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Will We Build It and If We Do Will They Come: Is the U.S. Policy Response to the Competitiveness Challenge Adequate to the Task?"

Remarks by Robert D. Atkinson
at the 2006 American Association for the Advancement of Science Policy Conference

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…the issue for the United States is no longer whether to play the (competitiveness) game but how to play it. Playing the game means developing a competitiveness policy focused on ensuring that innovative activities, as well as innovative people, are attracted to, stay and grow in the United States.

Thank you. It's a pleasure and an honor to address you today about whether the United States policy response to the competitiveness challenge is adequate to the task.

Competitiveness is the new buzzword in Washington. Many private and public leaders now realize that the United States faces a new and formidable competitiveness challenge. President Bush announced his American Competitiveness Initiative in his 2006 State of the Union Address and continues to highlight the issue's importance in speeches around the nation. In Congress several major legislative packages addressing competitiveness have been introduced. The slew of recent reports and books highlighting America's new economic challenge has helped put this issue on the political agenda.

Will this new found interest bear fruit in the form of effective new initiatives and increased funding? Equally important, do the current proposals on the table go far enough to adequately address the challenge?

With regard to the first question, only time will tell. Congress may act this year, but with about 13 weeks left on the legislative calendar it's not clear that significant action will be forthcoming.

And while both parties and the executive and legislative branches have highlighted the importance of the issue, it's not clear that there is the sense of urgency needed to move these proposals up from the category of "desirable" to "necessary." So will legislation to expand R&D tax credit be left on cutting room floor to make room for capital gains and dividend tax proposals? Will the Appropriations Committees take the first steps to doubling the NSF and NIST budgets? Will the House move the Health IT legislation that has passed the Senate? Will the fight over illegal immigration sink legislation to make it easier for foreign scientists and engineers to come to this country? In other words, will Congress do more than say the right things? Will they actually act

this year? We will see. But by the end of July we should know whether all of this concern was actually translated into action this year.

But what if all the proposed policies were enacted? Do they go far enough to meet the challenge? Well again only time will tell as well. But let me suggest that the current proposals, while a necessary and important first step, do not go far enough and will not be adequate to the task of ensuring America's continued technological leadership.

Before I speculate as to why not and what policies might go far enough, it's worth spending a few minutes considering why rhetoric has not so far been translated into more action. Seventeen years ago I wrote my doctoral dissertation to explain why some states responded to the competitive and economic restructuring challenges of the 1980s with well thought out and significant policy initiatives, while some similarly situated states did not.[1] The answer was in some ways profoundly simple. States where there was a broad and highly developed consensus about the need to act did more and did it better than states where this consensus was less broad and less developed. In short, a widely shared understanding of the need to act coupled with the right analysis of the problem matters.

That finding is relevant today in Washington. Even with the numerous reports, books, op-eds, conferences and hearings highlighting "the gathering storm," elite leadership is still not completely convinced that all this competitiveness talk is anything more than the wailings of disaffected Cassandras and special interest pleaders. Indeed, I would argue that the prevailing mood in many quarters in Washington and of much of the economic policy punditry is still one of complacency, rather than urgency. For these skeptics, the case simply has not been made adequately that the United State faces a significant competitiveness challenge. For example, in reference to reports citing a shortage of STEM graduates *Newsweek* economic columnist Robert Samuelson claims that it's "A Phony Science Gap?"[2] *The Washington Post*'s Sebastian Mallaby agrees, calling it "The Fake Science Threat." Just this week Mallaby told us that we have "No Need to Feel Threatened," because China is after all just a "low wage country that crams on science." He goes on to claim that the fact that China is moving aggressively ahead with science and technology-led economic development is irrelevant because "innovation depends neither on low wages nor science."

Really? While a low wage country that crams on science might not produce the next Intel, Google or Apple (although it has produced tech companies like Lenovo and Legand) it can and does attract (and sometimes coerce) innovation-based multi-nationals to set up production there. Developing countries don't need to grow strong domestic companies to have a more innovation-based economy as long as they are able to attract innovation-based activities. In other words, combing low wages and high science is a powerful combination. Just look at the result: R&D investments by U.S.-based firms in China grew from $5 million in 1994 to $506 million 2000 and multi-national companies are establishing over 200 new R&D laboratories a year in China.

