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Good morning.
Living and working in Ireland for the past five years gave me a unique opportunity to view the U.S. from a distance. I hope my comments will encourage you to think differently about America's future, because living outside our country during these tumultuous recent years has convinced me leaders here must change their expectations of their states, their universities, and their K-12 schools.

From my vantage point across the pond where the relative complacency and comfortableness of America appear quite stark, I came to believe that the only way the U.S. can retain its top position in science and engineering is by making sweeping changes, and that includes in the EPSCoR program.

The time for change certainly has come. Almost all of the important factors that shaped the current research effort in the U.S. occurred in the late 1940s and 1950s – in large part due to the work of scientists and engineers in WWII and as a response to Sputnik. The devastation in Europe and WWII also allowed us to move quickly to the top in science and engineering. Then, we simply grew budgets or, said another way, became addicted to growing federal support. The all-too familiar success rates of grant applicants to federal agencies (low), grant sizes (often small) and, frankly, treadmill approach to proposal writing inherent in our system suggest we should reconsider how effective we really are at apportioning wealth to talent and potential. We do not seem focused on two key areas that should benefit from federal investments, where the collective good calls for it: economic growth and K-12 education. I find myself asking, have our federal investments protected our local political systems and thereby stifled innovation?

Let me begin with what I call seven myths of the United States that give us a misguided sense of security. Let me pose them as a set of six true or false statements.

Myth 1: True or false: The base of our competitiveness, U.S. – R&D – will remain in the U.S. and will not be outsourced.

False.

Other nations are putting massive resources into catching us. Does anyone recall how we all viewed Toyota and GM in 1973? We are now in the first stage of what I call the "Toyota-ization" of industrial R&D. We are like the proverbial frog in soon-to-be boiling water; we don't realize the change we are immersed in.

Let me give you a few examples.

Bell Labs is not the same research leader it was in earlier years, but it is still a significant resource that merits investment and the name Bell Labs still implies, appropriately enough, excellence and talent. A number of countries would like Bell Labs to expand in their countries to seed enhanced R&D growth. Two years ago, Bell Labs expanded to Ireland.

Likewise, Intel's research now includes a robust connection to Trinity College Dublin.

And a leading researcher recently accepted an appointment at Dublin City University despite substantial offers from Cornell and UC-Berkeley. The researcher does not have Irish or European roots. Rather, he understood that in Ireland he would have a far easier time than he would in the U.S. conducting high-end research that required other disciplines and industry partners.

Myth 2: True or false: Universities in the U.S. are easier to work with than foreign universities and companies prefer to work with U.S. universities.

False.

Specific biopharma companies have discovered time and again that it is more straightforward to work with university groups in Ireland than in America, not least because they saw that Ireland recognized the imperative of making decisions in a timely manner. Ireland isn't the only one that is applying this lesson either, to the great interest of American businesses in the R&D realm. During my tenure in Ireland, I met regularly with U.S. corporate R&D leaders who stated in strong terms the advantages over America that other countries now offer for research cooperation.

Myth 3: True or false: No place can offer the advantages for software creativity or production as the U.S.

False.

Ireland exports more software than any other country, and has established a software engineering center to build on this base. China and India, in particular, have considerable talent in these fields, while the U.S. has seen a downturn in computer science interest by its students. Tom Friedman's book, *The World is Flat*, clearly articulates the competition from China and India.

Myth 4: Technically educated people from Europe and Asia will keep coming to the U.S. as everyone wants to be here.

False.

This is false particularly for the young people who are increasingly developing a negative view of the US as a place for them or have better opportunities at home. The global economy even now beckons ex-patriot Asians and Europeans, for example, to return to their roots.

Myth 5: The U.S. is the melting pot that welcomes everyone and assimilates them.

False.

After 9/11 and our reaction to it, this may never be the case again, and for at least another generation or more unless we soon re-commit ourselves to the potency of our immigrant ways.

Finally, **Myth 6**, which is not a myth at all and can be our saving grace: We have the best research university system in the world.

True.

As of today, no one can easily compete with the top 25 or so U.S.-based research universities.

But this does not guarantee that it will always be that way. In fact, China, Japan, and the EU have outstanding universities; thus, these countries will build on and approach our system.

But even this powerful force in American competitiveness has a soft underbelly: how long can the K-12 education system in this country fail our people and leave it to the universities to play global catch-up? We have lowered our standards in K-12 education and made the universities in many states remedial educators.

