

## **Swords into Plowshares:**

### ***How Tech Transfer (unless we mess it up) Can Help Change the World***

*“Social prosperity means man happy, the citizen free, the nation great.”*

*Victor Hugo in Les Miserables*

There is a pressing need for our profession to speak up on what we are about. A little reflection shows that what we are really doing is fostering international economic development. And what could be more important in the current world situation?

We need to take this larger view. Broad based economic growth is intricately linked with political freedom. Political freedom fosters stable international relations. Stable international relations promote wealth creation. And so the cycle grows.

The economy of the 21<sup>st</sup> Century will be driven by tapping the creativity of the human mind, the greatest unlimited natural resource in the world. And what’s the key for unlocking this treasure?

A strong, dependable intellectual property system.

Too often, we neglect explaining this connection to policy makers. We are seeing this foundation increasingly under attack. This may soon come back to bite us. We must rise to its defense. The stakes are enormous.

As President Abraham Lincoln aptly stated, without a patent system “any man might instantly use what another had invented; so that the inventor had no special advantage from his own invention. The patent system changed this; secured to the inventor, for a limited time, the exclusive use of his invention and thereby added the fuel of interest to the fire of genius, in the discovery and production of new and useful things.”

Recently, I accompanied my former boss, Senator Birch Bayh, to the Licensing Executives Society (LES) meeting in New York City on the 5<sup>th</sup> anniversary of 9/11. Looking around the room as Senator Bayh was speaking; the geographic, ethnic and even religious diversity of the LES audience was remarkable. People were there from all over the world. When he finished, Senator Bayh was asked to meet with a delegation from South America that was hoping to better integrate intellectual property into their region’s economic growth.

It was comforting that in the very shadow of the terrible events of that other September day, here were people from every region of the world building important international partnerships rather than retreating into shells of isolation and fear.

The impressive growth of LES cannot be attributed simply to the importance of licensing, but a much bigger phenomenon. The world economy has never been more interconnected. The public and private sectors are intertwined as never before. In the U.S., new tools such as biotechnology and nanotechnology are direct results of

government funding of research. The human genome project never could have been accomplished wholly by the private sector. The rest of the world is now building on our model for capitalizing economically on such opportunities relying on the foundation of the Bayh-Dole Act of 1980 that opened a new era of public-private sector cooperation in the transfer of new technologies from universities to industry.

This system relies on bottom up incentives rather than top down directives. But the underpinning is the intellectual property system that made this country economically strong.

While international business and science are forming strong connections, politically much of the world is becoming increasingly dangerous. This upheaval comes from regions that are alienated from the global economy, where small cliques control the wealth, where prospects for personal success are limited and the foundations of traditional societies are rapidly eroding.

South American economist Hernando De Soto's groundbreaking book, **The Mystery of Capital**, forcefully demonstrates that the fundamental weakness of perennially under-developed countries is the inability of their citizens to establish clear ownership of their property, both physical and intellectual. Without the incentive of ownership, wealth creation is not possible.

Increasingly, the wealth of nations is directly tied to providing incentives and encouragement to those who take risks with their time and resources to push forward the frontiers of science and technology, turning research concepts into useful products. Only then can the public be truly benefited.

So what's the larger message for the technology management profession? It's time we stop talking only about the intricacies of licensing. We are in danger of losing the larger philosophical war unless we explain to policy makers and the public why protecting intellectual property is important to society in general.

We have allowed our critics to dominate the public forum for too long, thinking that the fallacies of their arguments are transparent. This is a dangerous assumption and one that if left unchecked will undo us. This can happen literally overnight.

Too often, successful innovators are portrayed as exploiting the public once they achieve success after years of unrecognized effort. Some critics sincerely believe that important discoveries would be more readily available and inexpensive if only others could freely copy them.

They seem to believe that inventors will continue producing important technologies whether we reward them or not. Unfortunately, since the press and public lacks a fundamental understanding of the innovation process, these charges find ready acceptance.

While certainly not intended, this philosophy is right out of George Orwell's brilliant book, **Animal Farm**, where the horses were supposed to keep working while the pigs decided who would benefit from their labor. It didn't work well for the animals (particularly the horses -- they started dropping dead) and it won't work any better for a society.