Even if the "what we me worry" pundits and economists do acknowledge a threat they dismiss it by pointing to the fact the United States has successfully faced challenges before. Why should this time be any different? When discussing the issue of the offshoring of jobs, Morgan Stanley's Stephen Roach argues that, "This is exactly the same type of challenge farmers went through in the late 1800s, sweatshop

workers went through in the early 1900s, and manufacturing workers in the first half of the 1980s."[3] Robert Samuelson writes: "Ever since Sputnik (1957) and the 'missile gap' (1960), we've been warned that we're being overtaken technologically."[4]

But what Samuelson, Roach and others with this view fail to realize is that one reason we were not overtaken technologically during prior challenges is precisely because we took the challenges seriously. Imagine if the response to Sputnik had been "Well we handled the British threat in the 1880s and the German challenge in the 1920s, so we'll just sit back and see what happens." Luckily we did respond, including by creating DARPA and NASA and beefing up funding for STEM education.

When we faced competitiveness challenges in the late 1970s and 1980s policy makers didn't just sit back and bask in the successes of the glorious past. Leaders from business, academia, and from both parties in government acted with creativity and resolve. Indeed policy makers responded with a host of major policy innovations, including passage of the Stevenson-Wydler Act, the Bayh-Dole Act, the National Technology Transfer Act, and the Omnibus Trade and Competitiveness Act. They created a long list of alphabet soup programs to boost innovation, including SBIR, NTIS (expanded) SBIC (reformed), MEP, and CRADAs. They put in place the R&D tax credit and lowered capital gains and corporate tax rates. They created a host of new collaborative research ventures, including SEMATECH, the NSF Science and Technology Centers and Engineering Research Centers, and NIST's Advanced Technology Program. They put in place the Baldridge Quality Award and the National Technology Medal.

Moreover, it wasn't just Washington that acted. Virtually all fifty states transformed their practice of economic development to stress technology-led economic development. Many realized that R&D and innovation were drivers of the New Economy, and that state economies prosper when they maintain a healthy research base closely linked to commercialization of technology. For example, under the leadership of Governor Richard Thornburgh, Pennsylvania established the Ben Franklin Partnership Program that provides matching grants primarily to small and medium-sized firms to work collaboratively with Pennsylvania universities.

All of these steps, coupled with efforts by the private sector and universities, helped the United States effectively respond to that competitiveness challenge. Today twenty years later, it may very well be that the United States will successfully confront its new challenges. But success is much more likely if instead of depending optimistically on America's inherent strengths, we act with the resolve and creativity we showed in the past.

Acting today is even more urgent because we are not the only nation that responded with new policy innovations. Within the last decade many other nations, including most of Southeast Asia and Europe, have made innovation-led economic development a centerpiece of their national economic strategies. And in many cases they looked to America for guidance. Why? The answer is simple. They know that moving up the value chain to more innovation-based economic activities is a key to boosting future prosperity and that losing this competition can result in a relatively lower standard of living as economic resources shift to lower value-added industries.

Just look at what's been done. Europe's Lisbon Agenda has set an ambitious (albeit somewhat unrealistic) goal of becoming "the

most competitive and dynamic knowledge-based economy in the world by 2010." Many European nations, including Sweden, Finland, UK, Switzerland, Netherlands, and Belgium are now acting not only to boost R&D funding but to introduce policy changes and government initiatives to more effectively transfer technology from universities and government labs to the private sector for commercialization. Closer to home Canada announced a national innovation strategy focusing on knowledge performance (e.g., the production and commercialization of knowledge); skills (e.g., adult learning, more Masters and PhD students, better immigration policies); the innovation environment (e.g., tax and regulatory competitiveness); and strengthening communities (e.g., growth of high tech clusters). As part of this Canada set a goal to go from 15th in R&D to GDP ratio among OCED countries to 5th by 2010. South Korea set goal in 1997 to raise R&D as share of the government budget from 3.6 to 5 percent and almost got there, moving it to 4.7 percent. Many other nations have set similar goals. As a result, while investments in R&D as a share of GDP actually fell for the United States from 1992 to 2002, they increased in most other nations, including Japan (15%), Ireland (24%), Canada (33%), Korea (51%), Sweden (57%), China (66%), and Israel (101%).