Not so long ago, I would have been part of the chorus that stood secure in the confidence of American preeminence in science and technology. But living and working in Ireland, in the heart of the most dynamic economy in Europe, I saw that America was far less formidable as a scientific and engineering leader.

Ireland has been proactive in transforming itself over the past 20 years from what the Economist magazine once called "the poorest of the rich" European countries. Essentially, Ireland was written off as nothing more than a beautiful tourist destination – by everyone but the Irish.

Instead of getting discouraged, the Irish got busy. They realized early on that their only true natural resource was their children, and so they strategically invested in education, and this paid big dividends. Last year, the Economist had another cover story about Ireland, but this headline pronounced Ireland "Europe's top economy."

The rest of Europe, and countries all across Asia, have been applying the same lessons. As a result, we see aggressive investments elsewhere in science and engineering and in education, at all levels. American should be hearing a clarion call: Wake up. The Cold War is indeed over. But the battlefield today is global and has shifted to economic competitiveness and innovation.

The Gathering Storm report highlights many of the issues we are facing. In this report, Intel executive Howard High mentions his company's competitive philosophy,

> *"We go where the smart people are. Now our business operations are two-thirds in the U.S. and one-third overseas. But that ratio will flip over the next ten years."*

We need a new model. Specifically, I want to argue that EPSCoR is preventing you from competing in a manner needed by your states in the 21st century.

I realize the challenge I am going to offer to the EPSCoR states may not be appreciated by many participating in this conference – but my intention is to stimulate fresh thinking based upon my reading of the Gathering Storm report, my experience living abroad, and my conversations with CEOs of companies such as Intel, IBM, and Wyeth. I believe the concerns conveyed in the Gathering Storm are on target. Like Michael Crow, I believe we are in fact in the storm already but unaware of it. We are not ready for the competition just as we were not ready for the competition in the automobile industry or for Sputnik.

EPSCoR began way back in the last century, in 1979, as a way to stimulate sustainable R&D efforts in traditionally underrepresented states. The acronym says it all: EXPERIMENTAL program to stimulate COMPETITIVE RESEARCH. The title itself indicates that it was not intended to extend in perpetuity.

EPSCoR investment dollars have born fruit and, in particular, encouraged institutions in various states to begin to work together. But EPSCoR has not done what it was meant to do – to build fully competitive states. Where are the EPSCoR graduated states? What does it say about our nation in 2006 that 25 states are still defined as EPSCoR states? By the way the number of states that originally were defined as EPSCOR states were 5 or 6! Why are the leading researchers and elected political leaders in these states content with this fact? Can we afford to continue this "experiment" if the outcome after almost 30 years is having half of the country not fully competitive? Or is EPSCOR a convenient way for our representatives to cash in on the research pork bonanza?

If you keep doing what you have always done, you will get what you have always gotten.

Given the challenges we face as a nation, we should consider how to restructure the EPSCoR program to achieve its goal of graduating the states it terms, in effect, "non competitive." It is, after all, the state's responsibility to change this fact for itself, not the

federal government's – or it should be the state's responsibility, and EPSCoR has helped the state's political, university, business, and education leaders to deny otherwise.

Ireland, which, with a population of four million, is about the size of a small U.S. state, represents a clear, long-term example of how singular places can determine their own destinies.

In Ireland, the business community demanded a focus on world-metrics and lists like the Shanghai list and other independent metrics for the ranking on a world competitive scale. The business community assumed that if the universities did not rank more highly on the world list, the economy would be at risk. Since the universities were not as highly ranked, as they needed to be, the business and government required them to focus on improvements that meant something in the world.

Ireland's recent success would not have been possible if, 40 years ago, the country hadn't laid the groundwork for economic competitiveness by taking several fundamental steps. Here are the key ones:

- It reduced taxes on manufacturing from about 40% to 10% (now it is 12.5%) to stimulate growth.
- It made a concerted effort to increase educational participation rates.
- It made a demanding primary and secondary education system more rigorous.
- It linked industry and education, including support for workplace education.
- It enhanced the economic development agency, IDA (IDA is vastly different than individual US state commerce departments.). IDA Ireland has been a dynamic, performance-led organization for industrial recruitment and economic growth in Ireland. IDA is a driver of change.
- It created a social partnership between the management and labor sectors to benefit Ireland and thereby one another too.
- It created Science Foundation Ireland (SFI) to invest in research to create a competitive advantage for its economy. SFI synergy with IDA benefits Ireland.
- It created competitive advantages for doing research and business there. The government now provides a minimum of $200 million per year for competitive investments in research areas that are strategically important to the state's economic success and complement the extensive research funding available from the EU.

