A paper featured at the

2010 Topical Symposium:

Economic Security: Neglected Dimension of National Security?

Hosted by:
The Institute for National Strategic Studies
of
The National Defense University

24-25 August 2010

By

CARMEN A. MEDINA

INSS
INSTITUTE FOR NATIONAL STRATEGIC STUDIES

In the new National Security Strategy articulated this year by the Obama administration, prosperity is identified as the second of four US national interests. Specifically, the US seeks a strong, innovative, and growing US economy. In my comments today, I want to focus on that second adjective—innovative. I want to discuss the issue of innovation as it relates to economic security, although I guess I would rather use the term economic prosperity. I chose the topic of Innovation because it's a "thing", a dynamic, that really appeals to me intellectually and psychically. Despite 32 years in the Intelligence Community, I've come to realize that my cognitive orientation is essentially a progressive one. I am much more interested in what can be than in what is.

I'm sure that many of you share my sense that we're living in one of those periodic spurts of progress and innovation that punctuate human history on a fairly regular basis. I'm not prepared to argue that this spurt is unprecedented, although personally I'm inclined to believe the impact of the changes we're seeing now will have particularly profound—dare I say it—unprecedented consequences. For my purposes, it is enough that technological and process-based changes and improvements are bunching up right now in volume and chunkiness rivaling beach traffic approaching the eastbound Bay Bridge on a Friday afternoon.

So how important is it—to our economic-slash-national security for the US to be an important driver of this Innovation Caravan? To answer that question adequately, I indented four additional questions.

1. How important is Innovation to the overall economic health of the US?

2. Where does the US currently stand in the world's innovation index and how are we vectoring?

3. How do our likely peer competitors compare to the US in their innovation potential?

4. What is contributing to the conditions described in the answers to Questions 2 and 3? What are the causes and correlates?

I've tried to take the approach of the so-called objective intelligence analyst in answering these questions. So I'm not going to try to persuade you of my beliefs necessarily, but rather just lay out what I think is known and not known about this topic. When I do have a personal view I will label it clearly as such. I don't expect you all to agree with me, I don't want you to agree with me, although I hope you will find my approach and conclusions credible.

Before proceeding to answer the questions, let me spend a little time providing you with some definitions of Innovation. The World Bank, in a recent report on agricultural innovation, had a definition I liked, which I've paraphrased slightly for efficiency.

> Innovation is neither science nor technology but the application of knowledge of all types to achieve desired social and economic outcomes. Specifically, innovators master and implement the design and production of goods and services that are new to them and/or their societies.

People speak of many different types of Innovation. The taxonomy of Innovation is usually presented in the form of paired concepts that are in opposition to each other. So, for example, people speak of fundamental innovation, which is often technology-based and leads to new industries, as opposed to social innovation, which refers to changes in the way people behave. These changes in societal behavior, for example most people adapting to cell phones or GPS systems, are often essential to harvesting the advantages of fundamental innovations.

Process vs. Product Innovation: The experts generally agree that product innovation often creates jobs; although my question would be does it lead to a net increase in jobs? After all, new products usually displace the individuals working on the old products. Process innovation, however, usually eliminates jobs as few innovators seek to increase labor costs through process improvement.

Then there are several twin-headed taxonomies that strike me as generally describing similar qualities—the extent of change.

Is the Innovation Revolutionary or Evolutionary? This usually is assessed in terms of outcome.

Radical vs. Incremental Innovation. This usually distinguishes ease of adaptation.

Continuous vs. Discontinuous. This distinguishes those innovations that trigger mass extinctions from those that don't.

A final taxonomy pair distinguishes fundamental innovation, this time from applied innovation. In this case fundamental innovation involves science and engineering leading to a new "AHA" moment. Whereas applied innovations take these “AHA” moments and turn them into something utilitarian and in some respects pedestrian.

So with that out of the way, let’s return to the four questions I set out to answer.

1. How important is innovation to the overall health of the US economy?

Although some of the subsequent questions have less clear or authoritative answers, here the facts appear to be without controversy. Everyone agrees that innovation has accounted for most US economic prosperity in the post WWII period. The Department of Commerce notes for example that technology innovation is linked to 75% of US economic growth since WWII.