We can see evidence of how serious these competitors are when we look at the R&D tax credit. When the United States adopted its R&D tax credit (a 20 percent credit on the incremental increases in research investments) in the early 1980s it was a policy leader. But today while Congress debates whether to the make the credit permanent (or even whether to extend it a few years) many other nations have forged far ahead to provide much more generous tax treatment of R&D. For example, the UK and Australia provide what is equivalent to a 7.5 percent flat credit on R&D, meaning that their effective credit is almost twice that of the United States. Japan's credit is almost three times as generous as the United States' and for small companies it's four times as generous. On top of salaries for R&D personal that are as low as 1/6th costs in the United States, China provides a 150 percent deduction on R&D expenses (provided that R&D spending increased 10 percent over the prior year). In an explicit effort to attract U.S. corporate R&D, our neighbor to the north is even more generous. In Canada large companies are eligible for a flat 20 percent credit while small firms can receive a 35 percent credit. In many provinces equally generous credits can be added on. Even France, who many pundits deride as a socialist basket case, has acted with resolve, adopting in 2004 a credit essentially equivalent to a 40 percent incremental R&D tax credit.

Given the generosity of these tax policies, it's perhaps not surprising that investment in R&D by U.S. majority-owned affiliates has increased over twice as fast overseas since 1998 as it has at home (49% compared to 23%).[5] And many of these projects are in developing nations. UNCTAD reports that of 1773 greenfield R&D projects set up between 2002 and 2004, over half (953) were from companies in developed countries establishing projects in developing nations, with 70 percent of these in China and India.[6]

In response to these developments many elites, particularly conventional neo-classical economists, not only minimize the challenge, they actually define it away, claiming that countries don't really compete against each other. As a result, we should stop worrying. Mallaby gives voice to this widely held view when he wrote, "The science lobby should also stop pretending that countries compete the same way companies do…the 'China threat' argument ignores the ways that competition between countries, unlike companies, is a positive-sum game."[7]

To be sure, there are aspects of competition between nations that are beneficial. Competing to see which nation produces the most Nobel prizes or develops a cure for cancer helps everyone. But it's simply naive to assume that if another nation moves up the value chain to high value-added, innovation-based economic activities that this cannot come at cost to us. Even with continued entrepreneurial innovation and scientific progress, demand for software, airplanes, pharmaceuticals, microelectronics, instruments and other high value-added goods and services is not unlimited. For the same reason that companies want to be in these higher margin businesses, so to do countries. As a result, while the conventional approach to competition (firms compete, countries don't) provides some important insights, it is simply not an adequate guide to explaining how nations achieve or sustain competitive advantage, particularly in an economy driving by knowledge and innovation.

This view of competition not only serves to minimize the importance of the challenge, it also confines the scope and character of policy proposals in response. If only firms compete and if a firm loses in global competition workers and communities may suffer, but as long as those firm resources (included skilled workers) move to new uses all is presumed to be well. According to this view if American aviation, machine tool, semiconductor, or software firms lose in competition to firms in other nations (or move high value-added facilities), as long as America maintains flexible labor and capital markets, these resources will flow into other industries, creating new firms in more innovative and higher value-added sectors.

If the conventional view accurately describes today's economic environment, then many of the recommendations proposed in Washington today – boosting education and training, including ensuring an adequate supply of engineers and helping displaced workers – will indeed suffice, provided we have the political will to implement them effectively – no small task I would add. For as long as we take these steps, if we lose domestic innovation-based production to foreign competition, Americans will have the skills to transition to new opportunities. As John Zysman, co-Director of the U.C. Berkeley Roundtable on the International Economy, notes, "If general education creates these resources and they move quickly to other uses in the case of specific company failure, then the results of market competition will not matter to the basic pattern of a particular nation's development." In other words, according to this model, this intense global competition between firms has either no effect on U.S. development or a positive one by forcing us to move up the value chain.

