondary education to state economic needs.</p>

Table 2. (continued)

Element	Action	State Best Practices
Conduct audit of state needs	<p>Determine economic needs through advisory group, and cluster and market analyses</p> <p>Understand postsecondary education in the state by assessing its relative standing among similar states</p>	<p>MN – Directed by the governor and legislature, the Office of Higher Education created a baseline of data, called Minnesota Measures, to understand the educational and economic conditions of the state and its people.</p>
Articulate the goals and “priority mission” of postsecondary education	<p>Agree on the mission, priorities, and key outputs of the overall postsecondary system, including production of STEM teachers and critical competencies as well as acceleration of innovation</p>	<p>KY – Governor-initiated postsecondary education compact designed to improve the social situation, health, and well-being of the people by asking five questions, each benchmarked to a metric.</p>
Specify the responsibilities of the state	<p>Share the responsibility for the success of postsecondary education in the compact by outlining state government commitment to provide clear direction to postsecondary education; align and adequately fund compact efforts over the long-term; and reduce the bureaucratic and regulatory burden to allow postsecondary education to be more flexible</p>	<p>VA – Legislation passed in 2005 provides universities with more autonomy (in areas like purchasing and capital spending) and less regulation if they make progress meeting 12 statewide goals, including stimulating economic development in university communities, increasing the level of externally funded research conducted at institutions, and facilitating the transfer of technology from university research centers to private sector companies.</p>

Table 2. (continued)

Element	Action	State Best Practices
<p>Create a system of mutual accountability</p>	<p>Establish mutual accountability systems to enforce the compact that include these tools: transparency, rewards, and sanctions for noncompliance</p> <p>Underpin accountability system with robust longitudinal data systems with performance tied to the above enforcement tools</p>	<p>KS – The Board of Regents reviews and approves institutional improvement plans based on core indicators of quality performance developed in cooperation with each institution. The receipt of any new state funding is tied to how well these indicators are met at the end of a yearly evaluation cycle.</p> <p>CA – The state’s Higher Education Compact, established in 2004, stabilized university-system funding in return for measurable outputs in innovation. By 2010, the California State University is committed to doubling the number of credentialed math and science teachers—from 750 to 1,500—while the University of California is raising its math and science teacher output from 250 to 1,000 annually, in part through the “California Teach” program.</p>
<p>Articulate and agree on roles of individual institutions</p>	<p>Establish agreements that coordinate and specify responsibilities to avoid duplication</p>	<p>CA – Created in the 1960s under the leadership of Chancellor Clark Kerr, the California “Master Plan” divided labor among state colleges and universities this way: The University of California system held the exclusive right to confer doctoral degrees and draw undergraduate admissions from the top 10 percent of high school graduates; the California State University system earned the right to confer master’s degrees and draw graduates from the top-third of high school graduates. The community college system was to have a statewide presence and provide an open pathway for all students, with specific articulation agreements facilitating transfer from one institution to another.</p>

See this individual report for detailed reference information (online at www.nga.gov/center/innovation): *A Compact for Postsecondary Education*. By Christopher Hayter, program director for Economic Development with the NGA Center for Best Practices.

Innovation in Action

Kansas City, Missouri—Postsecondary Education Forum

States understand that they can't work in a vacuum if they hope to generate interest in and enthusiasm for the innovation agenda. That's why in May 2007 teams from more than 30 states took part in a one-and-a-half-day forum to exchange postsecondary innovation ideas at an event led by *Innovation America* Task Force Governors Matt Blunt of Missouri and Kathleen Sebelius of Kansas.

The forum, held at the Ewing Marion Kauffman Foundation, featured a task force discussion about the compact between states and their postsecondary systems, including efforts in places like Kentucky to institute new accountability compacts with land grant colleges, and initiatives like the Midwestern Higher Education Compact, which is relying on regional cooperation to improve postsecondary education in 11 states.

Implementing Innovation-Based Economic Policies

Two mutually reinforcing tiers can be used to support effective innovation strategies. The first tier involves ensuring that an environment exists throughout the state to support innovation across all business activities. This requires a regulatory, fiscal, and policy landscape that removes impediments to business development, a public education system that is strong from kindergarten through college, government processes that facilitate e-commerce, and policies that support entrepreneurship. These policies and practices form a foundation that will help accelerate state and regional growth.