The results of these steps have been dramatic. To cite a few examples:

In the mid-1960s, less than 5% of Ireland's eligible students attended college in Ireland. By the mid 90s, the percentage had risen to 25%. Now it is almost 50%. By 1995, Ireland had more students as a percentage of population with science-related qualifications than any of the other 30 countries in the Organization for Economic Development (OECD).

In 1990, there were about 11,000 companies exporting out of Ireland. By 2002, this figure had increased to 70,000. Ireland now accounts for roughly one-quarter of all American foreign direct investment – or FDI – in Europe. It is a base for more than 1,100 multinational companies.

- Ireland is the world's biggest software exporter, ahead of the U.S.A.
- Ireland accounts for almost one-third of all foreign direct investment in Europe in pharmaceuticals and health care.
- Six of the top twelve "block buster" drugs are manufactured in Ireland.

Nine of the world's top ten drug companies call Ireland home. So do 15 of the top 20 medical devices companies. These industries replaced the textile base of the past.

The fact is, a long-term commitment to education and competitive commerce laid the groundwork for the Celtic boom that followed.

Ireland has kept the momentum going with a *focused strategy*. Through organizations such as IDA, Enterprise Ireland and Science Foundation Ireland, it is investing in R&D. More than that, Ireland is investing in scientific and engineering fields that capitalize on its highly educated talent and its connections to industry.

I think the lessons from Ireland are clear and meaningful:

- Research must be strategically tied to creating a competitive advantage for states.

- Universities must take far greater responsibility for K-12 outcomes and be engaged in their constant improvement.

- State governments must require real performance metrics indexed tightly to service to society.

The status quo of EPSCoR has, unfortunately, been founded upon the opposite of such innovation and competitive requirements. It has been founded upon an entitlement. The federal government's response to the states that have limited R&D capacity must instead become a significant incentive. The EPSCoR program can be adapted to the global economic competition in a variety of ways. One way would be for the federal government to say and do the following: The federal government will invest in the underperforming research states with substantial EPSCoR funds *if* local leadership invests substantially in R&D talent and education and there is a clear goal to graduate within 5-7 years.

What a study of Ireland demonstrates is that change can happen – if leaders are committed to being competitive.

Ten years ago, Governor Tommy Thompson started welfare reform in Wisconsin and it became the model for American welfare reform. I believe we need a similar radical idea in an EPSCoR state – one that can inspire others to borrow the model.

Trying to be a Stanford or a Harvard, for example, is not appropriate for our EPSCoR institutions unless the institution can somehow get an endowment of $20 billion or more. We frankly don't need more institutions like Harvard. We need more contemporary region-state institutions focused on service to society at the highest levels of performance – a modified land grant, if you will. We need institutions with more of the spirit of Ireland or like Arizona aspires to be.

By creating Science Foundation Arizona to strengthen research in strategic areas to benefit the state, Arizona has said, "It is not enough to grow; we must grow with quality; we must grow strategically. We must compete as measured globally." Meanwhile Michael Crow, the president of Arizona State University, is building a new university model designed to connect closely to a state and its challenges. Is the ASU model the natural evolution of an important institution in our society?

Take a look at where your institution ranks on the Shanghai ranking list, for example, or how your state competes in education and economic growth as measured by an OECD or other standard international metric. If your state is not competitive – and agile enough to remain competitive – you will be a victim of the *Gathering Storm*. A refusal to confront the hard facts, like the Shanghai list or the OECD measurements, is denial, and we know where denial got companies like GM.

You must keep your attention on the international competition because each state, like the country itself, competes globally, whether we realize it or not. Without a successful economy, the research dollars will continue to move offshore. And if industry moves out of the U.S., as suggested in the *Gathering Storm* quote from Howard High of Intel that I cited earlier, do we really think the nation can sustain the innovation and enterprise of the past fifty years, including anything like EPSCoR?

I challenge the leaders here to step up to the issue of global competitiveness and engage in new ways. One important step we can take is to redefine EPSCoR, establish goals to be achieved on each state, measure success or failure, graduate states that are achievers and help the others that are not. The noble object is to get rid of the need for EPSCOR. Then we can reinvent the program for tomorrow's competition, not yesterday's, and leverage this national investment in your state into an expanded state investment in your own state's future. Then, if we are smart, the rest of America will follow, and by following innovation, remain a global leader. We have boldly faced change and competition before in America. We must again.

Thank you.