But what if the conventional view is not sufficient to explain industrial and economic change, particularly in an economy in which knowledge is increasingly the major factor of production? What if a significant share of knowledge, particularly less formalized "tacit" knowledge, is embedded in organizations, and not just in individual workers? What if there are significant spillovers from firm activities? What if there are considerable first-mover advantages, including learning effects, which let firms translate early leads into dominant positions? What if there are significant network effects that mean that advancement in one industry (e.g., broadband) result in advancement in a host of others (e.g., Internet video, telemedicine, etc.). What if lost higher value-added activities end up being replaced with lower value-added ones? What if, if you lose it, you can't easily reuse it?

I would argue that these factors more accurately describe the workings of the 21st century knowledge-based global economy than the model of the economy imbedded in

the "countries do not compete" model. That conventional view has its roots in the 19th century commodity economy where production could be easily replicated if lost and where there were fewer first mover advantages. It's this model that forms the basis for much of the dominant neo-classical economic paradigm. Yet, this is a poor guide to today's economic reality.

A better guide can be found in the disciplines of what some term evolutionary or growth economics. In an evolutionary economics model losing corporate competitions in knowledge-based industries means losing much more than just the firms. It means losing deeply embedded and hard to replicate knowledge. It means that it can be very difficult to recreate value from these dispersed pieces of value now represented by unemployed workers, vacant offices, and underutilized suppliers. Again as Zysman notes, "If the production of one sector using highly trained science-based engineering drops, those workers and the training they embody cannot easily be used in other sectors." Perhaps the simplest way to put it is this way, if America were to lose a company like Boeing for example, in all likelihood it could not rely on market forces, even a dramatic drop in the dollar, to later recreate a domestic civilian aviation industry. For to do so would require recreating not just the firm, but it's complex web of suppliers, professional associations, university programs in aviation engineering and other knowledge-sharing organizations.

Defenders will argue that it's okay to lose a Boeing, General Motors, or other technology-based firm because we can move on to the next new thing. When a country is on the technological frontier, as America is, much opportunity is in the next new thing. But it's unrealistic to believe that the next new thing can be completely created by greenfield entrepreneurs alone cobbling together the dispersed pieces from closed or downsized establishments.

As a result, a robust national competitiveness policy needs to be grounded in a simple understanding that like it or not, in the 21st century global economy most nations enact policies to tilt the choice of corporations to invest there. But this is no different than what U.S. states have done for the last fifty years. Most U.S. states – and it mattered little whether they were led by Republican or Democratic governors – put in place policies to tilt the choice of corporations to invest in their states. To be sure even the most liberal Governors recognize and respect the power and primacy of markets as the key driver of prosperity. But in contrast to many of the Ph.D. economists shaping economic policy in Washington today, even the most conservative Governors realize that this market-produced bounty does not always automatically end up in their own jurisdiction. That's why both Republican and Democratic governors "intervene" in their economies with robust economic development policies. They are not content to let the "market" determine what kind and how many jobs are created: they work to ensure that they gain more good paying, higher value-added jobs. That's why they target sectors such as advanced manufacturing, bio-technology, information technology, nano-technology and sophisticated business services. This is same reason why most other nations are doing the same thing.

Now that the U.S. economy has become in essence a large state (in the sense that it now competes actively against other large "states", the same way U.S. states competed against each other in the post war period), the issue for the United States is no longer whether to play the game but how it to play it. Playing the game means developing a competitiveness policy focused on ensuring that innovative activities, as well as innovative people, are attracted to, stay and grow in the United States.

Will They Come If We Build It?

This suggests that a robust national competitiveness policy must do more than focus on enhancing skills and boosting research, although clearly both must play a key part in any solution. Yet, currently that's the extent of virtually all the dialogue and discussion. Most competitiveness advocates argue that accelerating funding in frontier research and making sure that U.S. workers have the skills needed for high-wage jobs will suffice.