The second tier involves actions or strategies that focus on the unique strengths of the state and regional economy. These policies are designed to help regional concentrations of fast-growing firms—or “clusters of innovation”—become more productive and thrive. Such firms often share common markets, technology, suppliers, and talent. They benefit from targeted policies that help fill their talent and research needs; facilitate collaboration among firms; align investments, infrastructure, and incentives to help the firms grow; and open global markets.

Table 3 shows some of the strategies and policies that can be used to promote innovation-based economic development, along with state best practices.

Innovation in Action

Cupertino, California—The Talent Pipeline

America's innovation agenda runs on a well-oiled and robust talent pipeline that is crucial for business expansion and growth.

To learn about strategies to produce a steady stream of talent—essential for the high-tech industry sector—Governor Napolitano turned to Symantec CEO and *Innovation America* Task Force member John Thompson, who co-hosted a forum with individuals from the Silicon Valley high-tech business, government, and university communities.

Each recommended a variety of programs, efforts, and strategies to feed high-skilled workers into the innovation-based business economy, from creating public-private partnerships that foster and nurture innovation to finding creative ways to encourage engineering students to complete their degrees.

Table 3. Implementing Innovation-Based Economic Policies

Issue	Strategy	Policy Examples	State Best Practices
Bring together firms and associations around common needs and goals	Foster collaboration	Cluster leadership councils Cluster organization support	<p>FL – Inspired by a visit of Florida defense contractors to Italy’s industrial districts, members of the Technology Coast Manufacturing and Engineering Network (TeCMEN), which is funded by the state and foundations, attend meetings, collaborate on training, bid jointly on contracts, and learn about federal research that can be commercialized.</p> <p>MN – The Twin Cities’ “device cluster” Life Sciences Alley, a 500-member association that provides education and training, networking, and early-stage capital support to members.</p> <p>RI – State seed funding for Rhode Island Economic Council to coordinate software companies.</p>
Boost the skills of the existing workforce	Arrange education and workforce systems around clusters	Cluster-based workplace learning systems Cluster hubs at colleges	<p>AL, CT, NC, SC, WA, WI – Aligning college systems with clusters.</p> <p>CA – Mission College’s summer internships with National Semiconductor and Intel for all faculty members.</p> <p>NC – Community college cluster hubs in entertainment; hosiery technology; and BioNetwork, which links all colleges together in a central network, operates mobile training labs, and provides innovation funds.</p>
Fill gaps in qualified workforce	Find and recruit talent	Policies to attract artists, entrepreneurs, and out-of-state experts	<p>VA – Carytown arts district in Richmond.</p> <p>OR – Pearl District in Portland.</p>
Maximize impact of training investments	Encourage training consortia	Training networks	<p>OR – Wind Energy Training Consortium, a partnership of business, the Workforce Response Team, Columbia Gorge Community College, and Mid-Columbia Council of Governments to train technicians.</p>

Table 3. (continued)

Issue	Strategy	Policy Examples	State Best Practices
Align research investments with economic development strategies	Encourage applied science research and development	Cluster-based innovation centers	<p>NC – The North Carolina Biotechnology Center, bringing together researchers, businesses, seed capital, and entrepreneurial support.</p> <p>NY – The Center for Electronic Imaging Systems at University of Rochester, supporting the area’s optics and imaging cluster.</p>
Address research and development deficiencies	Funnel research and development funds to clusters	<p>Higher education funds committed to industry-specific research and education</p> <p>Research and development tax credits</p>	<p>SC – State committed \$209 million over three years to Clemson University’s International Center for Automotive Research, a partnership with BMW and Michelin to create a premier auto and motor sports research and educational facility.</p> <p>CA – State R&D tax credit, a study showed, was more effective than the federal one at stimulating development and inducing firms to relocate to the state.</p>
Facilitate research and development collaboration	Encourage multidisciplinary research and development	Cluster tool-sharing	<p>NC – Investment by 20 hosiery companies in an automated boarding machine to enhance cluster’s competitiveness with low-cost rivals.</p>
Mobilize investment capital	Seed high-tech startups	<p>Tax revenues and pension funds fill gaps in venture capital</p> <p>States broker to attract capital and loans, and to provide applicants with funding sources</p> <p>Statewide commercialization and entrepreneurship organization</p>	<p>NM – New Mexico Investment Council.</p> <p>MI – Michigan Strategic Fund.</p> <p>MS – Mississippi’s Magnolia Fund.</p> <p>ME – The Finance Authority of Maine.</p> <p>OK – The i2E organization, which helps companies with strategic planning, networking opportunities, and access to capital.</p>

