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“American Innovation in Crisis”

by

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Good morning.

I'd like to thank Doug Maughan and DHS for their gracious invitation to address this gathering of distinguished technology entrepreneurs who are focusing their talents on protecting the security of our nation's critical infrastructure.

“Crisis” seems to be the common thread in everything we see on television or read in the popular media. I do not use the words “American Innovation in Crisis” lightly. As a venture capitalist, an entrepreneur, and an American, I am very concerned about the state of innovation in our country today. I believe that we need to be proactive in addressing the innovation crisis because the consequences for the future of our country are simply unacceptable if we don't.

What is this innovation crisis?

Innovation and entrepreneurship, the crucial growth engines of the U.S. economy, are at risk of stalling out due to the

convergence of three major negative trends. The first two trends have been developing for decades, and the third has precipitated a potential disaster for our country's future leadership in innovation.

The first negative trend concerns decades of American spending on research and development emphasizing incremental innovation and commercialization at the expense of basic research. While both incremental innovation and basic research are necessary, by emphasizing the former, our country has increased the long-term economic risks associated with under-investment in basic research.

Second, since the mid-1990's, the United States has reduced the intensity of overall R&D funding as a percentage of GDP at the same time that the nature of global competitiveness in business has fundamentally changed;

And third, the recent and ongoing global financial crisis has induced the systemic failure of large financial institutions, severely curtailing an already diminished pool of risk capital to fund future innovation and draining liquidity from the public equity capital markets. This combination has had particularly devastating effects on emerging growth companies.

Why is the interest rate paid by the U.S. Government to issue debt practically zero today while the private sector remains starved for access to credit? Because investors around the globe are so thoroughly afraid to take any risk that they are willing to accept zero nominal return from the government in order to know that they will at least get their principal back.

The risk premium for non-investment grade corporate debt, which is calculated as the interest rate spread between treasuries and these private debt instruments, is wider today than at any time after the dot-com collapse or at the height of the Enron

scandal. And this has happened before, in Japan during the mid 1990's, when risk avoidance among investors became so prevalent that the Japanese government could issue new debt with virtually no coupon— at the same time that the rest of the economy withered from a lack of access to capital.

Ironically, precisely at the time when we most need long-term risk capital to plant the seeds for the next generation of breakthrough innovations and to fuel sustainable job growth in America, these factors have conspired to drain the risk capital that is the lifeblood of our economy. This financial dislocation dims what could otherwise be a bright future for the next generation of American entrepreneurs.

Business entrepreneurs, soldiers, and statesmen, who all shared the willingness to take long-term risks with no assurance of success, built America. Our country's sustainable economic growth has been fueled for decades by breakthrough innovations in science and technology, many of which originated inside government research organizations before migrating into the private sector.

Wireless and optical technologies all came from ambitious, large corporate research initiatives. The iconic Bell Labs now symbolizes both the great heights to which American corporate research ascended, and its demise only testifies to the long-term decline in U.S. corporate research.

The vertically integrated corporate research model led to breakthrough technologies from UNIX, to the transistor, to the first integrated circuits, to lasers, and to the first mobile phones. Just as many Silicon Valley startups have sprouted from technologies that originated at Bell Labs, everyone knows that the Internet of today originated as a government and university network funded by ARPA in the 1960's and 1970's. Many of the

advances in wireless technology came from military applications, and much of the work that led to integrated circuits, as well as surgical innovations such as miniature cameras and advanced materials, originated with NASA sponsored programs.

This type of ambitious government-sponsored research originated in the Eisenhower administration, buoyed by our nation's will to fight the Cold War and to keep America ahead of the Soviets.

Even today, our government sponsored research organizations lead in scientific innovation. In August 2008, the National Renewal Energy Laboratory (NREL), which is part of the Department of Energy, set the world record in solar efficiency for a photovoltaic device, at 40.8% solar light conversion efficiency, which not only broke their previous record, but is also approximately twice as efficient as the best commercially available solar cell technology.

The innovation challenge that we face is not about finding leading technologies and simply commercializing them; our challenge centers on promoting effective innovation partnerships between government and university research organizations, corporations, and entrepreneurs. We must also foster the interactions that can lead to interdisciplinary cooperation between experts in different technology fields that can lead to breakthrough innovation.

How do we accomplish this?

