

South Carolina
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I come back to this beautiful state where I started my career, this state of tourism and industry and great writing and great music, this state of magnificent Low Country shores and spacious Up Country horse lands, this Palmetto state where educational television began, this state of resilience and perseverance that has overcome some of the most troubling challenges in American history, from the Civil War to the Charleston earthquake to Hurricane Hugo, this state in a state of change where forestry is so important and some of the most important battles of the American Revolution were fought, to try to mix a little Johnny Appleseed with a little Paul Revere. Like Paul Revere, I come to sound an alarm. Like Johnny Appleseed, I come in the hopes that in this state of forestry and glorious views end to end, there is fresh ground for the emergence of new ideas.

Good evening, and thanks very much for the opportunity to join you this evening.

I have been asked to challenge this gathering of leaders with some provocative ideas and I will try to do so. Let me set the stage with a brief golf story – since, no matter how high tech and smart any of us think we have become, we will always have golf to remind us otherwise.

I am reminded of the story of an exasperated golfer's long day on the course. He finally turned to his caddy and said, "You must be the absolute worst caddy in the world!"

"No, I don't think so," said the caddy. "That would be too much of a coincidence."

Today I come to you as someone still getting re-acclimated to America, in my role at Science Foundation Arizona, but to some degree fighting against getting too acclimated. I spent five eye-opening years in Ireland, in a country that is still enjoying one of the most remarkable turnarounds of any economy in the world in the last 50 years. And I learned some powerful lessons I hope to be able to convey today.

Frankly, I do not believe that South Carolina or, for that matter, America will keep pace with the world's new global competition without changing approaches dramatically. Any state like South Carolina that has been the birthplace of individuals from Chubby Checker to Strom Thurmond has to believe anything is possible.

The Pace of Global Competition

I am going in part to focus on China because China makes as clear as any economic force does today the nature and pace of change. While I was in Ireland, China and Ireland began working together. That gave me a chance to see this Chinese “juggernaut” everyone talks about. Let me tell you: what you have heard is mostly true. In fact, one of the things I must urge you to do is get a team together, if you haven’t already, and send them on a fact-finding tour of China. Trust me; it will make a certain type of Paul Revere out of you, because a challenge is coming from a massive, well-educated, highly motivated, technologically oriented country. Education, especially in science and engineering, really is a core value in places like China, Singapore, Taiwan, and India.

In this talk, I want to give you five steps I think South Carolina can and must take to compete in this new environment. Number one, and the point threaded through everything, is this: Education must be a core value, including in science, math, and engineering.

Today, education in India and China is growing at a pace comparable to what the U.S. experienced after World War Two. China and India are so large they are producing scientists, mathematicians, and engineers at staggering numbers – numbers we can’t compete with.

The only way to beat quantity is with quality. We must give the talent that we have every opportunity to thrive. America is still the best place for an individual to dream and imagine – and this source of greatness in our culture, of innovation and inspiration, requires every form of support we can muster for it.

Between the GI Bill, creating the world’s best universities, and developing the national science complex – including agencies like the ONR, the National Science Foundation, NIH and DARPA – America all but achieved the alchemist’s dream – we turned knowledge into something entirely different, global economic dominance.

Well, in the place where the drink is served like nowhere else, I have to say that other countries have drunk the *sweet tea*, to adapt a familiar saying. They have learned from America how education can fuel economic success.

Two decades ago, China and India awarded barely a fraction of the science and technology degrees they do now.¹ Between 1995 and 2000, China’s college enrolment grew by two-thirds. In roughly the same years, India’s college enrollment grew by a third, to 8.8 million.²

¹ “Gunning for the US in Technology,” *Business Week*, March 16, 2004.

² “Higher Education Financing and U.S. Global Competitiveness,” Statement of Dr. Watson Scott Swail, President, Education Policy Institute, Committee on Senate Finance, July 22, 2004.

In 1999, American universities awarded 220,000 bachelor's degrees in science and technology. China awarded 322,000, and India awarded 251,000. In 2005, China's institutions of higher education awarded **600,000** engineering degrees. India awarded **350,000**. And the US? **70,000**.

China's spending on R&D has tripled in seven years. India is due to double its number of engineering colleges to 1,000 by 2010. China's share of scientific papers rose from 16 percent in 1990 to 25 percent in 2004. If this trend continues, within 10 to 15 years, Asia will publish more science than America.³ That is a sobering probability.

In 2003, America even lost its status as the world's leading recipient of foreign direct investment. The new leader is China – a warning sign for how the market now judges opportunity. And India is equally dedicated to this transformation.

