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Using Pro-Growth Public Policy to Create a Real Strategy for American Innovation

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Abstract: *Increasingly, policymakers are focused on entrepreneurial innovation as a key to unlocking higher levels of economic growth. With the economy still functioning at a sub-par level and the unemployment rate a stagnant 9 percent, many people believe that only heightened entrepreneurial activity can get America moving again. President Obama shares this viewpoint, and legislative bodies at all levels have been intensifying their focus on this policy. However, what is the role of government in nurturing innovative products, services, and business ideas? Is government, through its banking and regulatory roles, the guiding hand that leads entrepreneurs toward socially and economically beneficial innovation? Or does government best support the growth of innovation by providing a non-intrusive institutional environment within which entrepreneurs create new things? In what ways can the government foster innovation, and in what ways is government a hindrance?*

WILLIAM W. BEACH: It is widely understood that the economy is not growing at nearly its potential, and there's a risk that it may not grow at its potential for a long time to come. You have to ask yourself the question, Why? I'm sure there are many reasons, among them being that government is too big and the taxes are too high, but in the end, the cutting edge of economic growth is defined by the economy's ability to innovate and change. In the end, economic growth is really not about population change and technical capacity; it's about the ability of human beings to adjust to a changing world. They do that through innovation.

Talking Points

- Economic growth is really not about population change and technical capacity. It is about the ability of human beings to adjust to a changing world through innovation.
- Prescriptions on why and how states should (for example) spend millions of dollars on state-run venture funds, create a position in the state department of education for an entrepreneurship education czar, and give away subsidies, grants, and subsidized loans to entrepreneurs who want to start businesses are recipes for bigger government, not for a dynamic private sector.
- Talking about economic growth means talking about what can be done to promote innovation.
- Some believe that the more government aid is provided, the more innovation will occur. In truth, however, it is changing the institutional setting for innovation that leads to more economic growth.

This paper, in its entirety, can be found at:
http://report.heritage.org/hl1189

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When we talk about economic growth, we're really talking about what we can do to promote innovation. We applaud President Obama's interest in this subject. Unfortunately, the way that the Administration may be looking at innovation is to think of it very much like filling a public policy "swimming pool" with subsidies and other types of aid: The more aid or "water" you have in it, the more innovation will occur.

That's not our view. We believe that you have to change the conditions or the institutional setting for innovation. By doing that, you'll get more economic growth.

Heritage analysts are continuing and accelerating a major research effort on innovation and entrepreneurship, of which this program is a part. I'd like to point out Nick Loris, who has been helping us organize this program and is doing some of the work in this area, and I want to thank Patrick Tyrrell for helping bring this group together. We are joined by Dr. Russell Sobel, Dr. Tony Woodlief, and André Andonian. I'm going to introduce each one of them and then invite Russell to start this panel discussion.

Russell Sobel is professor of economics and holder of the James Clark Coffman Distinguished Chair in Entrepreneurial Studies at West Virginia University and has published extensively in this area, with over 150 books and articles in economic policy, including a national best-selling principles of economics textbook that a number of us have used in the classroom. He's edited books on West Virginia economic policy; *Unleashing Capitalism: Why Prosperity Stops at the West Virginia Border and How to Fix It* is perhaps best known. *The Rule of Law: Perspectives on Legal and Judicial Reform in West Virginia* is another.

Following him will be two commentators. We are pleased to have Dr. Tony Woodlief with us this afternoon. For those of you who have been in Washington for a while, you'll remember Tony from his days as president of the Mercatus Institute. He's now Vice President for Academic Programs at the Market-Based Management Institute at Wichita State University. He has been connected to the Charles G. Koch Charitable Foundation, and you'll find in Tony's work an emphasis on the market-based management philosophy and processes that Charles Koch has done so much to develop and put into business use around the world.

Finally, we're honored and pleased to have André Andonian with us. The McKinsey International Group has just published a major study of innovation around the world, and André has been involved with that project. He's with the Stanford office of McKinsey and serves with McKinsey as a director and as a member of McKinsey's Shareholders Council. He's been focusing extensively on technology-based industries, and if you know the McKinsey operation, you know that they're involved in a number of important ventures.

—***William W. Beach*** *is John M. Olin Senior Fellow in Economics and Director of the Center for Data Analysis at The Heritage Foundation.*

RUSSELL S. SOBEL: I'm a professor of economics at West Virginia University, but I also hold an endowed chair in entrepreneurial studies. During my career at West Virginia University, I was also the founding director of the university's Entrepreneurship Center. I started it in 2002 and ran it through 2006.

When I started the Entrepreneurship Center, one of the first things I did was go out and look at the entrepreneurship centers at other universities and try to benchmark what they were doing. There were a lot of other entrepreneurship centers out there doing many different activities, but I think the biggest source of disappointment for me as an economist was that the vast majority of these entrepreneurship centers were run by management faculty, and when they had Web site pages on what state policies or what government can do to promote entrepreneurships, their prescriptions for promoting prosperity and innovation and entrepreneurship were not the prescriptions that I would have suggested.

They were prescriptions on how to grow government. They're filled with pages on such things as why states should spend millions of dollars on state-run venture funds, create a position in the state department of education for an entrepreneurship education czar, and with policies for how to give new government subsidies and grants and subsidized loans to entrepreneurs who want to start businesses.

Economists have done a lot of studies on the effects of policies and institutions on economic growth rates, but they have relatively little to establish the link between policies and institutions and entrepreneurship, which then leads to economic growth.

To me, these were recipes for bigger government. These were recipes for growing government, not for growing the private sector. As an economist who had spent my life researching the role of institutions and policies in economic growth, I started looking to the literature to see what was in economics texts on the role of institutions and policies and promoting entrepreneurship. I was very sad to find out that the majority of that work had not been done in economics; it was over in management by the same people who did all that work trying to grow government.