We should work to aggressively address the issue of education and skills, particularly science, technology, engineering and math skills (STEM), while also significantly boosting government support for research. Many of current competitiveness proposals are focused on these important steps, including enabling highly skilled foreign S&T personal to move here. President Bush proposed an increase in research funding for the physical sciences of $50 billion over 10 years with large increases at NSF, NIST, and DOE. The National Innovation Act of 2005 introduced by Senators Ensign (R-NV) and Lieberman (D-CT) includes a number of measures to boost spending on science and math education and authorizes the doubling of the National Science Foundation budget. The Protecting America's Competitive Edge Acts introduced by Senators Domenici (R-NM), Bingaman (D-NM), Alexander (R-TN), and Mikulski (D-MD) also would boost funding for science and math education and federal support for research.

Boosting federal support for STEM is important as fewer American students are studying science, math and engineering. For example, BA degrees in engineering granted to Americans peaked in 1985 and are now 23 percent below that level. As a result, the United States ranks just 14th in the percentage of 24 year olds with a math or science degree. We need to do more, not only to help boost math and science skills domestically but also ensure that an adequate supply of skilled foreign scientists and engineers can come to the United States.

We also need to boost research funding. Even though funding has increased in some areas, we have a long way to go. Were the federal government to fund research at the same share of GDP it did in the 1990s it would need to invest an additional $10 billion per year.

Congress should enact and fully fund these and other related measures this year. But if they are passed, policy makers should not think that they are done with competitiveness and can move on to other matters. Winning the new global competitiveness race will require at least a decade of careful attention to the issue by government leaders, businesses and universities. In particular we need to be thinking now of the next bigger, bolder and broader steps for 2007, 2008 and beyond. While such an effort will require the collaboration and work of many informed and interested individuals and organizations, many of who are here today, let me suggest four steps for the next phase of the competitiveness agenda:

1) Work to create a global trade regime based on markets, not mercantilism.

One of the reasons the proposals stemming from the conventional view are not enough is because it can be difficult for companies in the United States, no matter how innovative and lean they are and no matter how much we invest in science and skills, to significantly expand innovation-based activities domestically because many other nations are not competing on a level playing field. Indeed, many nations today, particularly many in Asia, are practicing what might be called market mercantilism: putting in place liberalized investment rules coupled with a host of government actions – some legitimate, some distorting and illegitimate – to attract foreign investment and boost domestic innovation-based

growth. They understand that the innovation economy is the goal, they just don't want to wait the 20 or more years it takes to get there if they limit their policy actions to legitimate means such as boosting university research, passing strong intellectual property protection rules, and investing in infrastructure.

Rather they want to take a shortcut to the innovation economy: turning a blind eye while domestic firms (and in some cases government agencies themselves) steal a wide range of foreign intellectual property (IP); pressuring foreign firms to share IP in order to gain access to their consumer markets; manipulating standards to favor domestic firms; and engaging in massive government intervention (in violation of IMF rules) to keep their currency prices below what the market would otherwise produce. When China pressures U.S. companies to open R&D laboratories as a quid pro quo for selling in the Chinese market, that's not capitalism, that's mercantilism. When 70 percent of the software used in India is pirated, that's not capitalism, that's mercantilism. When China seeks to manipulate the standards process to favor its domestic technology firms against foreign firms, that's not capitalism, that's mercantilism. When Japan engages in massive central bank purchases of the dollar to keep the value of the yen low in order to artificially lower prices of their exports, that's not capitalism, that's mercantilism. Such steps seek to substitute the wisdom of government for the allocative efficiencies of markets, leading to a global misallocation of resources and lower global productivity.

As a result, an effective American competitiveness strategy has to work harder to ensure that national economic development strategies around the world are based on positive-sum strategies like investing more in science and technology, building infrastructure and boosting education and not on negative-sum, mercantilist strategies. Competition to see who has the best university system, the highest share of scientists and engineers, the best broadband infrastructure, and the best IP protection system makes us all better. Therefore, we should continue to push for expanded global market integration and reduction of tariffs and other non-tariff barriers while at the same time working with the WTO and other international bodies to move the world trading system to one based more on markets and less on mercantilism.

