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# US Innovation Policy and Strategy for the Global Economy

## Introduction

The rapidly growing prominence of emerging countries in the global economy has created a new competitive landscape; a landscape in which entire economies must quickly adapt to the unique challenges of globalisation and to rising levels of competitiveness or risk marginalisation. In the United States, there have been many policy debates and initiatives to ensure that the country is prepared for the challenges posed by the global economy. Major issues include maintaining its leadership in basic science research, improving K-12 (kindergarten to high school) science education, building science and technology talent pools, and creating ecosystems for innovation in the private sector. US innovation policy is expanding into areas beyond the technological and economic, such as those with a social and environmental impact, in addition to monitoring its implications on foreign policy. Each of these policy toolboxes are not necessarily orchestrated under one national agenda, and at first blush it seems that the US lacks a comprehensive and holistic approach to prepare for globalisation. Despite the chaotic surface of the US policy agenda, however, all the stakeholders, including the federal government, Con-

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<sup>1</sup> Washington CORE.

gress, state governments, universities, think tanks, global companies, and venture capitalists are contributing, each in their own way, to the creation of the dynamic and robust American economy of tomorrow.

Heightened interest in innovation and competitiveness issues in the US was apparent in President Bush's State of Union Speech in January 2006 when he announced the American Competitiveness Initiatives (ACI). ACI was the culmination of developments of preceding years, particularly a private industry proposal for change, known as the Palmisano Report, and the report entitled *Rising Above the Gathering Storm*, prepared by a National Academies Committee headed by Norman Augustine, former CEO of Lockheed Martin. President Bush's ACI addresses the need for changes in the US to strengthen innovative capacity, which would be seriously endangered if the US were to continue to take no action. There are currently two priority issues being debated in the US: basic research and K-12 education. In February 2007, the US approved budget increases for 3 major agencies – the National Science Foundation, the Department of Energy, and the National Institute of Standards and Technology – in order to boost basic national science capabilities. There are numerous proposals and legislative bills to strengthen K-12 science and math education, indicative of the US's commitment to long term and forward looking investment in innovation capacity and next generation resources development.

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local governments to lead innovation policy and implement much more specific and direct programmes and measures so as to create their own "innovation

economies". There are a number of strong economic clusters in the US, and at the core of each cluster are usually research universities. Together with abundant and diverse innovation capital investment, American states have been very aggressive in creating regional clusters, which in turn has generated a vibrant entrepreneurial economy. The National Governors Association (NGA) declared the Year 2007 as Innovation Year, encouraging the states to be more active in promoting their own economic

competitiveness. One of the priority issues for many states is workforce development. There has been a widening mismatch in skills required for new jobs, mainly due to the rapid pace of technological advancement. Many states believe it is critical to have a labour force that is well-educated and skilled in global competition, and that education, training and lifelong skills development are the gateways to opportunity and the foundation of a knowledge-based economy.

In the past, social issues such as unemployment, wealth inequality, labour conditions, social safety nets, and programmes for the socially disadvantaged were not included in policies promoting innovation in the US. However, there is an increasingly strong connection between innovation and social welfare policy, as it is believed that improving the social conditions and quality of life of

every American citizen is the ultimate goal of an innovation-driven economy. One of the most alarming problems facing American society is the increasing gap between income groups, with wealth being concentrated

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among the richest fraction of the population. Also, high medical costs and growing financial risks with high debt payments are putting pressure on many US households. These issues are being addressed as a part of the larger innovation and competitiveness policy debate. Despite these problems, the US enjoys high social mobility, a powerful driving force for the US economy. There is also a sense among US citizens that there is the opportunity to improve standards of living through individual capabilities and efforts.

With the recent change in power in the US Congress, environmental issues have once again returned to the fore. The new Congress has already introduced a number of bills addressing environment and energy issues such as renewable energies, conservation and new exploration for fossil fuels. Simultaneously, the private sector is making a strategic strike, turning the environment into a top priority issue. Fortune 500 companies such as Walmart, McDonalds, DuPont, GE, Goldman Sachs and UPS are implementing creative environmental initiatives to lead environmental standards rather than waiting for government regulations.

Science and technology diplomacy has always been an important part of US external relations. However, it has become even more important in recent years as the US has realized that global cooperation is critical in a world facing pressing global issues, from climate change and HIV/AIDS to nanotechnology and stem cell research. The US regards science and technology cooperation as a part of the “soft power” pursuit of its foreign policy objectives, and has recently expanded external relationships with countries such as Brazil, China, Vietnam, and Pakistan, among others. Globalisation has blurred the distinction between cooperation and competition. This is exemplified by the recent establishment of the North American Competitiveness Council (NACC). The decision to create NACC came from the private sector of 3 countries, the US, Canada, and Mexico, which considered the issue of competitiveness not as a national one, but rather of regional importance. With the creation of NACC, the US strategy on competitiveness and innovation is taking a new turn by expanding beyond national borders. It is likely that the countries which can accept the concepts of open cooperation, share results, and create synergy among different countries will be the winners in this century of global competition.

## National Strategy Document

### *Overview of US National Innovation*

#### *Decision Making Process*

In the United States, the path to a knowledge economy has been debated for some time under the headings of “innovation” and “competitiveness”. In recent years, there have been two different periods when this debate became one of the primary issues among Washington’s policymakers. The first was when the US encountered stiff competition from foreign countries, especially Japan, in the early 1980s. The US had an enormous trade deficit with Japan, and seriously feared that Japan would surpass it in its role as an industrial leader. The second period is still underway, and began because the US feels that their economic competitiveness is being threatened and the country is ill prepared to deal with ever increasing global competition.

Although many indicators still paint a bright picture in terms of technology and innovation, many US officials and industry

leaders fear that the American supremacy in the world economy is being eroded. There are a variety of factors causing concerns about the future: new countries emerging as both economic and technological powers, job losses resulting from off-shoring, a decline in the number of students entering into science and engineering fields, substandard performance in K-12 math and science education, the shrinking of foreign talent pools, and ever increasing trade deficits. Officials and industry leaders fear that these emerging factors may compromise the future of American economic leadership and technological prowess.

The Council on Competitiveness (CoC) was formed in 1986 when the US faced a real economic threat in the form of competition from Japan. The CoC published a report that was later dubbed the “Young Report,” named after CoC Chairman John Young, then the CEO of Hewlett and Packard. The report put forward myriad policy recommendations. Though it is debatable whether the US government has implemented the Young Report’s suggestions, it is indisputable that not long after the Report was released the US reclaimed a leading global economic position, with an unprecedented period of economic growth later coined “the New Economy” – 10 years of consecutive economic growth without inflation.