Economists have a lot of studies on the effects of policies and institutions on economic growth rates, but they have relatively little to establish the link between policies and institutions and entrepreneurship, which then leads to economic growth. So I've spent a lot of my research career trying to focus on this link between policies and institutions and entrepreneurial activity. My presentation today is based on some of the work that I've been doing.

The Importance of Public Policy

I'd like to start out with my very favorite picture. (Click *here* to download Dr. Sobel's PowerPoint presentation.[1]) This is a satellite photo of the Earth at night. When we look around the globe, what we see is some places that are bright and shining with prosperity and wealth, and then sadly there are other places on the face of the globe that remain dark, dim, and impoverished. Economists since the inception of our field have been trying to figure out what's responsible for these differences in prosperity: Why do some places grow rich and others not?

The father of economics, Adam Smith, wrote the very first economics book, appropriately entitled *An Inquiry into the Nature and Causes of the Wealth of Nations*. Smith set out in 1776 to explain why some countries grow rich and others remain poor. We've now had 200 years to research the conclusions that he reached so long ago, and we still believe after looking at the data that Adam Smith hit it right on the head.

In *The Wealth of Nations*, he concludes that it's really a country's policies that matter much more than a lot of the things that other people worry about, like their educational levels or the resources that are available in the economy. For example, a lot of management people think the primary thing that drives growth in entrepreneurship is whether you have natural resources available. When we look around my state, West Virginia, it has one of the most resource-abundant environments in the U.S. and we're one of the poorest states.

I believe this means that public policies clearly matter. Economists since the time of Adam Smith have tried to document exactly what policies are responsible for growth or conducive to growth.

Measuring Change

Several organizations, Heritage among them, have developed indices to measure changes in the institutional or policy setting of economic activity. These indices try to measure how open and economically free the society is: freedom to compete in markets, freedom to compete as an individual in labor markets, as a business in the business sector, freedom from oppressive regulation and taxes.

Basically, they measure a country's reliance on capitalism. When you look around the globe, there is a striking resemblance between country freedom scores and the satellite photo of the Earth at night. The places that are the most open and economically free economies are the ones that are lit up; the least economically free economies are dark.

Let's start by visiting some of the places that score the worst on our indices of economic freedom. The first place is Zimbabwe. This is what life

1. Dr. Sobel's PowerPoint presentation is available online at *http://thf_media.s3.amazonaws.com/2011/ppt/2011-03-14-Innovation-Sobel.pdf.*

is like in Zimbabwe. There are people sitting in the sand around what look like garbage cans filled with porridge being cooked over firewood bonfires. The important thing to notice is that if that was a picture from 50 years ago, it would look not much different. What's going on in Zimbabwe is that things are staying pretty much the same through time. There's a real lack of innovation, of progress; the technologies that they have available aren't really different from what they were decades ago.

Let's move on up the ladder to a country that has low economic freedom but is not as bad. Romania was part of the former Soviet Bloc. They've tried to institute some reforms, but they're still listed as being very economically unfree. This is what life is like in Romania. The difference between their stores and ours is that ours have things on the shelf.

When you look around the globe, there is a striking resemblance between country freedom scores and the satellite photo of the Earth at night. The places that are the most open and economically free are the ones that are lit up; the least economically free economies are dark.

Some people think that in places like Romania, which is apparently still stuck in the 1950s and '60s with a lack of innovation, the problem is that they don't have enough entrepreneurs. The reason places like this are poor, they say, is there's nobody there who's innovative and entrepreneurial, unlike in America. Too bad they don't have entrepreneurs. Too bad they don't have individuals there who are creative enough to think outside the box.

Look at the next two pictures and tell me if that's true of the average Romanian. There is a picture of a man standing on top of a bale of hay on top of a small car. This is what they do in a world without the resources they need. They have to make do. Romania is starting to open up and grow, but they have a long way to go before their technology and infrastructure allow them to move to the 21st century.

Things start looking a little bit better in India. They actually have real capital equipment; people look like they're doing productive things.

Now let's look at two countries up near the top of the freedom index. The first is Hong Kong. Fifty years ago, Hong Kong was as poor as Africa. In 50 years, the island of Hong Kong, a volcanic island with no natural resources buried under its ground and not even enough drinking water for its own population, has grown from a place as impoverished as Africa to now having a per capita income as high as the U.S. and England with our centuries of history. That is not what Hong Kong was like five years or 10 years ago. There's innovation and growth, as there is in the U.S.

Fostering Entrepreneurship

Economic freedom helps to promote prosperity because it fosters entrepreneurship. It's decentralized innovation and entrepreneurship that really are the sources of prosperity. Entrepreneurs keep inventing new things that improve our way of living. Just look at our houses and how they've changed. My students today are surprised to learn that when I was growing up, most houses in America only had one bathroom for the whole family to share. My daughter lives in a world where she has her own bathroom. That may not be very important, but it's a signal of how times have changed. The vast majority of homes today have central heating and air conditioning, while when my parents were young, three-fourths of the homes in America did not.

But it's not just about these numbers. Things the numbers describe are better as well. Look at this comparison of bathrooms 50 years ago and now. Here is a picture of the older one, a bathroom I used at the College of Charleston in South Carolina. Their faculty housing when they have visitors is an old house, and the picture reveals the whole history of the bathroom if you look closely. It was a claw-foot tub; then they added plumbing into it; then they ran a shower up and put a curtain around it.