Table 3. (continued)

Issue	Strategy	Policy Examples	State Best Practices
Reduce business costs	Make infrastructure investments that maintain middle-class standards of living	<p>Traffic congestion-reduction policies</p> <p>Housing regulatory and zoning reform</p>	<p>TX – Texas Governor’s Business Roundtable helped pass a law authorizing a \$3 billion bond issue for highway improvement and additional authority to create regional mobility authorities to issue toll-backed bonds and design toll roads.</p> <p>GA – The Governor’s Transportation Mitigation Task Force, calling for reducing traffic congestion by 2030.</p> <p>TX – SMART program promoting affordable housing policies.</p> <p>KS – Online Crash Logs to record and distribute highway crash information, allowing the public to check crash logs.</p>
Boost productivity	Promote next-generation e-government	Order-to-pay procurement and technology improvements	VA – Establishment of an order-to-procurement system, eVA, a mandated ordering system for state agencies.
Enhance technology infrastructure	Facilitate broadband development	<p>Statewide video franchise laws</p> <p>Broadband demand aggregation</p> <p>Technology-based economic development</p>	<p>CA, IN, KS, NJ, NC, SC, TX, VA – Franchise reform legislation to allow states—not hundreds of individual localities—to approve high-speed data services franchises.</p> <p>MA – Berkshire Connect, created by the Massachusetts Technology Collaborative—an affinity group of business and government Internet users—has expanded high-speed telecommunications in Western Massachusetts through a privately constructed regional network.</p> <p>NC – The e-NC Telecenters that drive technology-based economic development in seven rural North Carolina communities.</p>

Table 3. (continued)

Issue	Strategy	Policy Examples	State Best Practices
Cultivate entrepreneurs	Develop entrepreneur-education initiatives	Entrepreneurial competencies integrated into education and workforce curricula	<p>WA – Center for Enology and Viticulture at Walla Walla Community College established four new wineries.</p> <p>National – Learning through Simulated Information Technology Enterprises, a program to teach entrepreneurship skills to students.</p>
Support promising entrepreneurs	Create entrepreneurial skills and networking programs	<p>Incubator spaces</p> <p>Cluster expertise at small business centers</p>	<p>CA – Environmental Business Cluster in San Jose promotes clean energy and environmental technology commercialization.</p> <p>NY – With support from Empire State Development Corp., New York Software Association manages incubator in New York City.</p> <p>NC – Central Carolina Community College Small Business Center creates arts incubators in 11 Siler City historic buildings, revitalizing the downtown.</p>
Participate profitably in global economy	Develop global pipelines to knowledge and innovation	<p>International participation in events and study tours</p> <p>Export and export-network support</p> <p>Cluster-based international learning exchange</p>	<p>MT – Montana World Trade Center organizes artists’ and businesses’ trip to Bank of Ireland art exhibition.</p> <p>NC – North Carolina Department of Commerce Export Ready Program.</p> <p>WA – Bellingham Technical College participation in Trans-Atlantic Technology and Training Alliance, which facilitates cluster-based faculty/student international exchanges.</p> <p>MD – Participation in Media Arts Alliance, a network of community and technical colleges to improve education, training, and opportunities in regional digital media and entertainment, and explores international quality standards for entertainment production programs.</p>

See these individual reports for detailed reference information (online at www.nga.gov/center/innovation):

The 2007 State New Economy Index: Benchmarking Economic Transformation in the States. By Dr. Robert Atkinson, president of the Information Technology and Innovation Foundation (ITIF), and Daniel K. Correa, research assistant at ITIF.

Cluster-Based Strategies for Growing State Economies. By Dr. Stuart Rosenfeld, president of Regional Technology Strategies, Inc., and co-edited by Stephen Crawford, director of the Social, Economic and Workforce Programs Division at the NGA Center for Best Practices and Randall Kempner, vice president, Regional Innovation, at the Council on Competitiveness.