Twenty years later, the US is once again feeling anxious. Americans are now worried that they are being challenged on multiple international fronts, and feel strongly that they need to act now and respond to the new challenges. The CoC made the first move with the National Innovation Initiative (NII) in 2003. The NII was headed by Samuel

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Palmisano, the CEO of IBM, along with an impressive 253 experts from diverse fields. Their findings, the so-called Palmisano Report, published exactly 20 years after the Young Report, warned policy makers of the new global challenges that faced America in the new century. It cautioned America that these challenges were different from those of the 1980s, and that the US either had to keep on innovating or relinquish its position as a global economic leader. The Palmisano Report was a wakeup call to policymakers

in Congress, who asked the National Academies to conduct a study about the issue. The National Academies formed the Commission on Global Economy of the 21<sup>st</sup> Century, which authored a series of recommendations in a well-known report entitled *Rising above the Gathering Storm*. The Commission was headed by Norman Augustine, the former CEO of Lockheed Martin. Immediately after the release of the Report, Augustine worked tirelessly to promote it and personally lobbied policy makers and think tanks to convince them that serious measures had to be taken if the US were to maintain its lead in technology and innovation. In his State of the Union address in January 2006, President Bush announced the American Competitiveness Initiative and specifically spoke of measures to prepare the US for the next century. His suggestions ranged from upgrading K-12 science and technology education and tax incentives for the private sector's R&D activities to increasing funding for public R&D. However, while many ACI-inspired bills were introduced during the 109<sup>th</sup> Congress, few passed. The current 110<sup>th</sup> Congress has already introduced more than 10 bills, many of which are related to education reforms. Innovation and competitiveness policy has a long history in the US. Though it is not certain how many of the abovementioned recommendations will actually be implemented, it is certain that the US is strongly committed to leadership in technology and innovation.

Figure 1

### Recent History Toward Innovation / Competitiveness Policy in the US



### *Major Issues and Implementation*

In the US, the implementation of innovation and competitiveness policies is undertaken through legislative actions that authorize spending on specific measures. Both the previous (109<sup>th</sup>) and the current (110<sup>th</sup>) Congresses have been extremely active in introducing a number of innovation and competitiveness related bills, indicating that the US is very serious about this issue and is aware of the need to change the status quo. There are two priority issues: basic research, and K-12 science and technology education. Details and specific means vary from bill to bill, but all focus on increasing basic research spending and enhancing K-12 education. It is particularly remarkable that these suggestions are made despite budget constraints, requiring the sacrifice of other government programmes. This obvious emphasis shows that the US is on the offensive in terms of its commitment to invest in a competitive future.

Since January 2007, many bills calling for increased funding for research as well as improvements in math and science education have been introduced in both the House and Senate. The congressional push to improve US competitiveness via research and education has been a major trend since 2006, when documents such as “Rising above the Gathering Storm” received great attention and the President announced the American Competitiveness Initiative. On January 31 2007, the House of Representatives passed H. J. Resolution 20, which substantially increases funding for critical research projects at the Department of Energy Office of Science, the National Science Foundation, and the National Institute of Standards and Technology. The resolution, written by House Appropriations Committee Chairman David R. Obey (D-WI) and Senate Appropriations Committee Chairman Robert C. Byrd (D-WV), is very noteworthy because all other government agencies would receive flat or reduced funding compared to 2006 levels. In fact, 60 programmes were cut below current funding levels to make \$10 billion available to address “critical investment needs.” Of the \$463.5 billion budget, the amounts below were to be appropriated by the NSF, DOE, and NIST:

The National Science Foundation would receive \$5,916.2 million, an increase of \$335 million, or 6.0 per cent, over the current year funding of \$5,581.2 million. The bill specifies that \$4,665.95 million be allocated to the Research and Related Activities budget. This

amount is equal to the Administration request, and represents an increase of \$335 million or 7.7 per cent, in the Research and Related Activities Account. The Summary explains that “this increase is a down-payment towards enhancing US global competitiveness by investing in basic science research.”

The Department of Energy’s Office of Science would receive \$3,596.4 million, an increase of \$200 million, or 5.6 per cent, over the current year funding \$3,796.4 million. In addition, approximately \$130 million of previously earmarked funding would be available on an unrestricted basis. The Summary states that the increase is “to support research including new energy technologies such as improved conversion of cellulosic biomass to biofuels.”

The National Institute of Standards and Technology budget would receive \$425.6 million, an increase of \$50 million, or 13.3 per cent, over the current year funding of \$375.6 million. This increase will support “new funding for physical science research and lab support for nanotechnology and neutron research.”

The resolution will now go to the Senate, and House supporters hope that the bill will reach the President’s desk before current funding expires on 15 February 2007. The White House has indicated that the President will sign the bill.

There are several other House and Senate bills that address the problem of insufficient funding for basic research in the US. The lack of funding for basic research is problematic because basic research lies at the root of innovation. Developmental and short-term research projects may produce immediate results, but basic research discoveries are the real engines of innovation, as we saw in the late 1950s and 1960s. Recognizing the need to fund more basic research, House Science Committee Chairman Bart Gordon introduced the Sowing the Seeds through Science and Engineering Research Act (HR 363). If passed, this bill will authorize a 10 per cent funding increase per year for basic research in the physical sciences at the NSF, the NIST, the DOE, NASA, and the DOD.

In addition to the research and funding issue, K-12 science and math education has received much attention in Congress. An educated talent pool with a strong background in science and technology are the backbone of the US Innovation system. Recognizing the importance of a talented and well-trained workforce, both the House and Senate have introduced several bills that aim to standardize and improve the quality of K-12 science and math



education. These bills are also intended to encourage people to pursue teaching careers in math and science. In the Senate, Barack Obama introduced the Innovation Districts for School Improvement Act (S 114), which would award competitive grants to 10 urban and 10 non-urban local education agencies to create innovation districts. These innovation districts will establish tests to track the academic progress of their students, train teachers, and more. Meanwhile, Ted Kennedy introduced the States Using Collaboration and Cooperation to Enhance Standards for Students (SUCCESS) Act (S 164), which would provide support to states that choose to upgrade their science and math standards. In the House, a package of bills by Representative Vern Ehlers (HR 35, 36, 37, 38) proposes to amend the no Child Left Behind Act and make states accountable for the results of science and math assessments, authorize tax credits to math and science teachers, and enhance math and science readiness in the Head Start programme. Representative Ehlers also introduced the Standards to Provide Educational Achievement for Kids (SPEAK) ACT, which will eliminate the variability among states with regards to measures, standards, and benchmarks for academic achievement in math and science. Representative Goldman also introduced the “10,000 Teachers, 10 Million Minds” Science and Math Scholarship Act, which will provide scholarships to undergraduates majoring in science, technology, engineering, or math who commit to K-12 teaching after graduation. In the Senate, it is expected that an updated version of the bi-partisan competitiveness act introduced last year, the “National Competitiveness Investment Act,” will be reintroduced. This Act will most likely address science and math education as well as research at federal agencies. As US competitiveness becomes an increasingly hot topic, Congress is expected to continue their discussion of research and education as the drivers of innovation.

## Regional Dimension

Regional efforts to foster innovation are much more direct and hands-on than at the federal level. One of the few federal programmes that directly influence the Nation’s innovative prowess is basic research funding, administered by “mission agencies” including the NSF, the National Institute of Health (NIH), the DOE,

the Department of Defence (DOD), and NASA. Most of this funding goes to research universities, which then serve as sources of innovation. Aside from basic research funding and high level rhetoric campaigns for innovation, federal efforts are limited to more indirect policy areas such as corporate tax, immigration, litigation reform and healthcare. Although these issues are certainly important in creating environments that encourage private sector innovation, the main players in the US government's innovation system are state and local governments. It falls to state and local organisations to take innovation into their own hands and implement much more specific and direct programmes and measures for the development of their own local economies.