Then look at today's bathroom in this second picture. I think the most underappreciated entrepreneur of all time has to be Mr. Jacuzzi. I don't think anybody knows his story, and every one of us has had such a great time with his product.

Now look at this picture. This is really an improvement in our standard of living. These are our cars. The old ones look pretty cool, but they're not a lot of fun to drive to Grandma's house. Our cars today are so much better than they were, and they're so much safer.

Here is a picture of our phones. Look at how phone technology has changed over time. The thing that really upsets me is when my students are complaining about the price of an iPhone, because what they don't realize is, this 1980s cell phone cost about $4,000. This thing is one-tenth the price of that one in nominal terms, and it connects to the Internet and does lots of other great stuff.

Economic freedom helps to promote prosperity because it fosters entrepreneurship. It's decentralized innovation and entrepreneurship that really are the sources of prosperity.

Our entertainment has changed: We now have virtual movie theaters in our homes. Our science: A calculator in the '70s cost hundreds of dollars. Our computers: This picture shows a real ad from 1989, about the time I bought my first computer. This is a Radio Shack computer, a Tandy, $8,500, monitor and mouse not included. Today, you can walk in and buy a MacBook Air, top of the line, for less than $1,600.

Our leisure time has been so enhanced as well. I remember this Mattel electronic football game. This was the best thing ever invented at the time. This was the first portable video game for that two-day trip to Grandma's. You could sit in the back of the car and play it. We thought nothing could ever be invented better than that game until they came out with Atari football. We were at my house every afternoon after high school playing Atari football. We thought, how can it get any better than this? Today, I play Madden Football. It's so good that my wife and daughter come down and think I'm watching a football game. It's unbelievable, the progress we've made.

This slide really sums it up for me because my family did have the early Atari video game Pong in my house, and my favorite video game today is Rock Band. Mario was fun, but it doesn't make you feel like you're a rock star on stage.

Creative Destruction

Here are more serious things. This picture shows what the average doctor in America would've had had you visited his office in 1900. Do you know what the main ingredient he had to work on you with was? A saw, and there's a bite strip in there so you can bite down while he's sawing your leg off. Yes, medicine is expensive. Now we have machines that can look inside your brain without cutting it open. As a result, our life expectancy has risen from 48 in 1900 to 76 today. In just a matter of a hundred years, we're living 30 years longer.

All this is part of a process called creative destruction. Creative destruction is a process in which new industries are continually invented; others go by the wayside. It's a very disruptive process, and firms that are going by the wayside always fight to get government to step in to protect them from competition. And some governments do; they try to centrally plan their economies by picking the winners and losers. The problem with that is that nobody knows where the future is.

Ken Olsen, chairman and founder of Digital Equipment Corporation, who was basically the Bill Gates of his day, was quoted in *Popular Mechanics* magazine as saying, "There's no reason why anyone would ever want a computer in their home." If Ken Olsen couldn't even figure out where his own industry was going in a matter of five or six years from the date he said that, I don't know how we could expect somebody sitting in Washington or the state capital of West Virginia to know what's going to be feasible.

Of course, the most popular story is Fred Smith, founder and CEO of FedEx. When he turned in the business plan for FedEx as an undergraduate at Yale, his professor turned it back to him and gave him a C on it and wrote in red ink: "The concept is interesting and well-formed, but in order to earn better than a C, the idea must be feasible."

The point is, none of us know the future, whether we're a Yale professor or Bill Gates or Steve Jobs. Even Steve Jobs doesn't know what the future of the computer industry is.

I ask you: If these people came to you asking for investment money, would you give them your life savings? This is Microsoft Company's first photograph. That's Bill Gates down there. Normally, when you give your life savings to a group of people that look like that, they go off and do drugs with it. These people went off and changed the way we live. I don't think a state economic development office would invest in a group like this.

Creative destruction is a process in which new industries are continually invented; others go by the wayside.

Now, I've talked a lot about countries, but differences across states in their policies matter a great deal as well. There are indices that rank the states by economic freedom. One of the reasons why I got very interested in this topic is that in *Economic Freedom of North America*, an index put out by the Fraser Institute,[2] West Virginia, the state I currently live in, ranks 50th in economic freedom and has since the inception of the index. As a result, we've impoverished our state.

Here's how the top five states in economic freedom compare to the bottom five states in important measures of entrepreneurial activity: venture capital investments, patents, sole proprietorship growth, establishment birthrate, and the establishment birthrate for large companies. By any measure you want to construct, there is no question that those states with the most economic freedom also have the most entrepreneurship.

How to Promote Entrepreneurship

So what types of policies can states reform to better promote entrepreneurship?

Let's go to policy number one. First, we want to reduce the barriers to entrepreneurship and create a regulatory review process. I travel around my state giving a lot of speeches, and there's always a couple gas stations I like to stop at along the interstate because I know where they are, and my favorite is this little Go-Mart just off the interstate.

Here's what's on the wall at that convenience store: 13 permits to operate a convenience store in West Virginia. Maybe I need to tell you they don't do open heart surgery in the convenience store; it's just a convenience store.

You wonder where all the mom-and-pop convenience stores and gas stations have gone. You need corporate legal staff and tax attorneys to be able to deal with this process. It's almost impossible to open a business in West Virginia unless you have people who know how to deal with that. When I was running the Entrepreneurship Center, every time I had a student want to open a business, the biggest hurdle they couldn't figure out how to overcome was how to deal with our government.

This is a picture of what's on the wall at a Sam's Club in Morgantown, West Virginia: over 20 permits. Can you imagine something more uniform throughout the U.S. than a Sam's Club? I can't imagine that they need that many permits just to open a store. They don't even sell much stuff that's open. A big-box store needs that many permits in West Virginia.

