

Future of University and Industry Relations in Technology Commercialization

Speech delivered by Dr. Keith McDowell
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As a young boy growing up in America in the early 1950s, I had the experience of watching the great struggles of the Korean people and seeing the strength and character of your nation and its people. Today, I have the privilege and the honor of visiting with you and seeing the great nation that has emerged, to visit the magnificent Gyeonggi Technopark, and to participate in your tenth anniversary celebration. What you have accomplished is extraordinary and you are to be commended.



I'm particularly pleased to be here to talk with you about the future of university – industry relations and to tell you about some of the technology commercialization activities in Texas. To add context to that discussion, I would like to make several comments on the state of global competitiveness.

From my perspective there are several dimensions to globalization that we need to probe. First is the notion that we are engaged in competition among nation states. While that is true in some measure, it is also true that we cooperate in many ways. To emphasize this duality, I would point to a similar episode that occurred in North Texas during the 1960s and 1970s. At that time, the cities of Dallas and Fort Worth each had their own airports. It was clear to everyone that a modern regional airport would be essential to the growth of industry and prosperity. An entity entitled the North Texas Commission was formed to bring everyone together and to avoid confrontation between two major cities. This commission recognized that cooperation and competition were important and complementary elements of success. Indeed, they invented a new word, “coopetition”, to describe this synergy. The result of this concept was the Dallas-Fort Worth airport and the growth of the region into one the world’s largest high technology clusters. I suggest that “coopetition” is exactly what we need globally.

My second observation on globalization is that many of the forces we see at work now will change significantly over the next decade or two. We should not model our plans on current dynamics since we are truly in a transformational stage. For example, there is great concern in America about the outsourcing of manufacturing jobs to other parts of the world. Certainly, this dynamic is occurring; however, we also see a continuing migration of manufacturing jobs around the globe. I believe this phenomenon will soon end and we will see a rather rapid leveling process. Even now, labor costs are not necessarily the principal reason for the location of manufacturing plants. Regulatory requirements, availability of energy sources and transportation infrastructure are just some of the factors to be considered. Over the next decade, all of these forces will come into balance around the globe.

A final observation I would make on globalization is that businesses and corporations have been multi-national for many years and in many cases are more in command of world events than are nation states. It no longer makes sense for nation states to engage in confrontation. Cooperation and friendly competition are the best policy.

What is the role of universities in this globalization, especially their interaction with industry? We are all aware of the traditional role of educating our youth and serving as the centers for creation of knowledge through research and discovery. Recently, many analysts have described universities as “engines of economic development” to the point that universities are considered by some to be the keystone and most important factor for prosperity and wealth creation. I personally consider this point of view to be exaggerated and not the most productive perspective. Instead, I believe it takes a partnership among universities, government and industry to foster economic development. I will now address some of the elements of the partnership between universities and industry.

One of these elements is the sponsorship of university research through sponsored research agreements. In the UT System, industry sponsorship of research amounts to 6% of all research. In other words industry sponsorship of research over the years has traditionally been rather small. Why is that? Basically it has to do with the nature of university research versus industry research. Universities tend to focus on basic and applied research while industry focuses on technology development and product related research. There is a fundamental difference and gap between these two research agendas that is very difficult to bridge. Considerable pressure is being put on universities to change their agenda and to force faculty to focus on entrepreneurship and commercialization of their discoveries, in other words, to become engines of economic development. In my opinion this is short-sighted and doesn't reflect the full spectrum of activities that must exist to maintain a healthy discovery to commercialization pipeline. We need our Albert Einsteins as well as our Thomas Edisons. While the university culture must migrate to accommodate technology commercialization, industry and government must recognize the need for the full spectrum of activities and reward all components.

Another element of the university – industry relationship that has received considerable attention in recent years is the need to properly manage intellectual property. This issue has been particularly sensitive for large multi-national corporations. In America we have taken a number of steps to confront this concern. Nationally, we have formed the University – Industry Demonstration Partnership, a group of university and industry leaders tasked to discuss all aspects of the partnership and to determine best practice. Dr. Susan Butts of the Dow Chemical Company is the chair of the group and much progress has been made in identifying the factors that affect university – industry relations. I will address some specific factors in a moment when I present to you some of our activities in Texas.

Before I discuss those factors, I want to inform you of the size and structure of The University of Texas System of which I am a member in order to provide context for some of my comments. UT System is composed of fifteen institutions with nine academic universities such as the flagship UT Austin campus and six health science centers such as

the M. D. Anderson Cancer Center and UT Southwestern Medical Center. We have a total budget of about 11 billion dollars with 2 billion dollars in research expenditures. Our institutions are located in major metropolitan areas as well as small cities and along the Mexican – American border. We are a complex system of institutions with diverse and differentiated cultures. As the Vice Chancellor for Research and Technology Transfer, I have the wonderful opportunity to work with this diversity and to see how commercialization works in a number of different regional settings. I would now like to make some observations about university – industry relations based on this experience.

The principal factor in the university – industry relationship is the university technology transfer office. Traditionally over the past few decades, these offices have carried out two functions. First is the process of invention disclosure including valuation and protection through patents of the intellectual property. Second is the licensing of the intellectual property to existing industry or to startup companies. Over the past decade or two, a major transformation has occurred with the recognition that technology commercialization is also an essential function. Indeed, many technology transfer offices are now called technology commercialization offices! So, what does it mean for a university to engage in commercialization? Is it the same as traditional economic development activities?

There are many facets to technology commercialization over and above the traditional invention disclosure and licensing functions. They can include deal making, marketing of technologies, formation of ignition or launch funds, incubation of startup companies and entrepreneurship training. I want to talk first about “deal making”.