### *Regional Cluster Development*

Strong regional economies make strong national economies. There is a number of robust local innovation centres in the US known as clusters, which are rich and diverse in different industry sectors. The most famous, and the envy of every state, is Silicon Valley, located north of San Francisco. Other well known clusters include Boston's Route 128 (Boston, MA), the Research Triangle (Raleigh/Durham, NC), and the Wireless Valley (San Diego, CA), although these three are not the only such efforts in recreating the success of Silicon Valley. Similar initiatives can be found in the Silicon Alleys (NYC, NY), the Digital Gulch (LA, CA), and the Bio Capital (Baltimore, MD). States throughout the country are trying to establish IT clusters, bio technology hot spots or nanotechnology centres of excellence, and it is precisely these local clusters that provide the rich soil of innovation from which the robust US economy grows.

Research universities are usually at the core of each cluster, and they receive a large amount of federal research dollars and engage in cutting edge basic research. The following is a list of the top 20 university recipients of federal research funding. At the top of the list is Johns Hopkins, well known for its life science and health related research, which received roughly \$1.5 billion. Other universities received around half a billion dollars. In addition to conducting basic research, these universities train future innovators, sponsor research that helps the private sector to come up with technological solutions, and greatly contribute to the spread of the entrepreneurial spirit not only within the campus but beyond.

Figure 2

## The top 20 universities with the R&amp;D funding in 2005

Ranking	University	2005 (\$Millions)
1	Johns Hopkins University	1,444
2	Univ. MI all campuses	809
3	Univ. WI Madison	798
4	Univ. CA, Los Angeles	786
5	Univ. CA, San Francisco	754
6	Univ. CA, San Diego	721
7	Stanford University	715
8	University of Washington	708
9	University of Pennsylvania	655
10	Duke University	631
11	PA State Univ. all campuses	626
12	OH State Univ. all campuses	609
13	Cornell Univ. all campuses	607
14	MIT	581
15	Univ. CA, Berkeley	555
16	Univ. MN all campuses	549
17	Univ. CA, Davis	547
18	Columbia Univ. in the City of NY	535
19	Washington Univ. St. Louis	532
20	University of Florida	531
	Top 20 universities Total	13,691
	Other universities	32,059
	Total R&D funding for Universities	45,750

Source: NSF [www.nsf.gov/statistics/infbrief/nsf07311/table4.xls](http://www.nsf.gov/statistics/infbrief/nsf07311/table4.xls)

### *Innovation Capital*

States offer various incentives and programmes that facilitate the creation of regional clusters. These are provided by states' economic development arms – sometimes a part of their commerce departments, and other times separate non-profit organisations that operate independently from states. There is a trend toward setting up economic development organisations independently of government structures due to the increased freedom and creativity they enjoy. In order to woo companies and encourage investment, states cannot afford to be slow or bureaucratic. They use a variety of incentives and programmes that help local com-

panies grow and expand, including tax credits, rent subsidies, building infrastructures such as roads and broadband networks, and education and training through community colleges and universities.

In recent years, states have been very aggressive with one innovation programme in particular that offers “innovation capital.” This term was coined by the National Association of Seed and Venture Funds (NASVF), a national organisation of state economic development groups that specifically focuses on capital assistance. A NASVF report entitled *Seed and Venture Capital: State Experiences and Options* defines “innovation capital” as follows: “innovation capital – the funding, knowledge, relationships, and influence needed to develop and commercialize innovative technologies and ventures – is vital to a healthy, growing knowledge-based economy.” NASVF identifies the following eight different types of programmes offering innovation capital: direct investment by state agencies; state investment in privately managed, geographically restricted funds; investment in a portfolio of private seed and venture capital partnerships; tax credit incentives for private direct investment; tax credit incentives for private indirect fund investment; mobilizing angel networks; matchmaking services; and culture bending initiatives.

### ***Regional Competition and Collaboration***

One of the most remarkable characteristics of the US innovation system is fierce competition among states. States are very competitive and aware of what rival states are doing to encourage innovation. For example, North Carolina has been benchmarking its innovative strengths and weaknesses against those they consider to be their peer states: Massachusetts, Virginia, Texas, Pennsylvania, Georgia and Michigan. It measures its innovation level by such metrics as research and development funding, entrepreneurial activity, intellectual property and technology transfer cases, number of science/engineering graduates, and venture capital activity. Balancing state competitiveness, however, are their collaborative efforts in sharing of information and best practices in state governmental affairs. The National Governors Association (NGA) 2007 Initiative “Competition and Innovation” was inspired by the innovation promotion campaigns originating at the federal level from the CoC and the National Academies’ report,

*Rising above the Gathering Storm.* Governor Janet Napolitano of Arizona, chair of the NGA Initiative, spoke of the importance of regional competition in innovation: “In today’s economy, competition between nations is less relevant than competition between regions of innovation – groups of high wage, rapidly growing businesses that are closely linked through collaboration, research efforts, common products and services.”

According to Chris Hayter, lead staff at the NGA Innovation Initiative, the issues that matter to the states at NGA can be divided into three areas: education, health care and economic development. The first two have hitherto dominated the NGA activities, although the issue of economic development has increasingly gained the attention of states that believe in the importance of bolstering innovative capacities to empower their economies to operate in the global economy. Each state approaches the challenge of cultivating innovation differently. One way is by redefining the roles played by research universities, which are often Land Grant Universities. The Land Grant Universities were created in mid-eighteenth century by the federal government to educate, carry out research and extend to the local economy by contributing to local economic development. According to Hayter, some research universities have not got involved in local economic development despite their mission. Many states are thus applying pressure on state universities to increase accountability regarding their activities and to play a larger role in state economic development efforts. For example, there is a bill pending in Ohio that would require the Chancellor of Ohio State University to report to the Governor, to ensure that the state university works with the state on a common agenda. In the past, presidents of universities enjoyed autonomy and independence from state governments, and state universities were allowed to pursue their own agenda, despite the fact that a large portion of their funding came directly from the states. Indeed, requiring state funded universities to play a larger role in the regional economic development is a recent trend. As an example of a particularly close relationship between a university and state, Georgia Tech State University now houses the state’s Economic Development Office. In the face of the tide of globalisation, the states have become aware of the vital importance of innovation, and together they will enable the entire nation to thrive and prepare for the challenges of the future.

### *Workforce Development at State Level and Regional Level*

States are working on a number of issues to increase their innovative capacity. One such is workforce development and education. Many states believe it is critical to have a labour force that is well-educated and skilled in order to compete globally. Virginia is a case in point. Governor Timothy Kaine has been focusing on education and workforce development issues, which he believes are the key to ensure Virginia's continued success as a leading innovation state. According to Virginia's Secretary of Education, the state has one of the finest educational systems in the US. A national education journal, Education Week, proclaimed Virginian children to be the most likely nationally to experience success as they move from childhood to adulthood. The state education system goes from "Cradle to Career", emphasizing skills development among youths capable of achieving excellence in the fast-paced knowledge society. Virginia is also making workforce development a top state priority. Governor Kaine established the Workforce Development Vision, a comprehensive plan for Virginia's workforce to compete successfully in the global economy. It is based on the belief that in order to compete most effectively, workforce

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and economic development strategies must build a skilled workforce through lifelong learning and worker training. Thus, Virginia has two comprehensive and distinct plans spanning the lives of Virginians: early develop-

ment from the cradle to career (K-12 to university to landing a job), and lifelong development (from currently employed and beyond).