But while a broader global market-based trading and investment system is a key to global and American prosperity, we will need to take even more robust steps at home to raise our game if we are to fully prosper in such a system. The steps we are all discussing this year will help, but simply expanding the supply of skilled workers and basic research will not, I believe, be enough. We need to take steps to make it more likely that companies invest in innovation-based activities here at home. In particular, we need to address the cost differential between the United States and "low wage countries that cram on science."

2) Overhaul the corporate tax code to spur innovation.

The tax code can be a powerful tool not only for boosting innovation but for helping level the playing field between other nations, particularly lower wage nations and nations that manipulate their currency levels. As a result, we should start by creating a new knowledge tax credit that allows companies to take a 40 percent credit on incremental increases in expenditures on research and experimentation, global standards setting,[8] and workforce training. Companies that would not qualify for the knowledge credit because their R&D to sales ratio has declined could take a credit equaling 10 percent of qualified research and training expenses over 60 percent of their qualified research expenses.[9] I should

note that the Senate PACE Finance legislation is an important step in this direction as it proposes to double the R&D tax credit to 40 percent.

But we should go further. One step would be to create a flat 40 percent credit for company expenditures on research at universities, federal laboratories, and research consortia and on support for education and training in American schools and universities. One reason for this more generous collaborative R&D credit is that more of the benefits of collaboration spill over to the economy than proprietary in-house R&D. The additional cost for this new knowledge credit would be approximately $22 billion per year.[10]

In order to pay for these new tax incentives, Congress could institute a modest business activity tax of the kind proposed by Gary Hufbauer at the Institute for International Economics.[11] The advantage of such a tax is that it not only would enable these and other tax incentives to spur innovation and investment to be paid for, it would do so in a way that would be border adjustable, in contrast to current corporate taxes that are not.

3) Create new research partnerships.

While we need to boost federal support for research, more money alone is not enough. One of the lessons from the policy innovations of the 1980s and 1990s is that the key was not just money it was institutional innovation. For example, the Bayh-Dole Act opened up a whole new avenue for increasing commercialization of university research. Thus, as we increase federal support we should also be thinking of new models of innovation partnerships. It's not enough to simply fund more individual investigator proposals, although we need to do more of that. We need to do more to boost university-industry partnerships and to mobilize collective talents around key technological challenges. This is needed, in part because there are still large gaps between the for-profit and non-profit (e.g., universities, hospitals, federal labs) research community. The former doesn't always know what capabilities and results the non-profit research community has produced (or could produce) that would be useful, while the later doesn't well understand industry's needs.

One step to bridge this divide and build more robust partnerships would be for Congress to establish an Industry Research Alliances Challenge Grant initiative to co-invest with industry-led research alliances. Industry members would establish technology 'road maps' and on the basis of these invest in research conducted at universities or federal laboratories. This initiative would increase the share of federally funded university and laboratory research that is market relevant, and in so doing better adjust the balance between curiosity-directed research and research more directly related to societal needs. Two billion dollars per year would be allocated to fund up to 100 industry–university research alliances. To be eligible for matching funding, firms would have to: (1) form an industry-led research consortia of at least ten firms; (2) agree to develop a mid-term technology roadmap that charts out generic science and technology needs that the firms share; (3) provide at least a dollar for dollar match of federal funds; and (4) invest the funds in universities and federal laboratories through a competitive selection process. Such a process would definitely not entail 'picking winners and losers' because industry, in conjunction with academic partners, would identify the broad technology areas critical for research.

We also need to do more to build a viable state-federal innovation partnership. Historically the federal innovation system has focused on larger firms and the approximately 30 first-tier, large research universities. Both institutions have played

key roles in driving innovation. However, in the New Economy entrepreneurial start-ups and small and medium-sized enterprises are playing an increased role in nation's innovation system. Moreover, many of the nation's non-top tier research universities and colleges have developed significant science and technology strengths and play key roles working with industry in their region.