Perhaps less appreciated—or less appreciated in any case by me until I started to do the research for this talk—is the unique role that venture capital and the modern private equity firm had in fueling post WWII US economic growth. It is generally agreed that the venture capital industry really began in the US in 1946. You had private investment before then—the Transcontinental Railroad was a startup—but the investors were rich individuals acting on their own. (A trend by the way that we appear to be returning to as the amounts required by startups decline precipitously as a result of web services and cloud computing, but that’s another talk.) Venture capital firms in the post WWII environment began by investing in the new businesses started by returning veterans. This was a uniquely American concept at the onset, but Europe caught up by the 1990s.

Venture capital reached its highest percentage of GDP in the mid-1990s at just about 1%, but the cascading effects of venture capital are more significant. The National Venture Capital Association estimated in 2003 that ventured-backed companies were then providing more than 9% of all US employment.

But we don't have to take the lobbying group's word for it. The OECD estimates that in the US firms less than 5 years old have accounted for almost all of the new jobs created in the US economy in the last 25 years. Put another way, established companies have essentially created no net new jobs during that same period. The Kaufman Foundation in a very recent study based on a new set of data from the government called Business Dynamic Statistics analyzes that firms more than a year old actually have destroyed net more than a million jobs since 1977.

Although I couldn't locate a breakdown of exactly how these new jobs link to innovation, I think it is safe to assume that the many of the new firms every year are based on some type of innovation, whether it is fundamental, applied, or social.

So there's no arguing, I think, that the capacity for innovation has been the primary catalyst of US economic growth. (And indeed capitalism essentially is built on innovation and the concept of creative destruction.) But my research suggests to me that, going forward, innovation will be even more critical to US economic prosperity. And that's because our particular economic circumstances today imply that innovation not only will need to contribute all US economic growth but will have the additional burden of compensating for anti-growth dynamics currently infecting the US economy.

Specifically:

1. The financial crisis and the necessary deleveraging occurring in the US economy. Economists agree that the hangover from a debt crisis is the worst kind and lasts the longest. I also have the hunch—very technical analytic term—that this economic downturn is made worse by a simultaneous disruptive secular shift in the economy—from analog to digital. Employment will stay stubbornly high because companies, I believe, are using this downturn to divest themselves of employees and occupations they no longer need in a digital and knowledge economy. (There are some economists who have argued a similar dynamic deepened the Great Depression, which was the occasion that finally allowed—so the argument goes—for the complete unwinding of the agrarian/horse economy that had dominated the US during the 19th century.) The only elegant way for the US to resolve its deficit issues is to grow ourselves out of them. A nice average 5% per annum growth rate for the next ten years might be a good place to start. Unachievable without the frisson of significant innovation. (And I suspect unachievable, period.)

2. The mature nature of the US population. Although there is considerable difference of opinion among academics as to how population growth affects economic growth, particularly for underdeveloped and developing economies, most agree that the declining and aging populations of Western Europe and Japan necessarily cut into economic demand. The US economy is not there, largely because of the positive impact of immigration, but we're also no longer going to benefit from the economic

boost that was provided by the consumption patterns of the baby boomer generation.

So having established that innovation is critical to the future of the US economy, let's turn to Question #2.

2. How are we doing in terms of innovation—specifically, given the focus on national security, relative to other countries?

My exploration of this topic did not reveal as much clarity as on the first question. Measuring where countries stack up on the Innovation Table appears to have become a cottage industry in the last ten years. Let me cite the two most recent and most credible:

A report compiled by the Boston Consulting Group and the National Association of Manufacturers. Like most of these studies it measures innovation inputs and outputs and has the US ranked 8th in the world.

A second report by the Economist Intelligence Unit, sponsored by Cisco, has the US as 4th.

A third report by Insead, the Paris-based economic school, still ranks the US as first in the world in innovation, God bless them. But I did not use it because I wasn't able to readily locate the details on the internet. Both of the reports cited below were published in the last couple of years.