The Department of Labour is also working on upgrading the skills of the nation's workforce through retraining programmes that will better prepare them for the knowledge society. As a part of President Bush's ACI, the Department of Labour launched a new programme called the Workforce Innovation in Regional Economic Development (WIRED) Initiative. This programme is a proposal-based grant, awarding \$195 million to the regions with winning ideas about long term strategies to enhance skills in their regions. US Secretary of Labour Elaine L. Chao said when announcing the winners of the WIRED grants in February 2006 that

“education and training are the gateways to opportunity and the foundation of a knowledge-based economy.”

Given the rapid pace of technological advancement, the US government feels that human resources developments in some areas of the country have not caught up with the speed of change in the worldwide economy. This change is reflected in the fact that a majority of new jobs being created require skills that are only attained at a college-level education or higher. The WIRED Initiative is built around the premise that talent development is critical to economic development. The 13 regions received awards after they submitted proposals to include a 3-year demonstration of how talent development can be a driver of regional development. They include Coastal Maine, Central Michigan, North Central Indiana, and Greater Kansas City, all of which experienced major changes in the local economy as a result of global competition. The US continues to raise the bar as it prepares for globalisation, and workforce development will play a key role in sustaining its world leadership.

### ***Social Impact on US Innovation Policy***

Social welfare policy is usually considered separate from innovation policy. Social welfare-related issues such as unemployment, social inequality, labour conditions, safety nets, and other programmes for the socially disadvantaged are not included in policies promoting innovation. However, there is an increasingly strong connection between innovation and social welfare policy, as it is believed that improving the social condition and quality of life of every American citizen is the ultimate goal of an innovation-driven economy. More and more innovation advocacy groups are bringing these issues to the attention of policymakers by raising a variety of social issues which they believe may hinder the competitive capacities of the US.

One of the reports addressing this issue is the CoC *Competitiveness Index: Where America Stands* of November 2006.<sup>1</sup> It discusses US performance in the world economy over the last 20 years, and its second chapter on “How Americans are Doing” is of particular interest in terms of how social issues are being discussed in the context of innovation policy. The chapter is divided

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<sup>1</sup> Council on Competitiveness (2006).

into four major topics. First, there is income wealth. The report shows that Americans remain the most prosperous people in the world, that poverty rates have improved over the past 20 years, and that the standard of living has improved substantially as Americans can buy goods and services relatively inexpensively compared to other countries. However, wealth is becoming increasingly concentrated among the richest fraction of the population. Second, it looks at education and mobility, and notes that one of the most alarming aspects of the economic prosperity of the last 20 years is an increasing gap between income groups. For the last 20 years, only those with 4 year college degree increased their income level, while the incomes of those with no high school diploma or high school diploma equivalents went down. However, social mobility remains very high. Overall, 60 per cent of households in the US have moved up or down. Third, it focuses on the job market. The US continues to have an extremely dynamic job market. Increasingly diverse and older workers are driving growth in the American workforce. Women and minorities from the Hispanic, African American, and Asian communities are becoming better represented in the workforce. The job market continues to be very flexible, with 30 million jobs churned every year. Unemployment has fallen since the 1980s, although racial and ethnic gaps still exist. Fourth, the chapter concentrates on challenges for workers, families and the economy. One of the major challenges facing US households is increasingly high medical costs. Premiums for health insurance coverage have grown faster than inflation. Many people are fearful that they will lose their insurance benefits when they change their jobs. Another challenge Americans face is growing financial risk. Debt payments have increased while the saving rate has fallen.

Income disparity and skills mismatch will become one of the major hurdles in pursuing the innovation agenda. As Alan Greenspan says: "A shortage of highly skilled workers and a surplus of those with fewer skills has meant wages for the lower half of the income scale have remained stagnant, while the top quarter of earners sprints away. The skills mismatch can and must be addressed, because I think that it's creating an increasing concentration of incomes in this country and, for a democratic society, that is not a very desirable thing to allow to happen."<sup>1</sup> US

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<sup>1</sup> [www.washingtonpost.com/wp-dyn/articles/A34235-2004Sep19\\_5.html](http://www.washingtonpost.com/wp-dyn/articles/A34235-2004Sep19_5.html)



policy makers and innovation advocacy groups, along with state governments and community leaders, are addressing this issue of the haves and the have-nots.

Despite increasing income inequality, Americans are still optimistic about the future. A significant reason is social mobility, a powerful driving force in the US economy. Among the factors that impact on measuring the level of individual prosperity is the sense of opportunity that Americans have that they can improve their standard of living through their own capabilities and efforts. This sense is extremely important and is indicative of people's attitude towards and happiness with their daily lives. Indeed, one can say that this optimism is the source of the robustness and dynamism of the US economy.

## Environmentalism

### *Overview of US Current Policy Debates*

As noted in the Washington Post, "conventional wisdom has labelled the new congressional majority a politically divided group, with socially conservative Democrats set to challenge more liberal party leaders. But this picture misses an area of overwhelming unity: energy and the environment."<sup>1</sup> House Democrats set themselves an ambitious legislative target to take the country "in a New Direction, to change the way Congress does business, and to get to work addressing the real challenges facing the American people." Among the initial legislation passed within the first 100 hours of Democratic leadership was HR6, which invested in clean, renewable energy and energy efficiency by repealing billions in subsidies given to big oil companies raking in record profits.<sup>2</sup> It was noted that "reducing our dependence on foreign oil is critical to bolstering national security and creating good-paying new jobs." American farms abound with crops that can be used to fuel cars and trucks. In 2005, the ethanol industry supported the creation of more than 150,000 jobs in all sectors of the US economy, boosting US household income by \$5.7 billion.<sup>3</sup> There is broad bipartisan support for ending the addiction to oil by investing in

<sup>1</sup> [www.net.org/policy/greencongress.pdf](http://www.net.org/policy/greencongress.pdf)

<sup>2</sup> [www.speaker.gov/legislation?id=0009](http://www.speaker.gov/legislation?id=0009)

<sup>3</sup> *Ibid.*

clean renewable fuels, and 52 per cent of the American public said the government should invest in alternative energy sources to reduce dependence on foreign oil.<sup>1</sup>

The leadership in the 110<sup>th</sup> Congress has made global warming and energy security top priorities. A record number of climate change bills were introduced in just the first few months of 2007, and more bills are expected.<sup>2</sup> While all legislation is aimed at reducing harmful greenhouse gas emissions, some bills include stronger and more effective provisions than others.<sup>3</sup>

### *Energy Issues Facing Congress This Year*

Oil provides about 40 per cent of US energy, and with the transportation sector's heavy reliance on it, legislative efforts are concentrated on augmenting and replacing this source,<sup>4</sup> with a focus on renewable energies, conservation and new exploration of fossil fuels. As regards the first, the 2005 energy bill mandated doubling of renewable fuels production – mostly corn-based ethanol

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at this time – to 7.5 billion gallons by 2012. The Renewable Fuels Association, a trade group for the ethanol industry, estimated domestic production of 5 billion gallons of ethanol in 2006 and projects up to 11 billion gallons per year within the next eighteen months. A bipartisan group of senators led by Richard G. Lugar (R-IN) introduced legislation in

the new Congress that proposes a renewable fuels mandate of 60 billion gallons by the year 2030. The group has also proposed legislation requiring a sharp increase in the production of flex-fuel vehicles and in the number of pumps that carry ethanol-blended fuel. Numerous other renewable energy proposals are expected.