We need to restore the special link that exists between innovation and risk-taking in our country. We need to reaffirm that American entrepreneurs can feel comfortable risking failure on the road to long-term success. Venture capitalists must continue to play a key role in this process. As we help build companies from ideas to reality, we provide important business process and pattern

recognition advice to entrepreneurs facing common, but still difficult, business challenges for the first time.

What makes America unique is our entrepreneurial culture, and the success of that culture relies on the understanding that, in our society, entrepreneurs are rewarded for having the courage to correct course when things aren't progressing, and they are given additional financial and intellectual resources so that they can refine, and sometimes even reinvent, their business models on the road to success. American entrepreneurs are expected to have the tenacity and conviction necessary to pick themselves up after falling, to stay on the entrepreneurial horse, and to relentlessly move forward. Our society's tolerance for risk-taking and our willingness to support the long-term development required for visionary, breakthrough ideas to bear fruit make American entrepreneurs all the more likely to succeed.

The acceptance of failure as part of the learning process is the 'special recipe' behind American know-how and the legendary success of serial entrepreneurs from Howard Hughes to Steve Jobs, from Andy Grove to Oprah Winfrey, from Estee Lauder to Martha Stewart. Our entrepreneurial culture has also historically set America apart from many other countries that seek to replicate the American model because few other cultures empower exceptional individuals to take open-ended business risk.

In Silicon Valley today, Judy Estrin is a successful entrepreneur who is widely recognized as a leading innovator and thought leader. She understands the power of risk-taking and the acceptance of failure as part of the learning process. She is the former CTO of Cisco Systems, and she has recently written an important book on the topic, **Closing the Innovation Gap**.

SLIDE 1

Ms. Estrin describes innovation as a virtuous circle of research, development and application, all of which must be pursued together in order to maintain a competitive edge.

In this book, Ms. Estrin convincingly argues, and I quote verbatim, that *“our national research community is suffering from neglect. Its contributions to the products that we use, the medicines we take, and the foods we eat have been nearly forgotten. Investment has been decreasing and horizons shortening as requirements and competition have increased. The OECD recently ranked the United States 22nd in the percentage of GDP devoted to non-defense research. Developing a research discovery into a commercial application can take decades, and the damage caused by underinvestment often is not visible until it’s too late. The country needs to invest in the full spectrum.”*

SLIDE 2

An increasing number of experts in the technology development ecosystem are concluding that there is an unhealthy and unsustainable imbalance between diminished resources devoted to planting the seeds for breakthrough new ideas and excessive harvesting of the fruit from breakthrough ideas that flowered 30 years ago.

In short, the historic equilibrium of the American innovation ecosystem no longer holds.

Estrin takes the position that, over a span of several decades, America has relied too much on incremental innovation-- in business, in academia, and in corporate R&D, at the expense of the pure open-ended scientific research that eventually leads to truly breakthrough innovation. She concludes that we not only

need to harvest the benefits of the past, but also plant new innovation seeds at a far faster pace. From my perspective as a venture capitalist, these conclusions are not only important in the context of their long-term implications but also because the nature of global competitiveness has changed.

Financing in general and long-term risk capital in particular are very difficult to access today. But our nation cannot tolerate the consequences of reduced private funding for breakthrough innovation at the same time that our government-sponsored basic research is withering. Long-term risk capital is essential to support the innovation ecosystem in our country, and its extended absence will have long-term, negative consequences to our economy and to our society.

According to Steven Ezell of the Information Technology & Innovation Foundation (ITIF), *“compared with other industrialized democracies, the U.S. government invests relatively little in innovation-promotion efforts. In fiscal year 2006, the Federal government spent a total of \$2.7 billion, or 0.02% of gross domestic product, on its principal innovation programs and agencies [.] . . if the United States wanted to match Finland’s outlays per dollar of GDP, it would have to invest \$34 billion per year.”*

Taking a different point of view, the RAND corporation issued a report in 2008 asserting that *“the United States continues to lead the world in most key science and technology measures and therefore concerns about threats to the state of U.S. competitiveness are alarmist and overblown.”* I find it hard to believe that anyone could responsibly take this backward-looking position when the underlying facts about the state of the world today suggest otherwise.