The problem in West Virginia and a lot of other states is, human beings all make mistakes. We pass regulations, and some of them turn out to be very detrimental. There's no process like a natural profit-and-loss mechanism that's present in markets to get bad regulations off the books. We pass them, they get there, and they get stuck there forever. They're never reviewed and never taken off the books if they're ineffective. We need a regulatory review process that can help us get some of these burdensome regulations repealed.

The second thing we can do is increase the profitability and growth of our entrepreneurs. Probably the most important thing we can do is lower taxes on capital investment. Capital investment is one of the biggest drivers of labor productivity.

This picture shows a feller buncher used in the timber industry in West Virginia. It can raise a logger's wages by about six times per hour, so instead of making 10 dollars an hour, he makes 60 dollars an hour. With one of these you're much more productive than you are with a chainsaw, so you earn

2. Nathan J. Ashby, Amela Karabegović, Fred McMahon, and Avilia Bueno, *Economic Freedom of North America 2010* (Vancouver, BC, Canada: The Fraser Institute, 2010), at *http://www.freetheworld.com/* (March 30, 2011).

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more. The problem is, one of these machines costs a million dollars, and the small entrepreneurs in West Virginia have a hard time affording a million-dollar piece of equipment just for one employee to use every day, particularly when you're having to pay property taxes on that machine over and over and over every year of its life.

We also need legal reforms that help make the cost of doing business more reasonable across states. This certainly varies by state, but in some states like West Virginia that are continually at the bottom of the legal rankings, legal reform is an important part of this process, particularly workplace lawsuits.

Playing Favorites

The next area I want to talk about is a favorite of management professors, and that is playing favorites: giving subsidies to this company but not that company because we think they might win. This is a system economists call crony capitalism. It's a system that looks like capitalism because you have private firms, but it's a system in which the winners and losers are picked by the government and the subsidy.

A famous case documented on TV not too long ago is Serious Materials. They produce windows just like Pella and Anderson and all these others, but because they have really good connections, they tend to get more subsidies than these others do. Their CEO was entrepreneur of the year, and he grew his business through government subsidies and presidential and vice presidential appearances at his factory. The sad part is, the other window-makers have windows that are just as efficient but don't get those favors.

A very famous economist named William Baumol has a theory that's very applicable here. He says that, basically, a society's entrepreneurs get channeled by the government's policies to either productive or unproductive areas. Productive areas means private-sector entrepreneurship, where people create wealth, goods and services that people value. Unproductive entrepreneurship is when people in a society spend their time and talents simply trying to capture government grants, government favors, or pursue lawsuits against other individuals that transfer money around without creating new wealth. The problem with a society that gets mired in transfers is that it wastes resources in the process, getting poorer.

In essence, what Baumol argues is that policies, across countries and across states, when they're bad create an environment where you end up with too many lobbyists and lawyers and not enough scientists and engineers. West Virginia, to put it in perspective, turns out to fit right into Baumol's mode. We've got bad institutions, and what do we have? One of the best states to be a lobbyist or lawyer and one of the worst states to be a scientist or an engineer.

Targeted tax credits and subsidies are the worst possible thing you can do if you want to promote real innovation. Let me share a story that will help to illustrate this. West Virginia has five pages of exemptions from its state sales tax, one of which is for Girl Scout cookies. Do you know how that got in the code? The Girl Scouts spent days in Charleston, West Virginia, lobbying our state legislature, having Girl Scout days, giving away free cookies to get their little exemption.

I don't blame the legislature. I couldn't have said no to the Girl Scouts either. I would've given them the sales tax exemption too. The problem is, the Boy Scouts came to my house at Christmas selling wreaths, and I bought one and had to pay sales tax. That doesn't seem very fair.

I was giving this example as part of a speech in West Virginia. After my speech, guess who came up to me? The head of the West Virginia Boy Scouts, who happened to be in the audience that day. He said, "Well, believe it or not, we're planning to have Boy Scout days at the legislature coming up so we too can get our sales tax exemption."

The problem with selective tax credits and subsidies is twofold.

First, when people spend their time and talents lobbying the government, there's an opportunity cost in terms of their time and talents lost to creating wealth in the private sector. When the Girl Scouts spend three days in Charleston, West Virginia, lobbying our government to get that exemption, we give up three days of what else they could've been doing that would've created wealth. How about selling the cookies? How about helping old ladies across the road? Learning how to build campfires? We gave that up for them to spend three days there to get their exemption.

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Second, and more important, when you start giving selective tax credits and subsidies, it requires that each and every group go out and fight for their own, and if then you measure the amount of time and effort in your state or country devoted to the political process rather than the private sector, what you get is a ton more time spent because each group is having to lobby for their own exemption. It's the Boy Scouts next year; who is it the year after? Some other youth nonprofit.

So all of our youth nonprofits are spending all their time lobbying the legislature. Of course, at least in West Virginia, they'll have career opportunities with that human capital they're learning, but it's not the right way to run an economy.

If you're going to do this, what you should do, instead of giving the Girl Scout exemption in the first place, is to give a one-time exemption for all youth nonprofits at once. Broad-based policies like an exemption for all youth nonprofits would minimize the amount of time and effort that individual groups had to spend fighting for subsidies, therefore leaving their efforts where they better belong—in the private sector to create wealth.

Reducing Government Control and Centralization

Another area that I'd like to talk about is reducing government control and centralization in the economy. One of the reasons West Virginia scores so poorly in these economic freedom indices is the share of government in the economy. In most major industrialized capitalist economies, about 20 percent to 30 percent of their economy is government spending. That's how we recognize a semi-capitalist economy. There are some that do a lot better with lower spending, like Hong Kong.