How Ireland Improved

We know these massive countries are transforming themselves. How can a single state possibly compete? We know the pace at which these countries are transforming themselves.

It's worth looking at what Ireland, which is smaller than almost every U.S. state, did to ratchet up its competitiveness. And it is worth noting this for you: Ireland and South Carolina have much in common. It is not only that Ireland sits opposite the Atlantic Ocean from the shores of South Carolina. Or that Ireland is a rich home to artists and authors and musicians just as South Carolina is.

It is also a fact that Ireland is about the same size as South Carolina. Ireland spent the better part of its history as an agricultural state just as South Carolina did. For nearly 100 years, profound internal strife tore at the fabric of Irish society as it did in South Carolina, founded here upon race, there upon religion and nationalism. Ireland went through a long period of massive economic and cultural struggle during the 20th century just as South Carolina did. And Ireland's population is about the same as South Carolina's.

If Ireland can transform itself, so can South Carolina.

First, I must say in this small state: Size does not matter. As I said, like South Carolina's, Ireland's population is roughly 1/100th the size of America's. But if some facts can be daunting, others can be inspiring. Here are five that I hope you'll appreciate.

One: Between 1994 and 2003, while the European's average annual real economic growth was just over 2 percent, and America's just over 3 percent, Ireland's was 8 percent.

³ "Do Not Fear the Rise of World-Class Science in Asia," Charles Leadbeater and James Wilson, *Financial Times*, October 12, 2005.

Two: From 1990 to 2003, Ireland's GDP per capita more than tripled, from \$12,500 to \$42,000. Many people shared in the prosperity, thanks to education.

Three: In 1990, there were about 11,000 companies exporting out of Ireland. By 2002, this figure had increased nearly seven-fold to 70,000.

Four: Ireland is the world's biggest software exporter, ahead of the U.S., and accounts for almost one-third of all FDI in Europe in pharmaceuticals and health care. In fact, nine of the world's top ten drug companies call Ireland home.

Fact number **five:** There are eight countries in the world that top the U.S. in per-person economic output. *Only one of them isn't an oil exporter, banking center, or tax haven. Yes, that singular country is the Republic of Ireland.*⁴

Five facts, one simple truth: If a small country like Ireland can do it, so can South Carolina.

I hope competitiveness is enough of a motivator. If not, I'd like to suggest another: *Fear.*

Imagine the pace of Ireland's progress at work in India and China and you have an idea of the new reality. All these countries have learned that three factors now dictate which nations or states will succeed, have growing economies and prosperity, and offer their children the promise of rising opportunity. *Places that do not offer people genuine opportunities to create knowledge, develop new ideas, and innovate will be condemned to third-rate status in this new era.*

I believe today a state's success in the knowledge-based economy requires several key actions.

I've already specified one – *make education a core value.*

I now want to add the second and third:

Second, support research and development that can transform those ideas into new knowledge and innovations. **Third**, create an environment in which government works in partnership with industry – to create a competitive advantage for the state -- if you want wealth generation –grow the “pie”. If you want to struggle and waste time, continue the inefficiencies of the current system.

Let me speak to each of these one a time.

First, make education a core value, including in science, math, and engineering. It is crucial to invest in talented people with great ideas. Talent powers innovation and invention, without which no society can keep up with the competition.

⁴ “Under the Radar,” Jack Hough, *Smart Money*, April 2007, p. 46.

There are about 700,000 children in South Carolina's public schools. What percentage experiences an education where education is a core value? What percentage experience an education that nurtures interest in and success in science, math, and engineering are given every fair chance of emerging? I would argue that if South Carolina doesn't have good answers to these questions, it's time to make the *sweet tea* a little differently.

Ireland's recent success would not have been possible if, 40 years ago, the country hadn't made a concerted effort to increase educational participation rates. It began making an already demanding primary and secondary education system more rigorous. And it started linking industry and education, including support for workplace education.

The result?

In the mid-1960s, less than 20,000 students attended college in Ireland. By 1999, the number had risen to 112,000. Educated people helped draw companies in, and highly educated people will leverage those partnerships. From 1990 to 2003, Ireland's GDP more than tripled, from \$42 billion to \$166 billion.

The fact is, a long-term commitment to education in Ireland laid the groundwork for the boom that followed.

But ideas undeveloped are ideas wasted. Which is why you must provide support for research and development that can transform those ideas into new knowledge and innovation. Which is why academic-industry partnerships are crucial. Quit waiting for the Feds to make you truly competitive in R&D.

Science Foundation Ireland's grants include support for centers in science, engineering, and technology, or CSETS. Already the CSET program has brought together researchers from Ireland and around the world to establish highly sophisticated, multi-faceted teams at Ireland's universities, in partnership with leading local **and** multinational corporations.

