INNOVATION AND THE ECONOMY
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INTRODUCTION

On any leader's agenda these days, few priorities are higher than innovation. It drives high-margin growth, strengthens competitiveness and creates jobs. It is no wonder that so many business and political leaders around the world have made innovation their number-one priority.

For much of the past century, the United States was the world's innovation engine. Today, however, we are being challenged as never before. Countries that until recently played a minor role in the world's innovation agenda are closing the gap -- China, India, Brazil, Russia, Finland, Israel and South Korea, to name just a few. Collectively, those countries are producing five to eight times the number of engineering graduates than the United States. Moreover, 50 percent of America's science and engineering workforce is approaching retirement, and the pipeline of succession is nearly dry. For those of us with a firm stake in the future of this country, this development is cause for concern. But it also should be viewed as an opportunity to drive dramatic change.

World-class engineering, science and technology have always been fundamental elements of U.S. innovation. But let us not forget that the management of ideas, the enrichment of R&D capabilities and the development of new business models and process innovations are crucial, as well. In today's hyper-competitive global economy, science and technology leadership, though very important, is not enough to achieve innovation. As the National Innovation Initiative states: *It is not enough simply to intensify current stimuli, policies, management strategies and to make incremental improvements to organizational structures and curricula.*

For the 21st century, what matters most is what we find at the intersection of technology and human insight. Increasingly, the most important innovations will be those that transcend any particular business or technology; they will be those that have a broad societal impact and improve the lives of real people.

Even as American industry depends on colleges and universities to develop deeper, more diverse skill sets in our students, fewer graduates are coming through the system. American industry needs people capable of applying technology, talent and capital in new ways to meet business and societal demands; we will need people with deep analytical skills and the ability to manage ambiguity. Overall, we will need institutions of higher learning to embrace innovation as a way to transform the U.S. system of higher education and prepare students to become innovators.

ECONOMY MOVING TO A NEW ERA

The global economy has reached a turning point:

- In less than a decade, the Internet – the most visible evidence of an increasingly networked world – has reached a billion people. It has become, in essence, the world's operational infrastructure.

- Global networks and open standards have taken hold in the information technology industry. Those open standards determine how computers operate, how software is developed, how digital content is managed.

- The networked world and open standards are enabling entirely new business designs, giving organizations options not feasible before. They enable business operations to be integrated horizontally and respond rapidly to business challenges

Those fundamental shifts are enabling institutions to innovate in entirely new ways. Companies are now able to integrate their myriad business processes; governments are transforming their legacy agencies to organize around missions rather than departments; academic institutions are delivering courseware through the Internet in addition to traditional classroom instruction.

Implementing those fundamental concepts is affording new growth opportunities in both economic and societal activity. Seizing the opportunities demands unique foresight and capability. Investment, talent and infrastructure are increasing everywhere, making the world more tightly integrated. For companies, governments and educational institutions, the choice is either innovation or commoditization.

Innovation is the arbiter of national competitiveness. We must recognize innovation as a national priority and adopt innovation as a core strategy for a 21st- century knowledge-based economy.

INNOVATION AND SKILLS

Perhaps the most important innovation occurring today is in the changing nature of innovation, itself. It happens much faster today and it diffuses more rapidly into our everyday lives; it is far more open; it spans virtually all disciplines; it is increasingly global. Innovation almost never arises in the isolated laboratory anymore. It arises in the marketplace, the workplace, the community, the classroom. Innovation is a two-way interplay of creation and its uses. Understanding the changing nature of innovation is the first step toward marshalling our energies and resources to prosper in this new environment.

In 2004 IBM not only co-chaired the launch of the National Innovation Initiative, we also embarked on a first-of-its kind initiative to explore the changing nature of innovation and what it means for business, academia and society. IBM brought together hundreds of ecosystem partners from multiple disciplines around the world to focus on crucial societal issues that cut across businesses, industries, borders and cultures. Again, they included issues such as health care, work-life balance, and effective government. The initiative was called the Global Innovation Outlook. Among its key findings:

- Because innovation requires continual collaboration, workers in the 21-st century no longer can rely on the expertise they learned early in life to keep them at the forefront of the skills queue.

- Colleges and universities are struggling to keep abreast of the fast-changing dynamic nature of work.

- Aspiring knowledge workers will need cross-disciplinary programs and degrees in order to compete. Historically, universities have found it difficult to provide such programs.

The Global Innovation Outlook also revealed that tighter collaboration among government, academia and industry is essential. It is the only way to spark innovation and drive solutions to the pressing problems we face. We heard this loud and clear, over and over, from government leaders, university presidents and senior business executives alike.