Would you like to know what government spending is as a share of the West Virginia economy? Fifty-two percent. We're one of only two states in the country where the government leaves less resources for the private sector than it takes for its own use. You just can't be economically free and grow when that much of your society's resources are locked into public-sector institutions that don't innovate well.

The next area is decentralization of government. When we talk about the role of states relative to the role of local governments, we can measure this and then do research on how decentralization affects different things in states. What we find when we do that is that more decentralized states and countries tend to have higher rates of innovation, and higher rates of growth in particular.

More decentralized states and countries tend to have higher rates of innovation, and higher rates of growth in particular.

It's linked to a lot of things. If you just take those business climate scores, we find that decentralized states have better business climates. Local governments compete more than state governments do, and when you decentralize a state, push the spending and responsibility down to the local governments, you get an environment that's more conducive to entrepreneurial activity.

The point about decentralization is this: The policies that would work best in the Eastern Panhandle today aren't the same ones that work the best in southern West Virginia today. Localities need to have the option of being able to control their own destiny. Too much centralization means too many one-size-fits-all policies.

It's not particularly the area of private-sector innovation, but, for example, in West Virginia the teacher pay is mandated to be the same across the state. What that means is that the Eastern Panhandle schools are competing in the D.C. labor market and unable to find teachers at the salaries they're offering, while in southern West Virginia, the salaries being offered for those same teaching positions are the same, and they are way above the market rates, and they might have an ad that will get hundreds of applications per opening.

Recognizing the Fundamentals

In conclusion, what's important to understand is that a policy climate consistent with innovation and entrepreneurship is one that recognizes a few fundamental things. First, entrepreneurship is decentralized and can't be predicted. Policymakers must realize that their job is not to discover the future, but to create an environment in which the residents of the state or the country find and discover the future, that we're powerless as a government to know where the future is, but what we are powered with is the ability to free people, to make it easier on them to roll the dice and experiment.

There are so many new things that we could discover, so many things that we will never know. We always think that things could never get better, and then we wake up in 10 years and there are things that we never dreamed of. It's going to be that way 10 years from now, I hope, in America.

Sometimes it's easy to forget how many new innovations are possible. Let me give an illustration of how this works. When my daughter was just six months old, my wife was sick, and I had to take her to a one-year-old baby birthday down the street. I was the only dad at this birthday party, and I sat my six-month-old drooling baby down on the floor with the other babies and the Fisher Price toys, and there was this one toy that had four holes—red, blue, yellow, green—and four balls—red, blue, yellow, green. Between sticking them in her mouth, she laid all four in the right holes.

The mom sitting across from me, her eyes got about this big, and she said to me simply, "Wow. What are the odds of that?" and I said, "One in 24." That's why you don't invite economists to baby birthday parties, because we know those formulas. There are 24 possible ways to put four balls in four holes, and that doesn't even count subsets like only using three or two or one of them.

The point of this is that if our economy only had four resources to work with, we could make 24 possible goods and services just with all four, but the American economy has a lot more than four resources to work with. There's a mathematician who's become very famous on Yahoo recently for claiming that every time you shuffle a deck of cards, you come up with a new combination of cards that's never before existed in human history. Go back to your office and try to type in "52 factorial" in Excel. It turns out that number's a 68-digit number.

Policymakers must realize that their job is not to discover the future, but to create an environment in which the residents of the state or the country find and discover the future.

So what this mathematician did is assume that every human being that had ever lived on the face of the planet 24 hours a day shuffled cards a thousand times a second and never slept. If every human being that had ever lived on the face of the planet shuffled cards their entire life a thousand times a second, we would've so far gotten through about a fraction of the number of possible combinations in a deck of cards. So the answer is, yes, the odds are pretty high that you're coming across a combination of cards that's never before existed in human history.

That's only with 52 resources to work with. Our economy has a great many more resources and, therefore, an almost infinite number of new possible innovations. What's important to remember is a process that allows entrepreneurs to roll the dice as quickly as possible, experimenting with all these combinations, and get quick feedback on which ones they've stumbled on are good or bad.

That's the role of the profit-and-loss system in the U.S. What we want is a climate that encourages experimentation and an economy that gives quick feedback, undistorted by taxes and subsidies, to those entrepreneurs about the value that they're creating.

TONY WOODLIEF: I know Russell, so I had an idea what he was going to say, and I'm here because I knew I was going to agree. I want to extend what he said a little bit and sharpen a couple things that I think matter and are relevant to the conversation about entrepreneurship that goes on in Washington in particular, because everybody is supposed to love the entrepreneur. We're also supposed to love the small businessman, and too many of us think that those two things are equivalent.

I want to make very clear that they're not equivalent at all, and conflating them can lead to all kinds of problems, especially when you start thinking about the subsidies and things that politicians are fond of handing out because people love them when they hand out subsidies—some of us love them; those of us who are paying for the subsidies tend not to love them.

Defining Entrepreneurialism

I want to suggest that the entrepreneur is not necessarily a business owner. An entrepreneur can be a business owner, and a business owner can be an entrepreneur, but I'm going to suggest that those need to be different things if we want the word "entrepreneur" to mean anything that matters to us.

I think what's happened is that, quite often, academics will define the entrepreneur as a business owner because it's easier to count them. It's like the guy who loses his car keys in the dark alley and then walks around the corner to the streetlight because the light's better there and that's where he looks for his keys. It's easier to measure, but you're not going to find anything that matters. I think that's what academics have done to the concept of the entrepreneur.

That extends to politicians who think, "Well, if we want to promote entrepreneurship, that means we need to hand out money to people who want to start small businesses," which may not be the best way to spend money.