Investing in Innovation

The United States is on the leading edge in flexible thinking and free markets. But countervailing influences have permitted others to match—and in some areas exceed—this country as the innovation leader of the world.

As states increasingly develop their own R&D investments to offset a net decline in federal investments, they can attract top talent, create high-paying jobs, build their infrastructure, enhance their reputation, and leverage additional federal, private, philanthropic, and other research dollars.

But states must ensure that investments are linked to innovation-based economic strategies and/or feed into cluster-based business and industry development, because nearly every sector and institution will cry out for more dollars. States should have a clear vision of what they hope to accomplish with their taxpayers’ dollars and let that knowledge—and not the inevitable pleas for more resources—guide their innovation investment strategies.

To do this requires the three C’s: customization, collaboration, and commercialization.

A growing number of states seem to be accomplishing these goals in their projects. The Georgia Research Alliance, for example, is a private-public partnership that directs supplemental funding to Georgia universities and aims to stimulate the commercialization of research.

R&D has always been part of a solid economic development strategy, but its value as a tool is now better understood. And it’s not the amount of R&D dollars that matter, but the ways in which they’re spent.

So what does work? Here are six steps to successful investing in innovation, along with a description of how some states are leading the way in each area.

<p>1</p>	<p>Put all the pieces together: Embed your R&D investments in a 21st century innovation strategy.</p>	<p>Georgia—Putting all the pieces together includes building expertise in appropriate technologies and orchestrating collaboration among key partners. The Georgia Research Alliance (GRA) does both. It uses part of its annual budget of nearly \$30 million in public and private funding to recruit “eminent scholars” to Georgia universities. The program typically provides scholars with a \$3 million endowment, half paid by the host university, half by the GRA. To date, 54 scholars have been recruited. The GRA also funds “Venture Lab” fellows—experienced entrepreneurs who work with faculty members and others to evaluate research and build companies that meet a demonstrated commercial need.</p>
<p>2</p>	<p>Make the right bets. Your state has strengths (and needs), so find them and fund them.</p>	<p>Ohio—A study by Battelle identified promising clusters and recommended that Ohio “build world-class R&D stature in areas of core competency.” In response, the state in 2003 launched its 10-year, \$1.6 billion “Third Frontier” initiative establishing the Wright Centers of Innovation in biosciences and engineering. Run through the Third Frontier Commission, the state has also spent more than \$50 million to develop a fuel-cell industry and more than \$100 million for the Biomedical Research and Commercialization program, and awarded \$60 million to create a Global Cardiovascular Innovation Center at the world-renowned Cleveland Clinic Foundation.</p>

<p>3</p>	<p>Invest in collaboration. Innovation is a team sport, with players from universities, industry, and government.</p>	<p>Maryland—The Maryland Industrial Partnership Program (MIPS) is a project of the Maryland Technology Enterprise Institute to jointly fund technology-based research and development between Maryland industries and University of Maryland researchers. Since 1987, the state has contributed \$27.8 million and industry \$115.6 million.</p>
<p>4</p>	<p>Enlist experts. There are lots of hard decisions in this process. You'll need the best advice to make them well.</p>	<p>Indiana—In 2004, Indiana's 21st Century Research and Technology Fund commissioned an independent review of its peer review and award process. The report found the fund's review process "highly independent and unbiased" but said it should "seek a greater pool of fresh reviewers and set limits on the number of times a person can serve on the review panels." The fund now involves peer reviewers from around the nation who have expertise in science and technology, economics, and other disciplines.</p>
<p>5</p>	<p>Be consistent while embracing change. Innovation needs sustained effort, but must also evolve with the times.</p>	<p>Arizona—Since the late 1990s, Arizona has strategically focused on building an innovation-oriented research enterprise around its key industry clusters—and with a biosciences niche. This effort includes a sales tax increase earmarked for university research aligned with local industry clusters, a new \$90 million nonprofit genomics research institute, \$440 million in new research facilities, and a new Science Foundation Arizona to support science and technology research and to attract top-notch research talent.</p>
<p>6</p>	<p>Measure Results. It isn't easy—but it is critical to success.</p>	<p>Maine—The state's independent evaluation—the Maine Comprehensive Research and Development Evaluation 2006—assessed the impact of more than \$296 million in research and development spending since 1996. Among other findings, the report concluded that the investment contributed to state economic growth but that more investments in commercialization and state industry were needed.</p>

See this individual report for detailed reference information (online at www.nga.gov/center/innovation/): *Investing in Innovation*. By Mary Jo Waits, director of the Pew Center on the States, in partnership with the NGA Center for Best Practices.