Ranking of National Innovation			
Boston Consulting Group National Association of Manufacturers		Economist Intelligence Unit Cisco Systems	
1.	Singapore	1.	Japan
2.	South Korea	2.	Switzerland
3.	Switzerland	3.	Finland
4.	Iceland	4.	USA
5.	Ireland	5.	Sweden
6.	Hong Kong	6.	Germany
7.	Finland	7.	Taiwan
8.	USA	8.	Netherlands
9.	Japan	9.	Israel
10.	Sweden	10.	Denmark
	China 27th		China 54th
Projected Rankings in 2013			
			Russia 32
			Brazil 45
			China 50
			India 52

What these tables tell me is that the methodology for these studies isn't very exact or agreed upon. Although most people agree on what are innovation inputs (skilled work force, education, R&D expenditures, etc.) innovation outputs are another matter. For example, the number of patents, a popular metric, is criticized by others who argue patents only indicate inventions and societal concepts of intellectual property, not innovation.

I don't know about you, but I can't quite work up a lather of concern because Iceland or Switzerland is considered more innovative than the US. I can say without doubt or equivocation that neither country will become threats to US national security. On the other hand, I believe these studies underestimate where China is—the Status Quo always underestimates the new kid on the block because the Status Quo owns the yardsticks. That said, however, I share the view of many commentators who think China's status as a holder of US debt will be a strategic problem for the US long before China's innovation capacity. It should matter in the long term, of course, but by then China will be dealing with its own structural problems, such as the graying of their labor force.

There is, however, no doubt that the US capacity for innovation has declined in relative and absolute terms over let's say the last 20 years or so. Our standing on these inexact charts has consistently declined. Other evidence points to a less vibrant American economy. For example, according to Deloitte's Center for the Edge, the rate of return of US assets has declined by 75% since 1965.

We've already begun to touch upon the Third Question.

3. How do our likely peer competitors compare to the US in terms of their Innovation potential?

   We've already discussed China's innovation performance and my instinct that the methods of measurement discount China's progress. Other potential national security concerns for the US, such as Russia, are essentially non issues, according to these studies, when it comes to economic innovation. Obviously Russia, given its strong performance on pure scientific research, retains the potential for military innovations but its economy, which is dwarfed by China's in any case, is increasingly based on exploitation of natural resources and is not poised for strong growth or innovation.

At first blush then, the European Union and China then are the two coherent economic powers that could deny the US leadership of—or a significant share of the economic innovations that will shape the 21st century. But a broader trend, the emergence of the BRIC economies—Brazil, Russia, India, and China—will, if Goldman Sachs is right in its projections earlier this year—fundamentally alter the world economic map by 2020. (By the way, I bet Goldman Sachs regrets its inclusion of Russia in this list given the developments of the last decade. The Economist Intelligence Unit indeed only speaks of the BIC.)

Let me quote directly from the Goldman Sachs report, which can be found on their website.

> Our baseline projections, underpinned by demographics, a process of capital accumulation and a process of productivity catchup, envisage that the BRICs, as an aggregate, will overtake the US by 2018. In terms of the size of the economy, by 2020 Brazil will be larger than Italy. India and Russia will be individually larger than Spain, Canada, or Italy. By 2020 we expect the BRICs to account for a third of the global economy and contribute about 49% of global GDP growth.

One of my favorite analytic sayings/precepts is that quantity has a quality all its own. (Josef Stalin) This kind of change in the global economy will have profound effects on the world which we in the West, in my view, are inclined to not even want to think about. And it only serves to underscore the argument that US economic prosperity depends upon our capacity for innovation, by which I mean that only innovation will allow us to fight about our weight class (i.e. absolute size of our economy—largely a function of demographics and maturity.)

So back to China and the EU. While many of the most innovative countries are in the EU, it is still hard to imagine the circumstances by which the EU becomes a peer competitor for the US, which returns us to China. Although China, in the EIU survey, is projected to rise to 50th in the Innovation Index by 2013, its low ranking is deceptive. China has risen 9 places in just 5 years, a rate faster than the EIU anticipated. In a separate study of Innovation in BRIC economies published last year in the journal Research Technology Management, it was noted that in 1995 the patent count, duly caveated by my earlier discussion, of China was the same as Brazil's. Now it is 7 times that of Brazil.