Just to make it more clear, if you doubt this point, think about a time you've had to hire an electrician or a plumber who happens to own his own business, and then he does a crummy job. A couple years ago, I hired a guy who literally dug holes in my yard, and at the end he gave me a bill for digging the holes. The bill was bigger because he dug a lot of holes. He worked hard, and he owned his own business, so according to a lot of professors, he's an entrepreneur, but he didn't really do anything valuable; he dug holes.

What the entrepreneur is doing is a disruptive thing: It's changing what customers want, changing the environment for producers, changing how we use resources, changing how we view the world.

I remember when that happened, I thought about Milton Friedman visiting China, and they showed him this canal project where you have people with shovels digging this miles-long canal. The person escorting him brags and says, "Look, we have all these people employed!" and Milton Friedman says, "Why don't you just give them tablespoons? You could employ them forever."

So digging holes is not necessarily a valuable activity, but this guy would count as an entrepreneur, whereas the guy who invented the Post-it note would not because he doesn't own his business.

I think if we do that, we make the word "entrepreneur" not mean anything that matters anymore. We don't have any traction to understand what's going on in the economy, and what matters in the economy and what we care about is creative destruction. It's one of my favorite terms because it's an oxymoron, like "jumbo shrimp" and "congressional deliberation."

Entrepreneurialism and Creative Destruction

Think of the entrepreneur as someone who drives creative destruction. An entrepreneur sees an unmet need, often before customers themselves see it, and then she takes on the risks that are necessary to profitably fulfill that need. The profit part is really important because if she's not making a profit, she's wasting resources; she's destroying value. So profits are good. Hollywood and too many politicians aside, profits are a good thing, not a bad thing.

This is a disruptive act, if you think about it. What the entrepreneur is doing is a disruptive thing:

It's changing what customers want; it's changing the environment for producers; it's changing how we use resources; it's changing how we view the world quite often. That's important to keep in mind because that's not going to win you friends across the board; some people are going to resist that.

In Washington, the term creative destruction has a different meaning than it does for us, for people who think about economics. Here it too often means the inventive elimination of one's political foes. He was creatively destroyed. "What happened to so-and-so?" "He was creatively destroyed in the last election; you're not going to hear from him again." So this is a city where predation prevails, predatory behavior.

But mankind advances through innovation by people who discover new ways to profitably create more value than was being created before with the same resources. Those are value-creating entrepreneurs, the productive kind. That's the kind of creative destruction that we need in this country, which means we probably need far less of the kind of creative destruction that Washington is used to turning out.

Entrepreneurship is this dynamic, creative act, and arrayed against it are the forces of inertia and predation. That would be underperforming but politically connected businesses, hidebound government bureaucracies, grandstanding politicians who are more concerned with their short-term political gain than with long-term growth and prosperity, and too often labor bosses who oppose the very workplace practices under which their most entrepreneurial members would thrive.

The Rules of Entrepreneurialism

I want to focus on the rules for just a moment. If we want entrepreneurial behavior in this country, then we have to protect, and in many cases restore, the institutions that have led to tremendous human advances over the past several hundred years. I'm talking about property rights and the rule of law, free speech, an unmolested price system, and the widespread understanding that when someone makes the lives of millions of customers better off, she darn well deserves to keep some of the money that she made doing it.

When we reward predation and poor risk-taking and inertia, and at the same time punish wise risk-taking and value creation, we will have stagnation, and that's the death of our society.

My concern is that as we witness predatory classes attack these institutions, the institutions that undergird prosperity, we've seen a concomitant inertia spread among the citizenry—especially among the young. So where once we widely agreed that you get ahead by serving the needs of customers, we're now afflicted with this pervasive sense of entitlement. I spent six years getting an art history degree; give me a job. I tried to flip a vacation home in Florida, and the market went south because of some greedy capitalists; I need a mortgage reduction. I wrecked my multimillion-dollar Ponzi scheme at an investment firm, so now I need a bailout—this pervasive sense that if things happen that are bad for me in the economy, somebody owes me something to fix it.

That's the opposite of the entrepreneurial mindset, which is eyes wide-open risk-taking with the understanding that things may go wrong, and that's part of life, and if things go right, you get paid.

So the rules of the game affect behavior. That's what I'm saying, and when we reward predation and poor risk-taking and inertia, and at the same time punish wise risk-taking and value creation, we won't have creative destruction. We'll have stagnation, and that's the death of our society.

I want to encourage folks listening as well to think about the rules of the game inside your organization. Russell told us about the rules out in society, in economies; think about how those apply inside an organization. We want to reinvigorate an entrepreneurial culture in our society, and we need it in our organizations. Too often, the notion is the geniuses at the top have all the answers, and the rest of us are supposed to do what we're told and not really think. That doesn't really lead to entrepreneurial behavior.

Since we're all pursuing creation of value in a nonprofit, like The Heritage Foundation, or a for-profit entity, we need rules similar to those in an entrepreneurial society. I'll give you some examples.

- We want authority and compensation based on performance rather than tenure or pedigree.
- We want measures of actual value creation rather than activities.
- We want a culture that rewards problem-solving and wise risk-taking rather than fealty and lip service.

So we all want to look at our organizations and ask, Do we have a culture that promotes entrepreneurship internally, or do we have a culture more like West Virginia or the Soviet Union? It's incumbent on us to ask that question about the organizations we're in, especially if we're in organizations that advocate liberty and markets and freedom.

We all know we're supposed to celebrate the entrepreneur, and we should. Now we need to focus on fostering the rules that make him emerge in society, in organizations, and within ourselves.

ANDRÉ ANDONIAN: What I have prepared is a short overview of the study that we've been conducting at McKinsey and that I've been leading. It reflects the point of view of individual companies.