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<sup>1</sup> Ibid.

<sup>2</sup> For a table showing global warming Senate legislation thus far in the 110<sup>th</sup> Congress, see [www.net.org/policy/global\\_warming/pdf/gw\\_110\\_senate.pdf](http://www.net.org/policy/global_warming/pdf/gw_110_senate.pdf), and for a table showing current and expected global warming House legislation in the 110<sup>th</sup> Congress, see [www.net.org/policy/global\\_warming/pdf/gw\\_110\\_house.pdf](http://www.net.org/policy/global_warming/pdf/gw_110_house.pdf).

<sup>3</sup> [www.net.org/policy/global\\_warming/legislation.vtml](http://www.net.org/policy/global_warming/legislation.vtml)

<sup>4</sup> [www.cfr.org/publication/12429/](http://www.cfr.org/publication/12429/)

As regards conservation, Corporate Average Fuel Economy Standards (CAFE) were introduced following the Arab oil embargo of 1973-74, but the standard for cars has remained 27.5 miles/gallon for 20 years. Experts say after years of being stalled, in part because of protests by the auto industry, improving CAFE standards will be seriously considered during this congressional session. Among the measures to be debated is a proposed "National Fuels Initiative" introduced by Lugar and Senator Barack Obama (D-IL) that would aim for a 4 per cent annual increase in CAFE standards. Senator Joseph R. Biden, Jr. (D-DE), who cosponsored a similar initiative last year, said "domestic energy policy is at the centre of our foreign policy." Senator Ted Stevens (R-AK) this year introduced legislation in the Commerce Committee to increase CAFE standards to 40 miles per gallon within ten years.

In the area of new exploration for fossil fuels, in December 2006, Congress passed legislation ending a ban on drilling in deep waters in the Gulf of Mexico. While areas closer to the coast remain off limits, the newly approved areas known as "The 181 Area" and "The 181 South Area" are estimated to hold 1.26 billion barrels of oil and 5.8 trillion cubic feet of natural gas. President Bush this year approved the measure and also used his authority to lift a moratorium on drilling in Alaska's Bristol Bay. But opening the Alaska National Wildlife Refuge (ANWR) for oil and gas exploration is seen as unlikely, especially after the change in power in Congress. One of the main champions for ANWR drilling, Republican Richard Pombo (R-CA), and former chairman of the House Resources Committee, was defeated in his re-election bid last November.

### ***Private Sector Trends***

According to David Doniger of the Natural Resources Defence Council, "business leaders are realizing that they could play a far greater role in shaping climate policy now, while the Bush administration is in office," than they could under a subsequent administration. These leaders, who are increasingly acknowledging that greenhouse-gas restrictions are inevitable, will be pushing for action now.<sup>1</sup> Contrary to popular belief, big companies are increasingly driven to voluntarily adopt eco-friendly measures, and are more environmentally conscious nowadays than in the 1980s.

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<sup>1</sup> [www.grist.org/news/muck/2006/11/17/boxer/](http://www.grist.org/news/muck/2006/11/17/boxer/)

“What’s hot right now are voluntary environmental programmes,” says Jorge Rivera, assistant professor at the George Washington University business school. Mandatory environmentalism is “effective, but expensive,” Rivera says, and it often produces nothing but “green washing,” whereby companies satisfy the letter of the law as quickly and as cheaply as possible rather than making a serious effort to innovate. (In some cases, this actually means an increase in environmental damage, as when harmful emissions are converted to less regulated but more harmful forms of emission.) Since as Rivera notes, “a lot of the big, obvious stuff has already been done” it is not effective to mandate uniform change to bring about marginal gains. “So to ward off excessive regulation, help the bottom line, and get brownie points at the same time, companies started playing nice with environmental groups.”<sup>1</sup>

By the end of 2000, organisations such as Greenpeace or Environmental Defence were realizing that the government was not a reliable ally. Corporations began to look very appealing when the alternative was George W. Bush. Gwen Ruta, director of corporate partnerships at Environmental Defence, claims that private initiatives are “the wave of the future,” in part because “we’re in a rather uncertain regulatory period. How aggressive will the government be in the next few years in creating regulations?”<sup>2</sup>

### *McDonalds*

McDonald’s gained the recognition of the EPA by building the first HFC-free McDonald’s restaurant, which opened in Denmark in 2003. HFC, produced by conventional refrigerants, have been labelled as one of the most potent global warming gasses ever invented. In the run-up to the 2000 Olympic Games in Sydney, Greenpeace threatened a campaign against companies (at the time sponsoring a “green” Olympic village) that failed to invest in new refrigerant technology. McDonald’s partnered with Coca-Cola and other suppliers to develop a carbon dioxide-based cooling system, then it built its prototype in Denmark. As it turns out, the Denmark store uses a lot less energy (17% less than a regular McDonald’s). The hardware costs are higher, since McDonald’s had to design many units from scratch, but the energy savings are incen-

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<sup>1</sup> [www.reason.com/news/show/36208.html](http://www.reason.com/news/show/36208.html)

<sup>2</sup> *Ibid.*

tive enough to keep working on the technology because of the long-term savings it provides. “We just had another refrigeration summit meeting,” says Bob Langert, senior director for social responsibility at McDonald’s Corporation. He thinks it is important to encourage voluntary cooperation with other players, because “we need others demanding industry standards. We can’t do it alone.” As he adds, “We were willing to invest money into something, but if it’s really going to be sustainable, it has to be economical as well.”<sup>1</sup>

### *Wal-Mart*

On 1 February Wal-Mart President and CEO Lee Scott unveiled “Sustainability 360,” a company-wide emphasis on sustainability extending beyond Wal-Mart’s direct environmental footprint to engage associates, suppliers, communities and customers.<sup>2</sup> As an example of this way of working, Scott also announced the company’s intention to introduce “Global Innovation Projects,” one of which is a challenge for Wal-Mart associates and suppliers to start thinking about how to remove non-renewable energy from the products the company sells. Scott highlighted Wal-Mart’s initiative to work with suppliers to reduce packaging by 5 per cent by 2013 – an effort equal to removing 213,000 trucks from the road, and saving approximately 324,000 tons of coal and 67 million gallons of diesel fuel per year. He also talked about the company’s goal to develop partnerships that help suppliers run more sustainable businesses and factories. According to Scott: “We all have an opportunity to be more sustainable. But even more, we have a responsibility. We need to be sustainable companies and countries made up of people who live sustainable lives. If we do that, if we do it throughout the coming decades, I believe we will make sustainability... sustainable. And this generation will leave a healthier humanity and a healthier planet to future generations.”