John Seely Brown and John Hagel, at the 2006 Davos conference, asserted that China is now the world leader in management innovation. I'm not clear as to the basis for their claim, but I do believe, as I've mentioned before, that the methodologies used to rate innovation by country are based, unavoidably, on how the West has done it and thus have a tendency not to appreciate how countries such as China, Brazil, and India might be doing things differently.

In theory, China's success (or any other country's) at innovation need not pose a problem for the US. But it can affect US economic capacity if US-based multinationals choose to divert more of their R&D efforts to China, which is graduating scientists and engineers at an incredible rate. The US, as we have discussed, is lagging badly on STEM education. If Chinese and Indian graduates stop wanting to work and live in the US, our innovation potential suffers. (By some estimates, Indian immigrants lead up to a third of the startups in Silicon Valley.) Finally, the economic advantage of innovation, that surplus income, goes to those who do it first and well. The more countries that have the skilled workforce and modern economic base for innovation, the harder it will be for the US to be first to the pole.

Let me be clear here. I'm not suggesting any malice or nefarious intent on the part of any other nation. These trends have impact regardless of the policies of specific governments. It's really just a matter of physics and arithmetic.

The Fourth Question

4. Why is the US losing momentum in economic innovation? The literature presented several compelling reasons. We've already discussed one, the US is falling behind in STEM education. Given the size of China and India's population, we will never be able to match them numerically, but at the rate we're going, the US will simply be overwhelmed.

   A second related issue is a current workforce that needs new training and skills.

   A third reason is the inadequate US federal and state government support for an innovation-friendly environment. We lag many other parts of the world. I'm not necessarily advocating increased federal R&D spending, which I suspect is not the answer. But today the US, for example, ranks 17th among OECD countries in the generosity of its tax credits for R&D. France is four times more generous than the US, according to the Information Technology and Innovation Foundation. This is not good.

A fourth factor points to the short term perspective of too many US companies and their outdated-slash-myopic management/leadership concepts. Steve Denning, a leadership consultant, notes that the management principles of most US companies are scalable bureaucracy. Bureaucracy is of course the natural predator of innovation. As a personal observation too many US companies seem to have become quite innovative in inventing ways to use fees to bolster their bottom lines rather than seeking to innovate a new product or process.

Finally, I also believe but have no sources or citations for support that the US, as a society and culture and economy, suffers from having transitioned into a Status Quo mentality. When I listen to the public debate, which I try to avoid, I hear altogether too much about preserving what we have or returning to core values. Having been a student of dozens of countries over the last 30 years, I believe I can detect the difference in the vocabulary and body language of a nation looking forward versus that of a nation looking to preserve what it has.

So let me share some concluding personal opinions that I think you may find negative or positive, depending upon your perspective.

1. Innovation is our economic strong suit but it will not solve all of the US economic problems. It can create many jobs, but my hunch is we are undergoing a significant transition in labor markets and the nature of jobs. It will not cure our debt problem.
2. As we transition from the knowledge economy, already OLD HAT, to the Creative economy, we are shifting away from economic concepts that can be captured in nationalistic or mercantilistic terms. (The Chinese, by the way, issue statements and doctrine that suggests they

don't quite believe this.) National boundaries are not only irrelevant to knowledge and creativity, they are actually counterproductive. Innovation is becoming more collaborative. So what do the terms economic and national security mean then?

3. In my opinion, we are focusing on security and spending on military matters out of proportion to our economic capability and economic potential. (By the way the experts tell us that our spending on health is similarly out of whack.) Paul Kennedy in his seminal book the Rise and Fall of the Great Powers, written during the 80s I believe, argued that such disproportionate spending is an indicator of a declining great power. There is presumably an optimum balance between wealth creation and military strength. Are we there yet?
4. The conditions I've described are not a platform for continued US "dominance" of the world. We don't want to talk about it, but the US economy will not support single, great power dominance once our economy represents only about 10% of the world economy, vice the 50% it represented after WWII.

I always want to tell young people just starting their careers that their greatest challenge will be to help the US make the adjustment from great power status to a more complex but I believe still quite comfortable relationship with many peers. Our choice is clear: we can either not talk about reality and continue patterns of deficit spending that will only hasten a messy denouement or we can begin to make the intelligent choices today that will ensure we remain the most influential society in the world even as we relinquish the only superpower status.

Thanks.