Anecdotally, to find evidence of the profoundly changed global competitive landscape, we need only consider that anyone active in cyber-security knows that the United States government and our large corporations are involved in a 24/7 cyber war focused on defending our critical data and communications infrastructure against attacks by increasingly sophisticated and well-funded foreign organizations. The media is filled with accounts of serious breaches of our private and governmental data, and the trend data reveal that these breaches are occurring with increasing frequency and on a larger and larger scale. Considering the risks to our critical infrastructure from these attacks, I was surprised to learn that, out of a total Federal R&D budget of \$143 billion for 2009, only \$300 million, or approximately two tenths of one percent, is budgeted to be spent on cybersecurity R&D.

In a different report, Ezell and Robert Atkinson, also of the Information Technology & Innovation Foundation (ITIF) soundly rebut the RAND report on multiple levels— most convincingly from the perspective that the playing field for global competition has changed in many ways that are disadvantageous to the United States.

SLIDE 3

Ezell and Atkinson's work identifies the United States as one of only a few nations where total investment in R&D as a share of GDP fell from 1992 to 2005, largely because of a decline in public R&D support. Comparing the United States to a group of competing industrial countries for the years 1991 – 2003, the researchers produced the chart that is now up on the screen, depicting the percent change in the R&D/GDP ratio over this period. This data clearly illustrates how U.S. R&D intensity has weakened against peer countries.

I suspect that, once it is available, the data since 2003 will show that this comparison has only gotten worse for our country over the past five years.

Of even greater concern is the fact that the collateral damage from the global financial crisis, left unanswered, will have the impact of accelerating further reductions of US government R&D spending— this will only add to the debilitating impact of reduced private sector spending on R&D as millions of jobs have been eliminated over the past fourteen months, with more job losses expected as the year wears on.

I believe this is a critical situation. We should be worried because many American businesses, in particular emerging technology companies with best in class products and services, are competing asymmetrically against international companies that are government proxies. In effect, these American businesses engage in international business competition with one hand tied behind their backs. As Ezell and Atkinson point out, international business since 2000 has evolved into an entirely different ballgame, and America appears to be the only country that hasn't figured out the new rules of engagement: *"In the 21st century global economy, nations can no longer be indifferent to the industrial and value-added mix of their economy. Indeed, with the sole exception of the United States, virtually all nations have consciously adopted national policies to "intervene in the market" —in this case to make it easier for corporations to invest in higher value-added activities that create higher-wage jobs in their nation."*

The answer for America is not trade protectionism— the answer is for our country to be proactive as opposed to reactive in addressing the innovation crisis by implementing policies designed to attract, educate, and retain the most skilled and

ambitious scientists throughout the world. We want these domain experts to continue to have compelling incentives to pursue breakthrough innovation in our country. We should not continue to be adding names to Tom Friedman's list of groundbreaking alternative energy technology companies that failed in the U.S., only to be acquired and transplanted into countries like Denmark and Japan, where they became very successful.

Not only are we failing to compete effectively on the international front, as a country we have not articulated a national will to commit the resources necessary to change our approach to international competition in order to maintain an even playing field.

As we consider proactive approaches to promoting innovation, America can learn from the example of successful countries like Finland and, more recently, from China. In an article in Physics Today published in late 2006, Cong Cao, Richard Suttmeier, and Denis Fred Simon analyzed China's 15-year science and technology plan. They point out that, *"according to the "Medium to Long Term Plan for the Development of Science and Technology", China will invest 2.5% of its increasing gross domestic product in R&D by 2020, up from 1.34% in 2005; raise the contributions to economic growth from technological advances to more than 60%, and limit its dependence on imported technology to no more than 30%."* This plan also includes ambitious goals in the areas of developing Chinese scientific thought leadership and domestic Chinese innovation. We can learn a great deal from this type of coordinated support of entrepreneurs and innovation and should consider formulating and implementing an equally ambitious plan for America.

Where is America's 15 year science and technology plan?

The Obama economic stimulus plan takes some clear steps in the right direction, as it contains billions of dollars in appropriations to make R& D investments in science. It is important to note that provisions in the ARRA actually recapture much of the funding that was authorized, but never appropriated, under the bipartisan America COMPETES Act of 2007, correcting several years of flat and declining Federal funding for the nation's research and economic development communities. These appropriations include \$3 billion in additional funding for the NSF, \$1.6 billion for the DOE's Office of Science, \$600 million for NIST, \$1 billion for NASA, and \$8.2 billion for NIH. Specific programs do include basic research in the physical sciences, climate change research, and biomedical research. It is also clear that the Obama administration broadly embraces substantial new funding for Cleantech as part of a national strategy for oil independence.

