

BEFORE THE
FEDERAL CIRCUIT BAR ASSOCIATION
BENCH AND BAR DINNER
BEVERLY WILSHIRE HOTEL
LOS ANGELES, CALIFORNIA
NOVEMBER 7, 2008

My fellow Judges, Ladies and Gentlemen – Good evening.

I must thank you for inviting me to speak about what I believe is the most vexing and urgent challenge we face today. It is a problem which can be easily overlooked in view of our other many national and international problems. We could easily allow this problem to remain unresolved. But this would be disastrous to the future of our country.

The country has just elected a new president. This change provides us with a significant opportunity to consider new solutions to the most demanding needs of our 21st century society – namely education and innovation. Some wonder why we should tie these together, but we must have one in order to have the other. The interdependency is so critical, that one builds on the other. The elements are not interstitial but interdependent.

It is, I believe, a very critical time in our nation's history where education, specifically the education of scientists and

engineers, has not been supported and encouraged by our national leadership as it was in the past. It is not now a national priority.

We have now almost completed the first decade of the 21st century. But have we learned from the major directives taken in the 20th century? I do not believe so.

During the mid-20th century, some of our most advanced technological developments – such as penicillin, radar, harnessing the atom, and development of supersonic jets – are a result and outgrowth of our national objective to winning a world war.

World War II not only resulted in new scientific discoveries, but also in the creation of one of the finest national education programs ever developed by a nation. This was the GI Education Bill, signed by President Roosevelt in 1944. Probably the highest and best investment in education that this country has ever adopted. The return economically, socially, and otherwise from the GI Bill funding gave this country the impetus to develop the second generation of 20th Century technology. The scientists and engineers educated with this funding placed the U.S. as a leader in technological innovations throughout the world.

Some would say that the forces coalesced by miraculous interaction. However, we had visionaries in political leadership who understood the impact of science and technology, such as Dr. Van deVeer Bush and President John F. Kennedy. Many others were also involved, but within the short period of time that we have to discuss these issues, I point to those two as having had a major impact in seeding the groundwork to pursue further development of the educational process in fields of science and technology. Dr. Bush, through his leadership as the science advisor to President Eisenhower and as the founder of the National Science Foundation (NSF), and for his clear understanding of the relationship between education and innovation. President Kennedy, for his willingness and vision to politically lead the nation in 1961 by publicly supporting the landing of a man on the moon before the end of that decade.

These individuals, among others, gave the U.S. a hard shove in the direction of making science and engineering education a leading social objective.

In 1957, this nation was shocked by the Russians placing the "Sputnik" satellite in space. The nation responded by the enactment of the 1958 Defense Act which encouraged the study of

science and engineering by scholarships and low cost loans. Some in this room are the beneficiaries of that government assistance.

During the last half of the 20th century, we also accepted the “best and brightest” from all over the world. We accepted these individuals into our educational system in the United States. We brought them in at both the undergraduate and graduate level. We provided them an opportunity to obtain a formal education in the science and engineering field. Many foreign students took advantage of these opportunities. Upon graduation they remained in the United States and added to the total sum of our technological knowledge and creative innovation.

Statistics support the position that many of these graduates, instead of returning to their home countries remained in the U.S., attracted by the economic opportunities provided within the U.S.

Some of these individuals provided the necessary scientific intelligence along with many Americans in developing transistors, memory chips, and creating the technical and entrepreneurial base for Silicon Valley. They also were instrumental in developing new companies based on cutting edge technology

and sciences concentrated in places such as Boston, Massachusetts and Austin, Texas. For example, Wang Computers, Digital Electronics, Dell, and National Instruments.

This intelligence pool created the opportunities for the U.S. to be considered the leader in many of the sciences and engineering disciplines. We essentially educated the “best and brightest” scientists and engineers from all over the world and nurtured, sustained and maintained them here in the U.S.