These centers leverage public dollars in a powerful way to engage people and resources from industry. So far, the CSETs have brought together outstanding researchers from around the world, including partnerships with Bell Labs, HP, Intel, IBM, Medtronic, Glaxo, Wyeth, and Proctor & Gamble. They all spring from the conviction that the best minds like big challenges.

These investments support for R&D in scientific and engineering fields that capitalize on Ireland's highly educated talent. Sounds just like India and China are trying to do – and, frankly, Arizona. Like I said, I hope competition is a good motivator. *If not, rely upon fear.*

Ireland is not hidebound to what is happening at the moment either. This point brings me to that **third** key step, namely creating an environment in which the best in the private sector and work in appropriate partnership with the best in the not for profit sectors – brains, leverage and speed are key in the 21st century.

One of Ireland's greatest strengths is its determination to create an environment where ideas and talent thrive. It was friendly to scientists. By the time I left Ireland, five years after SFI's inception, it was funding 450 projects with grants totaling \$540 million and involving 1,200 individuals, research teams, centers, and visiting researchers from Australia, Belgium, Canada, England, Germany, Japan, Russia, Scotland, Slovakia, South Africa, Switzerland, and the United States. *We must remember, to put that in even starker relief, that Ireland only began investing in these programs in a serious manner in 2001.*

Can South Carolina offer an environment where people with talented ideas have the room and support to stimulate innovation and invention? We are trying it in Arizona, I can tell you that.

Back to the Future

On that note, though, I have to say, I wonder to what extent we at home really take seriously the urgency of our challenge and the need for taking such steps in a bold way.

If we think that we are destined to lead forever, I hope we will give that blind confidence a moment's reflection. In 1840, China and India accounted for 40 percent of world trade. They produced commodities prized around the world, such as silk, jewels, and jade. In fact, at roughly the same time, in 1800, Cubans and Argentineans were richer than Americans.⁵

But none of those previously economically rich countries moved **fast** enough during the Industrial Revolution. China, India, Cuba, and Argentina all fell far behind their competitors in almost every aspect of national wealth and prosperity.

The fact is, "All of the world's great civilizationsrose on innovation, the spread of ideas and technology, and the cultivation of learning to fuel the creativity and productivity of their citizens. These societies ultimately failed not by being outflanked by stronger economies or military forces but from complacency."⁶

Paul Revere, calling 911 – you name it, the alarm should be sounded.

Science Foundation Arizona, for one, is out to build a new organization for investing in strategic areas to create a competitive advantage for its economy and its citizens. Our plan through SFAz and other ventures is to make Arizona fully competitive in this so-called knowledge arena or 21st-century global economy. I hope South Carolina seeks the

⁵ Juan Enriquez, *As the Future Catches You*, pp. 21-22.

⁶ Business-Higher Education Forum report 2004.

same objectives for itself. It is possible if the right system for innovation, education and invention is in place.

Ideas for Change

I've already said education must be a core value, including in science, math, and engineering. I've said, second, support research and development that can transform those ideas into new knowledge and innovations. Third, I've recommended creating an environment in industry is supported by government – where barriers to progress are reduced. Where we establish effective public-private partnerships to create a competitive advantage – to create high quality opportunities for children and grand children. And, so all of our children can elect to remain and work in SC because of the opportunities. We have lost a lot of talent from SC – though we frequently don't realize it since they end up in great jobs in NC, GA, VA, CA, TX, and yes even in NYC and DC.

Anyone who has been to South Carolina for a single fall football season knows the spirit of competition and the great fun with which it is enjoyed here. It sure would be amazing if that spirit of competition was not always amongst ourselves but instead was with the world, and especially in the area of ideas, cooperation, invention, and innovation.

Fourth idea: Truly link the best of the school system – namely, the resources of the university system – with each other and with the schools that serve most of the population – K-12 schools. We can't have the minds for a long-term, productive high-tech system without highly educated students coming through the pipelines. Students will only receive education at a world-class level if the parts work together.

I think, in fact, that you should demand that South Carolina's university system and K-12 system start creating a seamless education system. They should not be islands unto themselves.

Clearly, South Carolina must improve educational performance and educational quality. About 80 percent of South Carolinians earn a high school diploma. That's lower than in the U.S. rate. About 22% of South Carolinians have earned a college degree. That is also lower than the U.S. rate.

In fact, about 51% of the citizens of this state are officially considered economically disadvantaged – across the country, the typical rate is 36%.⁷

South Carolina must increase the size of its economic pie and expand the opportunities to enjoy it. Education is as important to doing so as everyone says. Education, though, that is a complete system, K-16, with industry partnerships and government investment at a meaningful, transformative level to boot.