ROLE OF HIGHER EDUCATION IN AN INNOVATION ECONOMY

Beyond the always-crucial role of producing graduates in the engineering, science and technical disciplines, institutions of higher learning must collaborate with government and industry to transform how the pipeline of future skills is being built – skills that are needed in a knowledge economy and a services-driven global economy.

Services Science

More than 75 percent of the U.S. GDP is services based. And, with the exception of India and China, at least half the workforce in every high-wage country is concentrated in the services sector. Further, the science of services should be recognized as a research discipline. Governments, industry and universities should invest in it and develop a future class of funded education and research programs to support it. One example is a learning discipline initiated by IBM and several universities called Services Science Management and Engineering (SSME).

SSME brings together ongoing work in computer science, operations research, industrial engineering, business strategy, management sciences, social and cognitive sciences, and legal sciences to develop the skills required in the services-led economy of the 21st Century. SSME students and faculty explore the current and future processes of business, as well as its human, technological and strategic elements. The SSME course focuses on the issues involved in aligning people and technology effectively, to generate new value for both services providers and services clients.

The development of new skills -- and combinations of skills for a closer marriage of technical and business disciplines -- must begin at the university level, along with methods to scale the application of those skills. Over the past 20 years, academic centers have slowly increased the advancement of practical and theoretical knowledge of services businesses. SSME offers a more systematic approach to research and teaching in services, which will play a vital role in helping universities to overcome their academic disciplinary boundaries that were created in a bygone era.

Multidisciplinary Research and Instruction

Many of the brightest frontiers of knowledge lie at the intersection of traditional disciplines. Advances in medical technologies, for example, integrate biology with physics, mathematics, materials sciences and software engineering. We have to find ways to break down traditional stovepipes and encourage collaborative and multi-disciplinary learning.

In addition to learning across scientific disciplines, we should encourage collaboration across technical, business and social sciences. Innovation requires individuals able to recognize how new knowledge could meet societal demands and translate potential into practice. That creates real and lasting value.

Regional Innovation Economies

Universities and community colleges are key components of successful regional economies. Universities should embrace a culture of commercializing knowledge and be active partners in regional growth strategies with government and industry.

Community colleges, too, should play a prominent role in an innovation economy. The NII recommends, for example, that we establish innovation management curricula for entrepreneurs and small business managers. Community colleges have a history of adapting to the skill needs of their localities.

THE 2006 POLICY LANDSCAPE

Congress and the Administration have responded to multiple reports linking national competitiveness to innovation. Recent policy initiatives include:

- Ensign-Lieberman National Innovation Act, based on the NII recommendations.
- Alexander-Bingaman legislation, based on the National Academies report.
- House Democratic Innovation Agenda.

Those agendas include many policy proposals, but most of the current debate centers on the post World War II formula for innovation – namely, more money for research and for science and math education. I believe that The Commission on the Future of Higher Education must set us on the path to do far more.

We need creative and bold policies that recognize the need for a more systematic approach to research and teaching in services science; that recognize the need for more multidisciplinary research; that recognize universities as the key component of regional innovation economies.

We should give very serious consideration to the suggestion Russ Whitehurst made in Nashville recently to establish a unit record system. As Mr. Whitehurst stated: "Accessibility, affordability, quality and accountability all must begin with good data."

We have consistently found that open, standardized approaches to problems provide the fastest path to innovation and success. It is foolhardy, in this modern era, to have a cacophony of competing, non-complimentary approaches to managing records.

We also must recognize the need for structural change. Even if federal and state higher education resources were to increase dramatically, that, alone, would not achieve the Commission's objectives or meet the needs of our citizens in an innovation economy.

Frankly, academia and government must be open to new ways of leveraging industry and private-sector resources to address our challenges. I worry that we are not tapping into this remarkable asset – America's business acumen – to address issues such as teacher training, new measures of institutional performance and standards of learning, and reform in the accreditation process.

SUMMARY

The forces of global economic integration, and advances in technology, are presenting complex challenges that can be addressed only by embracing opportunities for change and future prosperity. The status quo cannot be an option.

Institutions of higher learning must open up and collaborate with industry and government to create a U.S. educational climate and culture that enables innovation to thrive. No institution can go at this alone. It must be a joint stewardship of industry, government and academia.

America has a long and proud history of recognizing when change is required, and then rising to the challenge. We are at such an inflection point today. As we work to transform our rhetoric into action, innovation must be our engine and urgency must be our fuel. Innovation – the process of innovation – the collaborative, multidisciplinary, open nature of innovation – will enable all of us to build a brighter future for generations of students and our nation.