We have now become very complacent and have failed to recognize the global education competition which had its incipient stages in the late 20th century and the beginning of the 21st century. Our focus on science and technology education has diminished. We are not willing to expend the necessary investment required to maintain our leadership position. We no longer are attracting the “best and brightest” to the U.S. Other countries with global economies are developing their own educational structures which are competitive and will become even more so in the future. India is committed to establishing five technological universities to compete with MIT. The Chinese educational system is graduating ten times as many scientists and engineers as the U.S. These individuals are now staying in their respective countries because

the educational and economic opportunities offered are in many respects better than what are available in the U.S.

This imbalance and the inability of our educational system to attract the “best and brightest” are diminishing what I call our “science intelligence equity.” It is this equity factor which is being diminished. We have forgone the opportunity of maintaining a transfer of intelligence equity, which I submit, to you, will have a major impact on the future technological innovation in this country.

We have been unable to maintain our educational terms of trade as we had in the past. Innovation is premised directly on our science education equity. There have been empirical studies showing that innovation in a particular country is dependent upon its investment in science and engineering education.

Over the past 20 years, our technological innovation has been our most valuable export. Innovation, I submit, is premised upon and supported by a strong science and engineering educational system. Innovation does not happen overnight, nor is it a flash of genius; it is based upon a long-term investment of educational capital which creates the science intelligence equity necessary to develop innovation in the long term.

We must continue to maintain and reestablish our leadership role as global innovators in order to maintain a competitive edge. Innovation has a direct national impact on the economy and employment. For instance, our GDP in 2006 was 13.2 trillion dollars. We spent \$348 billion in R&D – combined private and public funding. This is 2.6 % of GDP – it is interesting to note that government R&D spending has decreased by 300% from 1964 to a dollar total of 38.6 billion. In real dollar terms, we have diminished our government spending. It is also interesting to note that Japan, South Korea, Germany, and Israel spend a larger percentage of their GDP than the U.S. does in R&D.

Our educational expenditures have not fared any better – in 2006, the total spending for education from pre-K to post graduate was 923 billion dollars – representing 7.4% of GDP – however, GDP from 1999 to 2006 grew by 35% – but the total educational expenditures during this time period increased by only two tenths of 1%.

The U.S. has a major problem. Can we maintain our leadership role without making the required investment, not only in research and development, but also in our educational system?

We must reach out to increase our financial support for our educational system from pre-K to graduate school to make up for the lost “science intelligence equity” factor caused by global education competition.

You are probably now asking yourselves, “Why are we listening to this?” Let me tie it together for you at this point. The U.S. PTO publishes statistics on the number of patents they issue to non-U.S. companies or foreign individuals.

In 2003, the patents issued to non-U.S. companies totaled about thirty-three percent. In 2007 – the total for non-U.S. companies has risen to almost forty-six percent. This is only one metric but an important one: It is only one point on the graph, but it portends a decline in the degree of innovation developed in the U.S. This, I believe, is a direct result of the loss in the “science intelligence equity.” We cannot allow ourselves to continue along this road, because if we lose our commanding position as worldwide innovators, then we not only will be buying our manufactured products from India China and other countries, but they will also provide us with the technological innovation in the future. This means that we will be buying our software, our

medications, and all other technological developments from other countries.

I am sure that in our present economic woes the new President will undertake an additional economic stimulus but, the increase in spending should also be directed more towards funding for education and innovation rather than consumer spending. I know and appreciate that the jump start to the economy requires short term spending, but this will only be a band aid solution. We need long term solutions to these problems accompanied by a new vision from our leaders. The bar association should not be pushing only for patent reform. Your scope is too narrow. You should be involved in the broader public policy discussions pushing for additional spending in science and engineering education to assure our continued leadership in education and innovation.

In order to avoid the loss of our "science intelligence equity," I submit to you that we need to refocus our attention on delivering a first class education, specifically aimed at science and engineering and made available on a broad front to our entire population. We must reconsider the need to spend that percentage of GDP required to structure a new GI Bill type of educational investment in science and engineering in order to assure that our children and

our children's children will have the necessary tools to compete for the leadership in a global economy.

Thank you.