Conclusion

There is no doubt that many of the promising approaches highlighted here will be expanded and replicated in the coming years as more states share their experiences—and effective strategies—on the road to adopting a comprehensive innovation agenda for STEM, postsecondary education and the workforce, and regional economies.

By putting in the hard work required to drive the innovation agenda forward, states—and this nation—will be rewarded with world-class schools, teachers, and research institutions, and globally competitive industries and regions.

Chapter 4 — The Path Ahead

We know what's being done now, but what are *Innovation America* strategies of the future? How do we sustain and build on our accomplishments? The next steps involve measuring progress, partnering with other organizations, securing funding, and building the capacity of the *Innovation America* agenda to keep its successes going well into the future.

International Benchmarking to Advance Innovation

Today's young people will be vying for jobs, both in the United States and abroad, against their international peers and will need to be academically prepared to compete in this increasingly competitive market. NGA, in collaboration with Achieve, Inc. and the Council of Chief State School Officers, will soon launch an initiative that will recommend action steps for states to compare their students' performance internationally and to ramp up their educational systems.

Partnering in Innovation

Leveraging our efforts with those of like-minded organizations will help bolster states' effectiveness in innovation, increase training workshop opportunities, and broaden innovation capacities across the nation. Some of the key stakeholder partnerships are already underway:

NATIONAL SCIENCE FOUNDATION (NSF)

Regional Innovation Workshops

At the NSF-funded regional *Innovation Summits*, NSF awardees—whose projects were carefully selected for their potential interest to state innovation teams—will showcase their work. The projects provide state teams with tools and ideas to identify existing and potential new resources, encourage entrepreneurship, improve mathematics and science education, better align postsecondary education systems with local economic growth, and develop regional strategies. The regional summits' programmatic/thematic content will align with the thematic content of the new state-by-state website under development (*described below*).

State-by-State Website

The proposed NSF website will highlight a small number of thematic areas of strong, common interest to the states (e.g., economic and workforce development, centers for research support), and provide a map that will allow the user to “click” on a region of the

“Innovation means that children are going to have to have developed at some point in their educational careers a love for learning, a passion for learning. This allows them to be adaptable and successful and a part of the competitive workforce permanently.”

— *Utah Governor Jon Huntsman, Jr.*

country (e.g., northeast, south) and “link” to relevant NSF projects funded by region. The thematic areas articulated at the homepage will be delineated through supporting narratives with relevant data provided from the *NSF Science and Engineering Indicators*.

The national map on the homepage will be partitioned into “clickable” regions so users can access any particular state in a region and the relevant projects funded there. A searchable website database—by state and thematic area—also will be offered. For each NSF-funded project in the database, users can access its abstract and get project contact information. The website will inform state planning efforts by highlighting NSF-funded resources that already exist in the respective regions/states, identify projects and ideas in nearby states that can foster entrepreneurship and facilitate the formation of new businesses in the states, and share information on programs associated with the entire innovation continuum.

Pilot Projects

Finally, about 50 NSF-funded projects will be chosen for their degree of innovation or potential utility to governors. At the pilot stage, three or four themes will be selected in consultation with NGA, and a database of NSF projects supporting those themes will be developed for one region of the country. The pilot will be rolled out at the initial regional *Innovation Summit* meeting for attendee comments and suggestions and will have that particular region as its focus. As meetings progress and suggestions are compiled, the website will be further refined, updated, and enhanced.

SCHOLASTIC INC.

At the 2007 summer governors' meeting, NGA and its partner Scholastic Inc.—the global children's publishing, education, and media company—unveiled www.youinnovate21.net: *It's Your Century*, an interactive website to illuminate the world of STEM in fun and appealing ways for America's youth.

The website, geared for middle school kids, displays different “windows” in science, technology, engineering, and math that students where students can discover related professions and lifework. *Youinnovate21.net*, built on innovative state initiatives, helps

students plan for the future by providing inspiring ideas for various career pathways, and helps parents understand what skills their children need to succeed in the innovation-based economy. The site also will impart knowledge with content embedded in factoids, activities, and games and offer teachers information to augment and enhance their curricula.