Other Fortune 500 companies are also trying to improve their environmental practices:<sup>3</sup> Since promising to reduce its greenhouse-gas emissions 65 per cent by 2010, DuPont has already brought them down 72 per cent from 1990 levels. It has also reduced its global energy use 7 per cent, saving more than \$3 billion. As part of the new “Ecoimagination” initiative, Immelt has

<sup>1</sup> Ibid.

<sup>2</sup> <http://walmartstores.com/GlobalWMStoresWeb/navigate.do?catg=691>

<sup>3</sup> [http://walmartstores.com/Files/WM\\_Fortune\\_GreenMachine.pdf](http://walmartstores.com/Files/WM_Fortune_GreenMachine.pdf)

promised to double GE's investment in environmental technologies to \$1.5 billion by 2010. Immelt also says that GE will reduce the company's greenhouse-gas emissions by 1 per cent by 2012; without any action, emissions would have gone up 40 per cent. Goldman Sachs, Wall Street's most prestigious investment bank, is putting \$1 billion into clean-energy investments. PFC chemicals used in chip-making are also a dangerous greenhouse gas. By 2010, Intel has promised to reduce emissions by 10 per cent from 1995 levels. Under CEO Mike Eskew, UPS has assembled one of the biggest alternative-fuel fleets around – 1,500 vehicles strong. In February, UPS announced that it had placed an order for 50 new-generation hybrid-electric delivery trucks, which will reduce fuel consumption by 44,000 gallons over the course of a year.

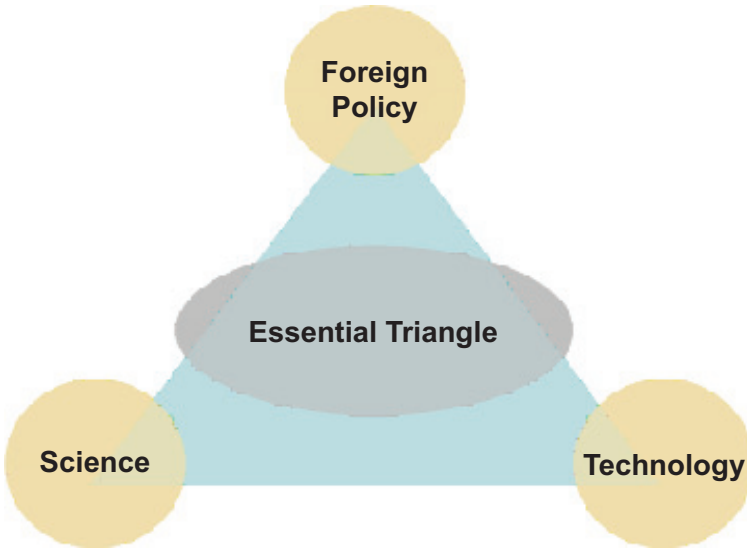
## Impact on Foreign Policy and External Relations

### *Science and Technology Diplomacy*

According to Paula J. Dobriansky, Undersecretary of State for Global Affairs, the use of science as an extension of US foreign policy dates back to the founding fathers. As she said in her speech to the Council of Scientific Society Presidents on 3 May 2003: "The proximity of science to diplomacy is as old as the Republic. The first US Foreign Minister to France was Benjamin Franklin, was one of the leading scientific minds of his time, as was our first Secretary of State, Thomas Jefferson." Recently, however, science and technology diplomacy has become more prominent as the US increasingly recognizes that it is critical to engage in meaningful external relations with its key partners in the new global era. According to Dobriansky, the US finds science and technology an important component of "soft power" in pursuing its foreign policy objectives. In the speech cited above, she stated that many nations are keenly interested in working and collaborating with US in expanding scientific and technological horizons. The US has recently been expanding such relationships with India, Brazil and China, Vietnam, and Pakistan, among others. She believes that a strong partnership between the American science and technology community and the foreign policymaking community is essential to address the global challenges of

the 21<sup>st</sup> century. She concludes that though science and technology is not a secret weapon, it is one of the most indispensable tools in the US policy toolbox, referring to science, technology, and foreign policy as the “essential triangle.”

**Figure 3**  
S&T Diplomacy in the US



Source: Dobriansky (2003).

Diplomacy achieved through scientific and technological means has been one of the most important and effective tools of US foreign policy. From climate change and HIV/AIDS to nanotechnology, the US has long recognized Science and Technology (S&T) as one of the areas is most pressing need of global cooperation, and has also recognised that the US needs to engage other nations over S&T issues actively. According to the State Department, the US considers S&T an important component of “soft power,” which may prove to be more effective and often carries more weight than more traditional “hard power.” In order to ensure that the US maintains this “soft power,” the country has been actively implementing “S&T Diplomacy.” An S&T Advisor position was created in 2000 at the State Department, after an advisory board at the National Research Council issued a report on *The Pervasive Role of Science, Technology and Health in Foreign Policy*. The report concluded that of the sixteen stated objectives of the US foreign policy, thirteen involve science, technology or health issues. The

S&T Advisor works very closely with the President's Science Advisor to pursue S&T related initiatives with other countries. There are more than 31 bilateral agreements with other governments. Through the Embassy Science Fellows Programmes, scientific representatives from the federal agencies such as the NSF, NASA and the NOAA are placed at US embassies abroad to strengthen S&T diplomacy. The US is also very active in helping to build the science and technology capacity of developing countries. Lastly, the US is extremely active in, and is often a leader of, international science and technology cooperative programmes such as the International Space Station and energy related consortia such as the International Thermonuclear Experimental Reactor Consortium (ITER) which the US rejoined in 2003.

The US has had an Open Policy for foreign scientists and engineers who have been major contributors to the innovative capacity of the US. While many other industrialized countries lament the "brain drain" problem after seeing thousands of potential innovators at home leaving their motherland, the US has been blessed with incoming flows of top talent and brainpower from around the world. After 11 September, it seemed that the US was on the verge of closing its doors to immigrants, including to scientists and engineers. Having realized that the innovative capacity of the US depends on international talent, the US quickly reversed unfriendly immigration policies and is now enthusiastically welcoming immigrants once more.

### *The North American Competitiveness Council*

Globalisation has blurred the distinction between cooperation and competition. This is exemplified by the recent establishment of the North American Competitiveness Council (NACC). The NACC was formed on 31 March 2006 by President Bush, President Fox (Mexico) and Prime Minister Martin (Canada) under the Security and Prosperity Partnership of North America.<sup>1</sup> The NACC consists of 30 representatives, five from each government, as well as business executives from each country.<sup>2</sup> The decision to create the

<sup>1</sup> [www.whitehouse.gov/news/releases/2006/03/20060331.html](http://www.whitehouse.gov/news/releases/2006/03/20060331.html)

<sup>2</sup> Some of the US firms include Campbell Soup Company, Chevron, Ford, FedEx, General Electric, General Motors, Kansas City Southern Industries, Lockheed Martin Corporation; Merck; Mittal Steel USA; New York Life; United Parcel Service; Wal-Mart; and Whirlpool.