My point is that our innovation ecosystem faces severe structural problems in a radically different global business environment. These steps, while positive, do not address the underlying issues, and they lack an overall cohesive vision that our national predicament desperately demands.

I recognize that, in many respects, the notion of having such a comprehensive plan in America goes contrary to the free market approach that has historically separated private entrepreneurs from the government.

As a venture capitalist, while I have great confidence in entrepreneurs, I also see that the playing field has changed fundamentally in our digitally networked global markets. Faith in free markets alone is insufficient when mercantilist nations intimately link their political goals to their commercial goals and use their power to support long-term commitments to innovation.

I firmly believe America's innovation ecosystem is in crisis and that this crisis is becoming progressively more acute. While thought leaders in the technology and venture capital fields are publishing opinion columns and blog posts calling for entrepreneurs to lead our country out of this mess, few focus on the longstanding structural issues that now stand as clear obstacles to the success of this collective entrepreneurial call to arms.

Innovation, American know-how, entrepreneurs, these are the foundations of American success. But our foundations are crumbling--we are living through a crisis of innovation in this country, and the implications of ignoring it or subordinating its resolution to the pressing short-term crises of the day are unacceptable.

I look at the challenges that face our country with great concern because too many Americans appear to have lost their long-term perspective. The question we must answer is, do we have the will to make the personal sacrifices and to take the required risks to pursue breakthrough innovation? If not, I find it hard to see how we are going to create the millions of new jobs that we need and that will lead us to a new cycle of sustainable, long-term economic growth.

Our political and business leadership must develop a comprehensive plan in the form of an effective public-private partnership to renew America's focus on long-term risk taking in order to nurture the entrepreneurs who represent the genetic material of progress in this country. New robust and liquid markets to trade public equities, new investment funds, and public-private partnerships must be created to shift asset allocation back toward a more sensible equilibrium. Creative government solutions, long-term corporate research initiatives,

and venture capitalists willing to take long-term risks to fund innovation can create solutions to reverse this trend.

We must not continue down the path we are currently walking, which is accelerating the crisis in American innovation. Corporate R&D budgets, new university endowment commitments to venture capital, and new commitments by private investors to funding of entrepreneurs are all declining in real time. The negative ripple effect from this collectively reduced pool of risk capital is not yet evident in our economic statistics. But this developing shock wave will have a profound, inhibiting impact on the formation of new small business ventures, the engines of growth that drive job creation in America. We must act decisively now to protect the continued longevity of America's innovation leadership before we find ourselves looking in the rear view mirror, yet again, and asking, "how did this happen?"

Thank you

Pascal N. Levensohn

Pascal Levensohn is the Founder & Managing Partner of Levensohn Venture Partners (LVP). Founded in 1996, LVP manages \$200 million and invests in emerging companies in the area of Intelligent Infrastructure, specializing in Security, Cleantech, and Digital Media. Mr. Levensohn currently serves on five portfolio company boards, including one NASDAQ public company.

Mr. Levensohn is a director of the National Venture Capital Association (NVCA) and currently chairs the NVCA's Education Committee. He is the principal author of three influential white papers on venture capital board governance best practices, and is a frequent speaker and a media commentator on venture capital trends. Mr. Levensohn is also the 2009 Honorary Forum Chairman of the third annual DHS-sponsored IT Security Entrepreneurs Forum.

Pascal Levensohn has been a professional money manager since 1983 and has extensive experience in public and private equity investing. During his 28-year business career, he worked for many years on Wall Street, principally in the risk arbitrage department at the First Boston Corporation. He joined Richard C. Blum & Associates in San Francisco as a partner in 1990. He is a former co-chairman of the Aspen Institute's Socrates Society and a life member of the Council on Foreign Relations. Pascal Levensohn is a graduate of Harvard College.

ABOUT LEVENSOHN VENTURE PARTNERS

Levensohn Venture Partners (LVP) is a venture capital firm investing in emerging companies in the market area of intelligent infrastructure, specializing in security, cleantech, and digital media. Founded in 1996 and based in San Francisco, California, LVP's portfolio includes recent exits Rapt (Nasdaq "MSFT") <<http://www.rapt.com/>> and Reconnex (NYSE "MFE") <<http://www.reconnex.net/>> and private companies BigFix, Broadlogic, Capella, Shotspotter and Ubicom. For more information, please visit www.levp.com <<http://www.levp.com>>.