For the past 22 years at McKinsey, I've been serving leading technology and high-growth companies. I led the High Tech practice in EMEA—that's Europe, Middle East and Africa—and since last year, my role has been to lead our new Advanced Industries Sector in the Americas and globally. In my work, I have traveled the globe extensively and visited many of the places Professor Sobel showed us just now during his presentation. Those pictures really resonated with me.

To tell you the truth, I got very worried when I was looking at those pictures of Romania and Zimbabwe and had a similar feeling when I was serving clients in countries like those. I worried about those countries overtaking the developed countries, the U.S. being the leading country. If we lose the edge in innovation, we basically also lose our edge in prosperity and in all other things.

Losing the Innovation Edge

Over the past few years, we have been losing our innovation edge, and I'd say that applies to both the U.S. and Western Europe. I would like to show you some data that support this view. I am hoping that this will be acknowledged and that the right conclusions will be reached, because I still believe it's not too late to change. However, if we wait much longer, then I think at some stage, the Chinese, or the Koreans, or the Indians, or some other nation will push us out of the lead.

At the end of the day, I think we need to take a close look at the industries that aren't commoditized and where ideas still count. We have to create an innovation environment where we can build on what we have. (Click ***here*** to download Mr. Andonian's PowerPoint presentation.[3])

What we have tried to do at McKinsey is create an objective fact base for coming up with our recommendations. So to begin, let me say that a very important question, and one we get asked very often, is what actually creates growth, and what creates innovation?

We have gathered data on where innovation is actually happening geographically. A geographic cluster should be defined in a granular way, and my definition of a cluster in this context would be someplace where you could travel from one end to the other within 45 minutes. Of course, that would also depend on the means of transportation, so if you have a high-speed train, the cluster may be bigger, and if traffic is very congested, then it's much smaller.

The government should not pick winners—either specific technologies or businesses.

Having our cluster definitions allows us to look across an ecosystem and understand the interaction dynamics. If I take the example of the entire U.S., when I start talking about U.S. innovativeness, then you ask immediately, Okay, are we talking about the state-level West Virginia, California, or do we go

3. Mr. Andonian's PowerPoint presentation is available online at *http://thf_media.s3.amazonaws.com/2011/ppt/2011-03-14-Innovation-Andonian.ppt.*

down to Northern California, or do we go down to Palo Alto?

I would argue that the granular level is actually Palo Alto or Silicon Valley, because that's a cluster, and that may be a completely different environment than elsewhere. That's the level we should be looking at. From a global perspective, Hong Kong is an example, and Singapore is another. Those are two clusters—among others—that achieved something in a small space and could blossom.

This is interesting because governments are asking a number of questions: What are the attributes of a successful cluster? What can the government actually do to create a blossoming innovation cluster? And, in some cases, Which industries should we be attracting, or what do we need to do to make sure that they can blossom here? Again, I am also completely with you on this, Russell, and I think the government should not pick winners—either specific technologies or businesses. Government is as bad as anybody else at doing this. It's very difficult to predict the future. But creating a positive environment that is conducive to economic growth is in fact possible.

Companies are asking questions too: Where should I put my next research center? Where should I expand? Usually the question relates to tailwind and headwind. If you're in a cluster that is dynamic, you automatically benefit. If you are in a cluster that has become very slow, you lose out. There are lots of decisions being made; the boards like to reposition their footprint in areas where there are more dynamic clusters. At the end of the day, it's a win-win situation if you can figure out a positive position for your own cluster; you have companies moving their enterprises there because they want to benefit too, and it creates a very positive and self-sustaining cycle.

Wealth and Innovation

I think there is a clear correlation between wealth and capacity for innovation, and there are different ways of measuring these. To study this correlation more deeply, we developed several ways of measuring the various stages of innovation. We differentiated between the ideation phase, the implementation phase, and the commercialization phase.

Let me explain what I mean. Ideation refers to ideas, and, depending on the sector, these often come from universities and academic institutions. We can measure this based on proxies such as the number of new patents taken out or number of scholarly journal articles being published in a cluster—that sort of thing. You can even get a sense of the quality of the publications by looking at how often they are cited by other publications.

Then we look at the implementation phase. That is to say, once the ideas are there, how do you turn that into something that adds value? Here, engineering and creative skills play a key role, and the existence of an entrepreneurial culture becomes very relevant.

Finally, there's the commercialization phase. That's the phase where you scale it up like Apple did with iPod, for instance. I would argue that Apple is extremely good at commercialization. The ideas were around—you can track that back 10 years—so the ideation part was there, even parts of the implementation, and Apple was extremely good at scaling that up. For the commercialization phase, I think that the "economic value added" is a good proxy measure.

In each of these stages, other requirements are important. We did quite a bit of analysis on industry groupings. We took 600 variables, ran correlations. We also did that for specific sub-industries and checked whether the findings actually made sense by looking at the evolution of a sub-industry to make sure the variables were really telling us something.

What came out is a map of the world. Russell Sobel showed us his map with the amount of electric light emitted in each geographic region. This way of looking at the world is a bit different. It has two axes. On the vertical, you see the momentum—that is, how much growth is happening based on patent growth—and on the horizontal, you see how diverse the patents are: Are they just coming from one industry or multiple industries, or are they just coming from one company or one institution or from multiple companies or institutions? By looking at these patent data as a proxy, we can look at all these global clusters based on these common metrics and understand where they are positioned.

The message here is that there are different stages for clusters, and clusters are one way of looking at the world. Some are nascent clusters. They're right at the bottom, so they have little growth and little diversity. Some examples of promising nascent clusters are some of the Middle Eastern countries, like Abu Dhabi, which are making a lot of strategic investments now. They really want to build something there, but they're still in this nascent stage.