Part of the problem is that once an entrepreneur solves a problem, it does indeed look easy. Our charge is explaining that this perception is false and dangerous. Innovation is risky, expensive and daunting to those leading the way. Failure is much more likely than success. The genius of the intellectual property system is that it encourages those who move our society forward for the betterment of all. Successful entrepreneurs create wealth not just for themselves, but literally all around them. For an economy like ours that is driven by small innovative companies, exclusive rights to core intellectual properties is their one key advantage over larger established companies.

Thomas Edison's dictum, that invention is one percent inspiration and 99 percent perspiration, is as true today as when he helped light the world. It took Edison more than one thousand experiments to get the right filament to light his bulb. Others had the idea, but either could not or would not do the hard work needed to turn an idea into a product.

It might be argued that once Edison hit upon the solution, others could have made the product cheaper. They did not have one thousand failed attempts to pay for, so their costs

of production were much lower. Such an approach would kill progress, but we need to go the next step and explain why.

The odds against any one discovery making a substantial amount of money in the marketplace are daunting. Of course, when the “one in a thousand” invention does hit the jackpot, it must also cover the costs of all its brothers and sisters that began the research and development cycle, but failed to survive. Additionally the “creative self destruction” of the competitive marketplace insures that successful technologies are quickly challenged by even newer rival products. Thus, the time to recoup investments can be limited.

It is for good reason that those braving the system are called “entrepreneurs.” Webster’s dictionary defines the term this way: *one who organizes, manages and assumes the risks of a business or enterprise.* The assumption of the risk is the operative part of the definition.

This is not a profession for the timid.

It is not an accident that entrepreneurship and individual freedom are linked. Both are essential for leading the world into new eras of prosperity. This is the true ethical high ground. We should not easily yield it.

Growth driven by entrepreneurs expands political as well as economic freedom across national boundaries. Technology driven economies create R&D partnerships, many of which are multi-national. Such alliances help build stable international relations. The necessary catalyst is an effective technology transfer system.

The basics of technology licensing are worth reflecting on from this larger perspective. For example, those involved in licensing tend to work well together personally and professionally, because for a licensing deal to be successful it must be a win for both parties, based on a code of professional ethics. Even less grandly, it's just good business to maintain these relationships because they are likely to be the very ones needed later to complete the next deal.

Technology transfer can only succeed when a society honors contracts and has a fundamental respect for the rule of law. It thrives in free enterprise economies encouraging personal risk and reward, the essential ingredients for building an entrepreneurial culture. With the rapid increase in science and technology, command and control economies are less and less effective. Change is simply too swift for centralized planners to predict. The ability to move nimbly is essential for economic survival in an increasingly competitive global market.

Helping others adopt the essential ingredients for prosperity is in everyone's immediate interest, because more is at stake than simply dollars and cents.

Economist Benjamin Friedman wrote a very interesting book a few years ago, **The Moral Consequences of Economic Growth**. Friedman's thesis is that politically open societies develop in times of growing economic wealth. When the economic pie is expanding, a society feels confident in itself, living conditions are demonstrably improved and personal freedoms increase.

Conversely, in static societies where the pie is either shrinking or staying the same, for anyone to move up, someone else must move down. Political freedoms start regressing, confidence is replaced by fear and governments start looking for internal or external enemies to blame to maintain power.

Now think about the international situation we face today. Where are the biggest threats to global stability coming from? Typically, from traditional societies that have missed out on economic improvements and see on their TV's every day how far behind they are. Their children are not taught any real marketable skills, but instead theories for blaming their misery on others. Such countries tend to repress their own citizens, punish minorities and threaten their neighbors.

As Adam Smith said, "It is in the progressive state, while the society is advancing to the further acquisition, rather than when it has acquired its full complement of riches, that the condition of ... the great body of the people seems to be the happiest and the most comfortable. **It is hard in the stationary, and miserable in the declining state** (emphasis added)."

India and China are good examples of states advancing from traditional poverty through the development of technology based economies. India once considered protecting intellectual property as part of a colonial heritage of exploitation they wanted to reject. Interestingly, when India decided that it wanted to be a creator of technology and not an exporter of scientists to the West, it began protecting intellectual property. The results have been impressive in a few short years.

Similarly, according to just released information from the World Intellectual Property Organization, China's patenting rates have soared to the extent that it ranks number 5 in the world, having seen its patent applications grow by more than *six hundred percent* since 1995!