Why not require your university system to work with the K-12 system, to work with business, to benefit industry and society, to build an educated population and an economy

⁷ <http://www.schoolmatters.com>

that sets a new standard rather than chasing the old one? Don't make partnerships an option.

For the **fifth** idea, I'd like to quote my favorite philosopher, Yogi Berra. He once said, "*When you come to the fork in the road, take it.*"

As is obvious, I think America and South Carolina are at a fork in the road.

Let me hark back to history for a moment. In 1862, Congress passed the Morrill Act. It granted the states more than 17 million acres of land to raise revenue to establish colleges. The land was to be sold and the profits used to create colleges for agriculture and the mechanical arts.

Such investments opened up college to a whole new population. I wonder if South Carolina has the foresight to do that for itself today? The impact on high-tech, high-knowledge, and high-wage areas would be profound.

Ireland – South Carolina's peer in so many ways.....economic and cultural history, size, population, and more – did it, and so can South Carolina. Fear and guts are a powerful combination. Look at how South Carolina recovered from Hurricane Hugo. It is amazing what can happen when the will is there. *Why must we wait for disaster to strike before we call for such willpower?*

When an agrarian and industrial economy drove American competitiveness, the Morrill Act was necessary. Now, wireless communication, the Internet, and the human genome project have come. South Carolina is one of the greatest resources for forestry and tourism in this nation. Thanks goodness for it. At the same time, I think we all know, there must be something more too.

South Carolina continues to work to diversify its manufacturing sector, and I know has enjoyed success building up the financial and healthcare industries and recruiting and building firms that make chemicals and automobiles and related equipment, among other promising sectors. Can South Carolina meanwhile forge an education and R&D system that leverages the opportunities such businesses can offer?

Surely, without doing so, South Carolina will continue to face one of its greatest dilemmas, the continued under-education of its young people, which is a tremendous drain on the greatest resource that this state of great natural resources possesses.

Out-migration haunted Ireland for generations. The country turned this problem around in the 1990s, and now enjoys an influx of talent that its own returning sons and daughters and highly educated people from around the world. Surely, South Carolina can do the same confronting the under-education crisis here, *and I think crisis is the right term*. Can South Carolina come up with its own version of the Morrill Act? Its own southern version of the Celtic Tiger?

The objection will be that you don't have the money. The objection will be that this idea threatens the system of today. The objection will be that the problem is private industry's, not government.

Such objections did not stand in the way of finding the land to sell to fund the Morrill Act. What is the equivalent for South Carolina of such a bold, transformative step? Find it, and take it.

I say it again: *Be afraid.* I have always found fear a good motivator. I think it is fear that keeps Ireland committed to SFI and its other state investments in R&D. I think fear is part of Arizona's motivation.

We live in the richest country in the world. South Carolina is one of the most historically and culturally rich states in America, and it has outstanding natural resources and a powerful location advantage from its special position along the Eastern seaboard. I hope South Carolina will take advantage of every strength it possesses. But it must start with the potential of its children, and build from there. I trust you all know, as educators and as leaders, that the greatest secret of South Carolina's future is in plain view: its children. They become the engine of innovation – “brainware” for the 21st Century.

On that note, let me call upon the words of someone who also knows firsthand the severity of our competitive situation. Craig Barrett, Intel's CEO, is on the Board of Science Foundation Arizona. He said something that has stuck in mind for its quick encapsulation of the challenge every state in our country faces.

He observed, “There has been a once-in-a-lifetime event that has taken place – the infusion almost overnight of about half of the world's population in the free economic system. That has meant increased competition because. They have lots of well educated people (who)....can do just about any job we do in the United States....No job is safe and secure in the United States by right. It's only safe and secure as long as we have best education system, the best ideas, the best productivity.”

South Carolina has many riches of talent, including this group. I hope you will lead the way for South Carolina. We're certainly going to try in Arizona. I'd like to be alongside you in the race.

Thank you for the opportunity to be with you this evening. Either you control the destiny of South Carolina or you cede the responsibility for it to others. I think we owe it to our children and grandchildren to renew and re-build a truly competitive civil society. There is no reason it can't happen in South Carolina and Arizona.

And, as Moffett Kendrick taught me years ago, don't go on the racket ball court unless you intend to win! It's time for this great state to suit up and engage in the 21st century and recognize success will come to the state/people that understand brains and speed are

key – bureaucracy and petty competition will fail. Work together. Create the incentives to insure cooperation for SC, inc.