States are well positioned to work with these kinds of firms and universities. In fact, all 50 states now have initiatives to promote technology-based economic development. However, because the benefits of innovation spill over state borders, states invest less in innovation-based economic development than is in the national interest. As a result, Congress could encourage states to focus more on technology-based economic development by appropriating $1 billion annually for a competitive matching grant fund to co-invest in state-supported technology-based initiatives.

4) Make digital transformation of the economy within ten years a national goal.

The digital economy is the source of much of the recent rebound in productivity growth. Moreover, accelerating digital transformation, particularly in the service sector, will be a key driver in the future not only of economic growth but of progress in a wide array of areas including education, environmental protection, government, health care, homeland security, law enforcement, and transportation. Unfortunately, because of a wide array of market failures, including "chicken-or-egg" dynamics and active industry resistance from some sectors, without effective public policies digital transformation is taking significantly longer than it might otherwise occur. While health care is only the most visible sector where digital transformation is lagging, many other sectors, including education, much of government, construction, and transportation, also lag behind. Moreover, in a growing number of information technology application areas, including deployment and adoption of broadband telecommunications, the United States lags behind other nations. As a result, we need tax, regulatory, procurement and other policies not only to remove a host of barriers to digital transformation but also help create more digital take-up by firms, non-profit organizations, governments and individuals.

Conclusion

In 1942 with the first inklings that the war effort might finally be turning the Allies' way, Winston Churchill famously proclaimed, "This is not the end. It is not even the beginning of the end. But it is, perhaps, the end of the beginning." Perhaps we will look back on the last year with the same sentiments. It's not the end. It's not the beginning of the end. But with the all the yeoman's work that has been done in the last year to highlight the importance of the competitiveness issue, perhaps it is the end of the beginning. Now we must continue the work to see that rhetoric is translated into action. Thank you.

ENDNOTES

1. Robert D. Atkinson, "Some States Take the Lead: Explaining the Formation of State Technology Policies," *Economic Development Quarterly*, Winter, 1991.

2. Robert Samuelson, "A Phony Science Gap?" *The Washington Post*, Feb. 22, 2006, p. A15. <www.washingtonpost.com/wp-dyn/content/article/2006/02/21/AR2006022101166>

3. Quoted in Erika Kinetz, "Who Wins and Who Loses as Jobs Move Overseas?" *New York Times*, 7 December 2003.

4. Robert Samuelson, "Knowledge Deficit?" *Newsweek*, Feb. 24, 2006. <www.msnbc.msn.com/id/11541799/site /newsweek/>

5. R&D Credit Coalition, "International R&D Tax Incentives Survey," (Washington, DC: February 2006) <www.investinamericasfuture.org /PDFs/021306incentives.pdf>

6. United Nations Conference on Trade and Development, *World Investment Report 2005* (New York: 2006) <www.unctad.org/TEMPLATES/WebFlyer.asp?intItemID=3489&lang=1>

7. Sebastian Mallaby, "The Fake Science Threat," *The Washington Post*, Feb. 6, 2006, p. A 15. www.washingtonpost.com/wp-dyn/content/article/2006/02/05/AR2006020501059.html

8. Corporate investments to participate in global standard setting processes are an important component to ensuring U.S. competitiveness. But because of the free rider problem where companies benefit from the actions of other companies, U.S. companies appear to under invest in standards settings activities, just as they do in R&D.

9. This would include the average of qualified research expenses over the last three years. The logic here is to help provide an incentive for firms that for reasons unrelated to declines in research (e.g., mergers, firm maturity) cannot take the credit.

10. Boosting the R&D credit to 40 percent would cost approximately $5 billion, expanding the base credit to 10 percent would cost approximately $5 billion, and creating the flat collaborative credit would cost approximately $2.5 billion. The training tax credit would cost approximately $8.5 billion.

11. Gary Hufbauer and Paul Greco, "Reforming the US Corporate Tax," Washington, DC: Institute for International Economics, 2005.

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