Council originated from the private sector of these countries, which considered that competitiveness does not concern individual countries but is rather of regional importance. NAFTA, founded 12 years ago, made unprecedented strides in enhancing cooperation among the countries of North America. As stated in the press release announcing the initiative: “We are convinced that regulatory cooperation advances the productivity and competitiveness of our nations and helps to protect our health, safety and environment. For instance, cooperation on food safety will protect the public while at the same time facilitate the flow of goods. We affirm our commitment to strengthen regulatory cooperation in this and other key sectors and to have our central regulatory agencies complete a trilateral regulatory cooperation framework by 2007.”

The NACC focuses on five areas: energy integration; supply chain management/trade facilitation/customs reform; regulatory and standard issues – harmonisation and sharing of best Practices; counterfeiting and piracy (“Fake Free North America”); and private sector involvement in border security and infrastructure projects. The creation of NACC shows that the US is interested in expanding its innovation and competitiveness efforts to its neighbouring countries. The word competitiveness, which previously implied a zero-sum game, is now increasingly referring instead towards a broader concept, including regional cooperation, the sharing of results, and interdependency.

### *Double Edged Sword*

Although the US is well aware that it cannot afford to disengage from international science and technology activities, there has been debate about the nature of and the extent to which the US should forge cooperative relationships with foreign countries. There seems to be a consensus that the rules underlying global competition have changed. As stated in the CoC Globalisation Debate,<sup>1</sup> “many 20<sup>th</sup> century assumptions about competitive success – exports create jobs and imports destroy them – rooted in an earlier industrial age and simply no longer apply to a world in which access to markets often means access to global supply

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<sup>1</sup> Council on Competitiveness, Global Advisory Committee Meeting, April 17, 2006

chains and enabling infrastructure.” It seems that globalisation is a double-edged sword. On the one hand, it is facilitating the trend towards the “open collaboration” whereby a company creates innovation by seeking out ideas beyond its own innovative capabilities. New ideas, services, and products thus come from outside of the company<sup>1</sup> and from all over the world, and everyone, ranging from governments, industry, academics and not-for-profits, is aggressively reaching out to encourage foreign partnerships to be a winner in the global arena. On the other hand, some believe that the US is being threatened by global networks and that the country is giving “too much” away to foreign competitors who are emulating American methods of innovation, processes, and know-how. Too much giving to foreign countries, some allege, places US national security at risk.

### *Active Engagement*

Although the controversy continues over the risks and benefits of globalisation, it seems that there is no turning back. The CoC concludes that the US must continue with its open policy because US leadership in innovation and competitiveness can be a powerful promoter of US foreign policy and security goals. According to one analyst,<sup>2</sup> the US should not prevent emerging countries from becoming economic powers, and should rather integrate new ideas from abroad into its innovative output. He also suggests that US companies should “track, develop, and invest” in Asian markets to avoid missing the opportunity to quickly incorporate new ideas into their own products and services. He argues that the US should maintain its dynamic innovation system, which can be created by increasing public investment in basic research, keeping the “entrepreneurial climate” alive and well, and innovation capital flowing. He concludes that the US must actively engage with new innovation centres around the world and incorporate diverse ideas and new technologies to its advantage.

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<sup>1</sup> One of the most well-known examples is Procter and Gamble whose CEO said that more than 50% of its new ideas should come from non P&G.

<sup>2</sup> Adam Segal (2004)

## Strength in the US Innovation

### *Dynamic Decision-Making Process*

Foremost among the characteristics that distinguish the US innovation system is the absence of a national agenda. There is no National Innovation Document to speak of and there is no government agency that coordinates the formulation of innovation policy. How is this advantageous? The very nature of the distributed decision-making process makes the US system very robust and creates a bottom up movement, in which the energy and commitment to innovation and competitiveness flow from the

stakeholders who have the most to lose and gain. The CoC has been one of the most vocal and influential voices in championing innovation and competitiveness policy in the US. Its focus on the issue has garnered them the solid

support of many Fortune 500-class companies. It has been instrumental in bringing the issue of competitiveness to the attention of policy makers. It was the organisation that first addressed this issue when the US faced economic competition from foreign countries, namely Japan, for the first time since WWII. The CoC wakeup call was crucial in helping the US address the problem of declining economic power in the 1990s, and it is again trying to

revitalize US economic competitiveness by aggressively advocating the need to get serious. In addition to a few prominent advocacy groups, there are trade associations and individual companies, universities, and think tanks which all want to take part in the innovation policy making process. The National Academies recommendations, coming one of the most respected advisory

institutions, are considered by the Congress and the executive with great care and seriousness. The independent opinions voiced by advocacy groups speak very accurately about the problems of

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*The very nature of the distributed decision-making process makes the US system very robust and creates a bottom up movement, in which the energy and commitment to innovation and competitiveness flow from the stakeholders who have the most to lose and gain.*

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the US and what the government should be doing to help solve them.

### ***Robust Innovation Capital***

The existence of robust innovation capital market sets the US apart from Japan or Europe, where banks continue to play a larger role in financing new and old businesses. Further, there are many other players in the capital supply market, including angels, private equity, venture funds, corporate venture capital, and state-backed funds. These diverse sources of funding help create an environment of innovation and entrepreneurship that encourages spectacular growth as evidenced by numerous gazelle companies (double sales growth for 3 years). Innovation capital in the US is indicative of its “take risk” culture. It is known that more than half of the money for new start ups comes from founders’ own money, most likely from their equity loans.

### ***Open Innovation at Work***

The days of closed domestic innovation are over. Nowadays, companies need to engage in outside partnerships to further the innovation flow into their companies. Partners include customers, suppliers, vendors, development partners, and even competitors. Proctor & Gamble, for example, say that they want to see 50 per cent of new ideas originate from sources outside of the company. Cutting edge companies in the US have a variety of programmes in place to seek out ideas far and wide, with programmes in BRICs to capture business ideas and technologies. They often have internal incubation programmes where many new ideas are experimented, especially new emerging fields such as nanotechnology. This mentality of competitive aggressiveness and global awareness seen in US multinational corporations make them winners in the global arena.

### ***Exit Strategy***

There are fast track programmes in the US that push ideas toward the market. There are many sources of ideas from the private sector (large and startups), federal labs (NIH, NASA, DOE, NIST, etc.) and universities (top research universities). The ideas and technologies generated from diverse sources are rapidly commercialized with the infusion of innovation capital. The suppliers

of innovation capital want to see quick results, and thus devise exit strategies, in other words, expedient means to reap the return on investment as soon as possible. The US government too helps the idea-to-product path with such programmes as SBIR (public R&D dollars set aside for the development of small businesses), the Bayh-Dole Act (allowing research organisations to own the intellectual property rights for their public funded research), government-backed VC (such as CIA's In-Q-Tel), as well as various awards incentives (awarded through competitions for the best technological solutions). The existence of a mechanism to expediently push a great idea through all the way from its conception to the market is a distinct advantage.