India and China are relatively stable countries where even huge swaths of the world's population have concrete evidence that things are indeed improving. Such progress would have seemed an impossible day dream a few decades ago.

As Edward Gibbons famously said at the conclusion of **The Decline and Fall of the Roman Empire**: "All that is human must retrograde if it does not advance." Nations, like individuals, are either moving forward in life or moving backward. We are never standing still.

However, there is another school of thought that is much more vocal than our own. These are the persistent critics of intellectual property who have gone too long without being effectively answered. They have created a cottage industry publishing articles attacking the very basis of a system that helped turn the U.S. economy around in the last 25 years. These articles quote each other to “prove” their points. While the arguments can rarely survive serious scrutiny, the basic premise that the general public is being victimized strikes a cord politically.

Because most members of Congress and their staffs are not familiar with how products are developed or how our research universities and federal labs are integral parts of our economic development, the apparent fallacy of the critics’ arguments may not be readily apparent in Washington.

As a former Senate staffer, I can assure you that it is very difficult to correct a misconception once it takes root politically. We need to get ahead of the information curve by actively engaging in the open forum of policy debate.

The example of the impact of the Bayh-Dole Act is a good case study in this regard. Let’s quickly review why the law passed; what it’s done and why its own success has led to it being increasingly under attack.

Some of us are old enough to remember when intellectual property was a dirty word in the U.S. After World War II, government policies giving away federally funded

inventions non-exclusively resulted in more than 28,000 inventions quietly gathering dust in Washington. These policies effectively destroyed the fuel of interest that President Lincoln knew was essential to justify the risk of investment.

In the 1960's and 70's we had a Justice Department dominated by antitrust lawyers who viewed patents suspiciously as monopolies and a court system that couldn't decide whether issued patents were worth the paper they were written on. Not surprisingly, American innovation began to suffer with dire consequences.

This witches brew came home to roost with a vengeance in the 1970's and 80's.

The U.S. began to slowly -- and then rapidly -- lose its place in high technology. Our historic manufacturing areas became the Rust Belt. The lead in electronics, autos, telecommunications, etc., shifted abroad. This toxic snowball undermined public confidence. For the first time, Americans began to feel that their children's lives might well be worse than their own. It was high time to re-examine where we were headed.

Senators Bayh and Dole decided that a good place to start was looking at what the country was receiving from our billions of dollars spent each year on university research.

The answer was that few inventions were being commercialized. Existing patent policies were based on the premise that any invention receiving federal support should be freely available to all. Such mandates destroyed the incentive of the inventor or the private sector to undertake the risk and expense of commercialization. Thus, few new products,

companies or jobs were being created. There was nothing moral or ethical in such a system. The American taxpayers were the initial losers, but the world was also denied new products that should have made their lives healthier and more prosperous.

Government patent policies had forgotten the wisdom of the Founding Fathers. It is no accident that one of the earliest parts of the Constitution (Article I, Section 8) lays the groundwork for the incentives created by the intellectual property system. Very wisely, they knew that if the new American Republic was to gain a place in the burgeoning Industrial Revolution that fostering innovation was essential. They were correct.

The Bayh-Dole Act builds on this solid foundation for spurring innovation. Creators need to be able to own and manage their discoveries. We gave the inventing universities and small companies the ability to manage their patents with minimum oversight from the federal bureaucracy.

The law helped unleash American ingenuity and the results are impressive by any standard. As the **Economist Technology Quarterly** proclaimed: *Possibly the most inspired piece of legislation to be enacted in America over the past half-century was the Bayh-Dole act of 1980. Together with amendments in 1984 and augmentation in 1986, this unlocked all the inventions and discoveries that had been made in laboratories throughout the United States with the help of taxpayers' money. More than anything, this single policy measure helped reverse America's precipitous slide into industrial irrelevance.*

Twenty-five years later the importance of universities as economic drivers is underscored by the findings of the Association of University Technology Managers annual survey of their members. Virtually every state now incorporates its research universities as important cornerstones for their economic development plans. The Milken Institute's September 2006 publication *Mind to Market: A Global Analysis of University Biotechnology Transfer and Commercialization* underscores the impact universities have made in creating whole new industries.