As states advance efforts to incubate innovation and augment STEM education in schools and universities—and create a world-class education system to prepare students for the 21st century economy—*youinnovate21.net* will be one among many tools to nurture youths' innate curiosity today and spark their aspirations for tomorrow.

U.S. CHAMBER OF COMMERCE

NGA's *Innovation America* and the U.S. Chamber of Commerce collaborated on an effort to enhance states' innovation capacity and economic prosperity. Governor Napolitano has met with state and local chambers during her state travel to discuss state and local competitiveness issues with the business community. She is giving the keynote address at the U.S. Chamber's Institute for a Competitive Workforce (ICW) annual meeting in September, where she will announce the "Tool Box for Innovation" to help state chambers garner support and encourage the business community to align the three key areas of innovation with their work.

Funding Innovation

STEM Center Grant Program and Network—Under this \$3 million program, six states will receive two-year challenge grants to improve STEM education in their states and will have the opportunity to participate in a network of STEM centers.

Building Innovation Capacity

STEM

- By fall of 2007, all states will be invited to participate in a STEM learning lab that focuses on the success and lessons learned from Alabama's STEM initiatives. The workshop will allow states to exchange ideas and learn from each other as well as from national STEM education experts.
- NGA will create a STEM Communications Toolkit that will be available to all states to assist them in talking with key stakeholders—business groups, educators, parents, and students, among others—about the importance of STEM.

POSTSECONDARY

- NGA will convene private sector leaders, regents, and state governors' staff on the postsecondary education compact.

REGIONAL INVESTMENTS

- NGA is sponsoring a \$300,000 policy academy for six states to help them develop regional innovation strategies.

Conclusion

We'll continue to build on the strong foundation set this year by the *Innovation America* Task Force so that, even as we turn to other topics important to the nation, our work in innovation continues to thrive and becomes a routine part of policymaking for the governors of today and for the leaders of the future.

Resources

Interested in learning more about *Innovation America*? All of the reports summarized in this compendium can be downloaded from NGA's website, www.nga.org/center/innovation.

- **A Call to Action: Why America Must Innovate.** By Everett Ehrlich, an economic consultant based in Washington, D.C., and 1993–1997 undersecretary of commerce for economic affairs.
- **Building a Science, Technology, Engineering and Math Agenda.** By Charles N. Toulmin and Meghan Groome, senior policy analysts in the Education Division of the NGA Center for Best Practices, with key contributions from the Bill & Melinda Gates Foundation and other external partners.
- **A Compact for Postsecondary Education.** By Christopher Hayter, program director for Economic Development at the NGA Center for Best Practices.
- **Cluster-Based Strategies for Growing State Economies.** By Dr. Stuart Rosenfeld, president of Regional Technology Strategies, Inc., and co-edited by Stephen Crawford, director of the Social, Economic and Workforce Programs Division at the NGA Center for Best Practices, and Randall Kempner, vice president, Regional Innovation, at the Council on Competitiveness. The Ewing Marion Kauffman Foundation contributed financial support and expertise to this effort.
- **The 2007 State New Economy Index: Benchmarking Economic Transformation in the States.** By Dr. Robert Atkinson, president of the Information Technology and Innovation Foundation (ITIF), and Daniel K. Correa, research assistant at ITIF. The Ewing Marion Kauffman Foundation sponsored production of this special edition of the 2007 State New Economy Index and granted NGA permission to publish it.
- **Investing in Innovation.** By Mary Jo Waits, director of the Pew Center on the States in partnership with the NGA Center for Best Practices. The Pew Center on the States funded this guide, with additional financial support and expertise provided by the Ewing Marion Kauffman Foundation.

The following supplementary information, which details an NGA-sponsored survey and focus groups exploring the nation's views on innovation and its economic benefits, is also available. All of these materials were prepared and presented by Dr. Frank Luntz, chairman and CEO of Luntz, Maslansky Strategic Research. The Verizon Foundation funded this work.

- Americans Talk Innovation: A Presentation to the National Governors Association.
- Americans Talk Innovation: An Analysis for America's Governors.
- Americans Talk Innovation: A Public Opinion Survey.



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