Most of the Western countries have lost their dynamic environment and momentum. They have become very complacent.

Then you have "Hot Springs": very dynamic, off-the-charts growth that is only focused on one or very few sectors. Bangalore, India, is a good example of that. A lot of the Indian IT players are in Bangalore. They are trying to create growth in this specific industry, and I would argue they are an example of a cluster that was good as a nascent cluster. They did the right things, and they grew in this sector, and now, to continue this growth, they will need to diversify into additional industries.

That's how a cluster becomes more than just a "Hot Spring–one industry" cluster. That is how a "Hot Spring" becomes a "Silent Lake," if you will, and "Silent Lakes" are where the challenge comes.

Most of the Western countries now have trapped "Silent Lake" clusters. They have lost their dynamic environment and momentum. They have become very complacent. Unnecessary regulation is rampant, things have become really difficult for entrepreneurs, but the situation is not bad enough because people are not starving. The level of wealth is quite good, so there is little appetite to really change things. But over time, we are losing our edge.

I would say most cities in Western European countries—I come from Munich—are in this category of "Silent Lakes." I would say most large U.S. clusters are in this stage as well. If we compare these "Silent Lakes" to "Dynamic Oceans" like a Silicon Valley—places where you have this essential level of creative destruction and constant re-invention going on—you end up with the dynamism of one industry as a "Hot Spring" and also make sure that other industries are creating new things at the same time.

That's a very difficult thing to engineer. That's why there are very few clusters worldwide in this stage. Silicon Valley is still the most successful. If you fail to diversify, you ultimately become a "Shrinking Pool." One that is on the edge and hasn't diversified beyond cars is Detroit here in the U.S. Another example might be Liverpool in the U.K.

What Determines (or Hinders) Success?

So there is a common cluster lifecycle, and now the question is: What determines success, and what hinders it? I would argue there are many things that matter here. These are the criteria, in our opinion, that enable growth in clusters:

- Human capital,
- Infrastructure,
- Financial capital,
- Business environment, and
- Local demand.

To start with, the most important factor is human capital. This includes entrepreneurship, both from a hard and soft aspect. By hard, I mean the pure numbers: having a high number of engineers, number of scientists, people who have essential domain-specific knowledge. Soft factors refer to attitude, willingness to take risk, to communicate and network, etc. We find that these soft aspects are also tremendously important.

Personally, I find that the U.S.—and I noticed this before I moved here—is good in this regard. There is a very positive entrepreneurial culture here. Risk appetite is higher, and the attitude toward wealth accumulation and wealth creation is positive. There are some countries where a more negative attitude prevails and there is a disincentive to say, "Do I want to become a scapegoat? I'm fine with what I'm doing."

Second, infrastructure is important, but this is only true up to a certain degree. After that, you can invest as much as you want, but it doesn't make much of a difference anymore. So infrastructure is an example of a "threshold" enabler.

Third, obviously, access to financial capital in all forms is important, though the level of importance will vary depending on the sector.

Fourth, the business environment—Russell touched on that—is key.

The fifth criterion is also something that comes naturally in the U.S., and that's the size of the local market. That, by definition, gives scale here from day one if you start a business. One of the big challenges in Europe is, if you're in a small country, you have to think about dealing with five, six, seven countries from the beginning while you're just starting up your business. You have to consider all the different regulations and all the things like different customer tastes and so on. That makes it really difficult.

This captures the five criteria that enable growth. There are different variables within these. Some I would call threshold enablers.

Let me use infrastructure, the second criterion, to illustrate what I mean by a threshold enabler. If you look at this closely, you can see that once you are beyond the "Hot Spring" stage, the level of infrastructure doesn't really matter much. You can invest even more in roads, in trains, or whatever, but it no longer matters. You need a certain threshold of infrastructure to advance, but after that it becomes a waste of resources. I would argue that certain cities in China are already reaching a threshold where it is no longer useful to invest in more infrastructure; India has some way to go.

Second, in the case of some enablers, the more you have, the better. Human talent is the big one here—whether this refers to engineers or people with academic degrees.

Third, some enablers can be classed as "world class differentiators." Interestingly enough, one was actually the presence of venture capital funds. This was not just because of the availability of capital, but rather the role local VCs played as incubator and sparring partner for entrepreneurs.

Earlier on, I mentioned that there is an innovation race going on. Let's look at some examples. It took Israel 14 years to go from 50 to 200 patents per year; Singapore took six years, and now only four years for Bangalore. I would argue the next ones will be even faster, perhaps two years. Speed is of the essence here. It's not a situation where you can say, I have to think about this for the next 10 years, and then I'll come up with a good recommendation or solution. By then it will be too late.

The Importance of Human Capital

I would like to focus on the human capital element as a driver for cluster growth because I think this is very relevant for the U.S. From our research, the U.S. has been benefiting a lot from immigration of the right type of talent into the country. This is something that is changing to the detriment of the U.S.

- The talent that immigrated to the U.S. is getting older.
- Reverse talent flow is now taking place. People from outside the U.S. who are very talented and who study here now often choose to go back to their home countries.
- A new breed of talent is now needed that hasn't yet been developed here. As an example, research shows that the number of U.S. patents that come from first- or second-generation immigrants is extremely high. There is no question that the U.S. has benefited greatly from this in the past.

This is my last chart. The percentage of students who stay in the U.S. and the share of students who study outside their home country are decreasing, so apparently more are choosing to go elsewhere rather than stay in the U.S.

To conclude, in order to jump-start or re-create innovation, we have to win what I would call the war for talent to make sure the best people not only continue to come to the U.S., but also choose to stay in the U.S.