

TALKING POINTS
STS Forum Working Lunch on Innovation
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- **Good afternoon. I want to set the context for our panel discussion on innovation by taking a few minutes to describe some of the forces of changes that are radically reshaping the competitive landscape. In fact, it is hard to fathom just how rapidly and how much the world we knew just twenty years ago has changed. And it is stunning to think that the new era of globalization and technology is in its mere infancy.**

New Competitive Realities

- **Of course, the digital revolution has been an epochal force of change. It has fueled an unprecedented integration of the world's national economies. And information, capital, know-how, and talent flow across national borders as never before.**
- **A major transformational shift is the rapid advance of emerging economies. In just one generation, emerging economies' shares of global imports, global exports, and foreign direct investment have nearly doubled.**
- **Innovation's pivotal role in national wealth creation has prompted many nations to adopt innovation-based growth strategies, boost public spending on R&D, and ramp up the production of scientists and engineers. This is resulting in the rapid rise of scientific and technical capabilities worldwide.**
- **China's rapid development into an R&D-performing country is unprecedented in recent history. In a little more than a decade, China's R&D investments have grown from \$12 billion to an estimated \$136 billion. The OECD reported that this investment would put China in second place in R&D spending, behind only the United States.**

- **International trade is also transforming. Twenty years ago, trade was mostly about goods that moved physically across national borders. But, today, the geographic footprint of supply chains is global. For example, U.S. multinationals increasingly develop products and services, and serve customers through foreign affiliates and foreign business ventures. In fact, sales from foreign affiliates of U.S. companies are more than three times greater than all U.S. exports of goods and services.**
- **This global sourcing and delivery model is complemented by workforce globalization. As billions of people in emerging economies have entered the world economy, the globally available labor pool has risen fourfold. About half of these workers are educated, skilled, and ready for work. And every day it is easier to ship work around the globe in bits and bytes.**
- **As a result, we are seeing for the first time, a true global labor arbitrage on a 24/7 basis, and a growing number of workers in high-wage nations are in direct competition with other workers around the globe.**

Changing Nature of Innovation

- **The nature of innovation is changing too. Twenty years ago, the concept of innovation revolved largely around science and technology embedded in hardware, products, and processes.**
- **Science and technology do remain vital enablers of innovation. But, the birth of the Internet economy and its web-based businesses, novel approaches to service delivery, the emergence of new media, and high-premium lifestyle products and services are expanding our notions of what constitutes innovation.**
- **Historically, new knowledge came through the efforts of individual investigators, focused on specific disciplinary specialties such as chemistry or biology. In contrast, innovation today is becoming more multidisciplinary, occurring at the intersections of disciplines. Examples include biomimicry, nano-biology, network**

science, bioinformatics, and digital animation where the skills of computer graphics specialists are melding with the skills of storytellers and actors.

- Innovation is becoming a more collaborative process. For example, customers and producers engage in co-creation, bringing scientists, engineers, creators and users together in the design and development process. Innovation is also more globally collaborative, as firms tap talent for their development teams from around the world, from inside and outside of the firm. In addition, innovation is arising from the blurring lines between manufacturing and services.
- Finally, we have learned that innovation is a complex, dynamic phenomenon, supported by a multi-faceted ecosystem in which many elements of the economy and society interact. These elements include: people, such as researchers, technology developers, and entrepreneurs; sources of capital; manufacturers and service providers; and the actions of government in areas such as intellectual property protection, and policies that affect capital mobility, market access, and openness to foreign direct investment. Networks that connect these elements enhance the ecosystem.
- I want to quickly mention another significant emerging challenge—the energy challenge.
- It has become clear that the future prosperity of advanced industrial nations is inextricably tied to the ability to create secure, sustainable, environmentally friendly energy systems.
- Global energy demand is expected to grow by more than half over the next two decades. Half the world’s known oil reserves are in the Persian Gulf, and the Middle East oil supply is increasingly unstable. Natural gas pricing is at near record levels. And we are now subject to increasing energy price and supply volatility. There are growing worries about global warming from fossil fuels, and pressure on advanced nations to do something about it.

- **These energy challenges are affecting manufacturing and service companies alike. That is why energy security is becoming a front-burner competitiveness issue.**
- **Many facets of the energy problem are international. But there are major opportunities to answer the energy challenge domestically.**
- **Of course, companies must continue to focus on energy efficiency in their operations, and elevate energy management to a strategic level concern in the company.**
- **But the opportunity is even greater. We can move to the forefront of a remarkable new era of technological advances, market opportunity, industrial transformation, and innovation of all kinds at every scale. As Tom Friedman points out, “With three billion new consumers from India, Russia, and China joining the world economy, it is inevitable that manufacturing clean, green power systems, appliances, homes and cars will be the next great global industry.”**
- **At the end of the day, the question is “given this radically transformed environment, how will companies, and the advanced industrial nations maintain their competitive edge?” I think innovation is the only sustainable edge for us. We must create a new kind of economy focused on transforming the world’s knowledge, information, and technology into value, growth, and competitive advantage.**
- **This will require changes in the way we manage research and development, how we engage globally, how we support entrepreneurship, how government supports innovation, and in what people are expected to know, be able to do, and in the types of workforce skills needed for an innovation economy.**