### ***Entrepreneurial Universities***

American research universities are among the most sought-after assets in the US innovation system. Creating ideas and knowledge, they are the fountainhead of innovation in America. With US corporations shying away from basic research, the universities are stepping in to fill the gap. Although US universities still perform pure basic research, an increasing share of their research is now being aligned with private sector needs through a variety of mechanisms such as sponsored research. Combining actual research and education is very effective, as the students experience real-world problems in an academic setting. American research universities often court large corporations for funding their research projects. Such universities produce entrepreneurial minded students and researchers. There are now numerous entrepreneurial training programmes for both business students and scientists. The universities are continuing to push multidisciplinary fields, and recognizing the increasingly global nature of the world by bringing in students and scholars from abroad and establishing programmes and partnerships in foreign countries. Without the support of strong research universities, there is little chance for one area to grow into a new innovation hub where ideas, money and people congregate.

### ***Regional Competition***

All regions in the world would like to have their own Silicon Valleys and successful Research Triangles. Most successful cluster developments in the US were developed from the bottom up, re-

flecting the natural tendency of private companies to congregate naturally in regions that exhibit desirable business cultures. Cities, regions, and states compete to woo companies while at the same time encouraging local endeavours. Competition among these re-

*Most successful cluster developments in the US were developed from the bottom up, reflecting the natural tendency of private companies to congregate naturally in regions that exhibit desirable business cultures.*

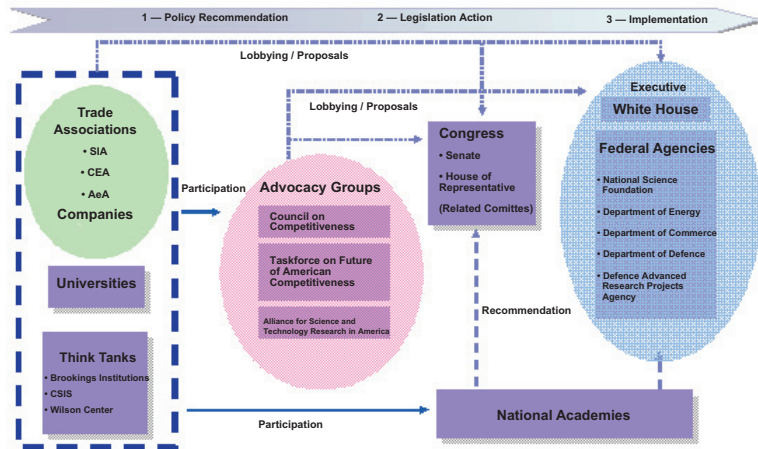
gions is very fierce and creative. Regions know their strengths and limitations. They take the initiative to come up with their own plans, rather than waiting for central government initiatives. They know their rivals and competitors and what they are doing. Economic development used to be in the hands of the government, but that is no longer the

case. Most local economic development groups are independent of the government and can act like businesses. State and local level rivalry makes the US innovation system strong and diverse.

Figure 4

**US Innovation System — Strength 1**

**Dynamic Decision-Making Process**

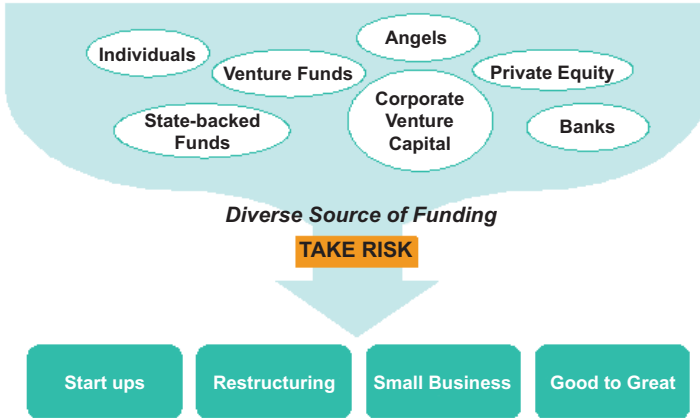


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Figure 5

US Innovation System — Strength 2

### Robust Innovation Capital

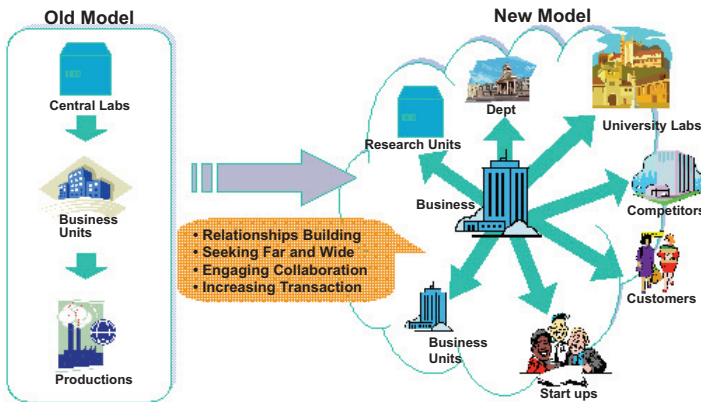


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Figure 6

US Innovation System — Strength 3

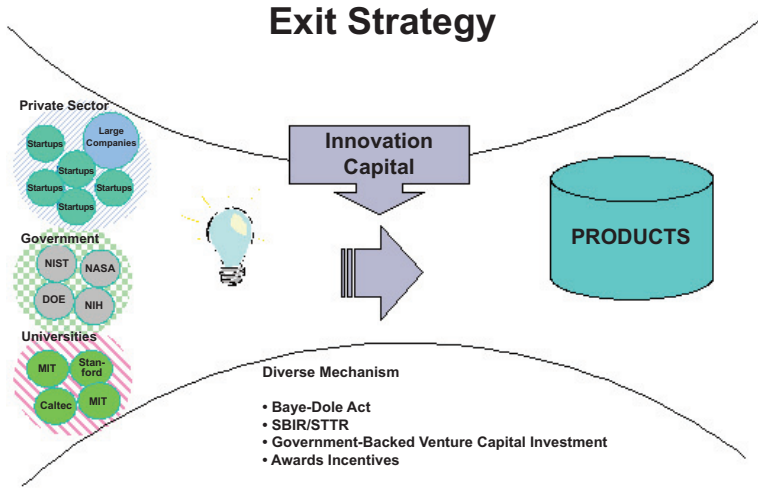
### Open Innovation at Work



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Figure 7

US Innovation System — Strength 4



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Figure 8

US Innovation System — Strength 5

## Entrepreneurial Universities

- ◆ Create Ideas and Knowledge  
→ **Basic Research Capabilities**
- ◆ Align Research with Business  
→ **Sponsored Research**
- ◆ Combine Research and Education  
→ **Future Innovators Research and Educate**
- ◆ Explore New Frontiers  
→ **Multi-discipline Fields**
- ◆ Lead the Global Market Places  
→ **Most Global Player**
- ◆ Connect Ideas, Money, Skilled and People  
→ **Innovation Hubs**

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Figure 9

US Innovation System — Strength 6

## Regional Competition

### Case Study: North Carolina



### North Carolina Miracle

- 49<sup>th</sup> ranking (1950's) to one of the top innovation states (Present)
- Collaboration among stakeholders
- Research Triangle:  
The success story of technology based cluster development
- Top Financial Service Center 2 of 5 Largest Banks HQ in Charlotte
- Tracking Innovation 6 peer states benchmarking

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