In the Reagan Administration, studies were done of the emerging technologies driving the economies of the future. At that time, the U.S. had already lost its lead in most fields and was looking to be soon eclipsed in the remainder. Today the United States has the most robust economy in the world and it's driven by technology. The effective transfer of intellectual property from our public research institutions to industry is an important part of this success.

So who are the real heroes in our turnaround? We should rightly laud our research universities, but even more important are those who assume the real cost and risk of commercialization -- entrepreneurs in the private sector. It is the business entrepreneur -- and particularly the small company -- that drives our economy forward. For these companies in particular, intellectual property rights are vital. Without intellectual property it is nearly impossible to raise venture capital, which has been the fuel for entrepreneurial firms.

Even now, success is certainly not simple. The typical “good” university technology is 5-7 years away from being a product -- in fact, it’s rarely more than a good idea at this stage -- and will require \$10 of development by private industry for every \$1 the government invested in research. In biomedical research, this formula is much more expensive and lengthy. A typical new therapeutic drug from a biotech company will require over \$500 million dollars of private sector investment just to get through regulatory hurdles, before the first dollar of sales. Even with a huge investment, there is no guarantee of success.

Yet with all this said, the system is under attack, sometimes even in business magazines.

Almost exactly a year ago, I was approached by **Fortune** magazine for an article on the Bayh-Dole Act. I talked with the author and offered to introduce him to several key players involved with developing the bill including Senator Bayh. I was floored when the resulting article, *The Law of Unintended Consequences* appeared.

The argument spun around the idea that free dissemination of research is good and exclusivity is bad. The final evidence? The author compared biotech licensing with software licensing to “prove” that non-exclusivity works better. Here’s the recommendation for amending the Bayh-Dole Act:

*The right to make a profit from a taxpayer-funded discovery should come with an explicit demand: The patent holder has to license the invention as broadly as possible—which would make exclusive deals the rare exception, not the rule. **The fact is, that the right people will always find a way to turn a good idea into something tangible...*** (emphasis added).

A similar article appeared in the **Economist** with the same angle -- exclusive rights to publicly funded technologies should be discouraged.

We simply cannot leave such statements unchallenged. Whether or not a patent is licensed exclusively or not depends on the nature and risk involved in developing it. The very idea that non-exclusivity is more noble because everyone has the same access can be fatal when development requires great degrees of risk and investment. Such an approach is decidedly anti-small business to boot.

We've been down this road before Bayh-Dole and it leads to economic disaster. The irony of these arguments is that they are *exactly the same ones we heard in 1979 from the opponents of the Bayh-Dole Act*. At that time we had *precisely* the kinds of policies that our critics now advocate. Federally funded inventions were freely available through non-exclusive licenses. Rather than creating the utopia envisioned, potential benefits from billions of dollars of taxpayer funded R&D were simply gathering dust on the shelves of federal agencies.

The reason may seem obvious, but is one that we must explain over and over again. As inventor Frederick Cottrell said while founding Research Corporation: “... *a number of meritorious patents, given to the public absolutely free have never come upon the market chiefly because **what is everybody’s business is nobody’s business***” (emphasis added).

It can’t be more clearly said than that.

The Bayh-Dole Act makes developing these potential products possible rather than leaving them in the laboratory as only interesting theories or papers. The magic of Bayh-Dole is that it provides market incentives for entrepreneurs to deliver new products, create new companies and jobs that otherwise would lie fallow in the public sector.

The principles of innovation are universal. We need to export them freely around the globe. We should never fear the success of our neighbors in a fair marketplace. The creation of intellectual property is not a zero sum game.

For creativity and innovation to flourish, human freedom and the stability of law must exist. There are direct links between the two. We must be passionate in explaining and defending them. There is an ethical underpinning required for any society that wants its entrepreneurs to do what they do best. They must be recognized and rewarded.

So we should feel proud of our profession. We truly are part of a vital international movement that is central to building a more prosperous, peaceful world. However, it is up to us to explain the connection.

Let's close with two sayings from Teddy Roosevelt that capture the current situation we face:

*"In any moment of decision, the best thing you can do is the right thing, the next best thing is the wrong thing, and the worst you can do is nothing."*

*"Don't foul, don't flinch—hit the line hard."*

Let's all do the right thing and hit the line hard as well. There's literally a world at stake.