In my experience the principal cause of discontent we often hear from industry and others when it comes to licensing or setting terms for intellectual property is the lack of negotiation skills to achieve a deal. Many in the U.S. industry have blamed problems on the Bayh-Dole Act which was passed by the U. S. Congress in the early 1980s. This is not so. The Bayh-Dole Act has been enormously successful! The real problem is that many in industry and many in university technology commercialization offices do not have basic negotiation skills. Knowledge of licensing structures, royalty rates, equity positions and deal structures does not translate into negotiation skills. It is essential that universities have personnel with negotiation skills partnered with technical experts if quality deals are to be made. Furthermore, while legal issues and proper contract language are essential to deal formation, zealous “lawyering” often stymies deal making and leads to extended time lines and failed deals. We should all remember that these negotiations are fundamentally business deals, not legal exercises.

Another component of the modern technology commercialization office is the marketing of university intellectual property or available technologies. This is a rapidly expanding field with the internet serving as a major tool. Both new software and internet providers such as IBridge and SparkIP are providing a means to accomplish this goal. Webinars are now a common feature. In Texas we are adopting or adapting all of these approaches and have a taskforce investigating the best practices for marketing our intellectual property. In some measure commercialization is a regional event and Texas has formed seven Regional Centers for Innovation and Commercialization to facilitate and accelerate the movement of new technologies to market. Our goal is to bring together all segments

including business, government and universities to form effective commercialization and economic development teams.

One of the biggest concerns we have in Texas and we believe one of the biggest barriers to commercialization is the failure to provide funding to researchers to demonstrate proof of concept for a discovery with respect to commercial potential. Federal research grants typically do not permit funds to be used in this manner. To close this gap, we created the Texas Ignition Fund for our UT System institutions. Funded initially at two million dollars, this fund provides “proof of concept” grants of up to \$50,000 to research teams to demonstrate the commercial potential of a new discovery. A key feature of these awards is the requirement that the research team demonstrate that contact has been made with key elements of the regional commercialization infrastructure. Our goal is to develop a culture where university faculty consider community interaction as a major component of commercializing their discovery. The concept of the fund has resulted in the growth of other ignition funds within our university system with a pool of over five million dollars available. In the first two rounds we have received 38 proposals and funded 19 for \$715,000 dollars.

A major challenge for universities, but an essential feature of the global economy, is the formation of new startup companies. These companies are often fragile and require a support structure to succeed. One method for accelerating the formation and growth of these companies is the use of business incubators, whether managed by local government, business, or universities. Should universities create and manage startup-company incubators, especially given that many incubators fail as real estate ventures? In my opinion the question has already been answered and the answer is yes! In the fifteen institutions of the UT System, we currently operate twelve incubators. Five of these incubators are actual physical facilities or separate buildings. Examples of these facilities include the Austin Technology Incubator in Austin, Texas; the Arlington Technology Incubator in the Dallas/Fort Worth Metroplex; and International Technology Education and Commerce Campus in Brownsville, Texas. Many of our UT System incubators are managed as virtual facilities in that we assign university space and equipment on an “as needed” basis and manage the operation through university facility use agreements and conflict of interest management plans. The university resources provided to the startup companies can include internet connectivity, wet lab space, access to electronic business equipment such as printers and faxes, business plan development and management training, student interns, and other such resources specific to the university community. To provide you an order of magnitude of the size of the incubator activity in the UT System, I can tell you that we are currently working with over 250 startup companies.

You might ask: are all these companies based on university intellectual property? Amazingly, only 15 to 20% of these companies are directly related to intellectual property from UT System institutions. This is a surprising fact! The conclusion to be drawn is that our universities are contributing very broadly to regional economic development through company formation.

Ultimately, the success of any commercialization effort requires people. For universities this means engaging faculty and students. In Texas we’ve taken a multi-pronged approach. For our faculty members we’ve created a program that we call “Ideas on Fire”.

This program is based on digitally capturing sixteen hours of presentations by both trainers and experts in the field of technology commercialization. We are currently editing and packaging these presentations into downloadable formats such as podcast and plan to make them available free of charge to all of our faculty to access and study at their leisure.

With respect to students many of our institutions have entrepreneurial certificate and degree programs and the number is growing rapidly. For example, students at UT Austin actively work with startup companies in the Austin Technology Incubator and gain real work experience. In my experience our students are demanding such programs! Many of them do not want to join a multi-national company. They want independence and the thrill of forming their own company. It is imperative that universities provide them with this training. Furthermore, we have a shortage of people capable of forming the management and entrepreneurial teams we need to make our startup companies successful. It is essential for the global economy and competitiveness that we produce such members of the workforce.

Another very significant factor that universities face in working with industry is that the technology commercialization office must deal with the full spectrum of industrial sectors including biotechnology, information technology and manufacturing just to name a few. Each of these sectors is very different and requires a fundamentally different approach. Can universities afford to staff commercialization offices to match all these demands? In Texas we are experimenting and taking the approach of forming regional technology commercialization offices. For example, we have formed a single office to manage four institutions, UT San Antonio, UT Health Science Center San Antonio, UT Brownsville, and UT Pan American. We believe that over time these integrated operations will grow and become the dominant mechanism to manage our very large commercialization activities.

The final factor that affects university – industry relations is the concept of innovation. We all agree that innovation, loosely defined as turning discoveries into commercial products, is essential to being competitive; however, we've turned innovation into the panacea that will save the business world. Many believe that the laws of knowledge creation have been suspended and that we can order innovation to happen and it will. "Go forth and innovate" is the clarion call of the day! If it were that easy, each of us would be competing for our individual Nobel Prize. The question is "who should be doing the innovation and where and how should it be done"? Historically, industry carried out this function for the most part. Should universities take on this role? My answer is yes, but in a very focused manner. In my former position as the Vice President for Research at The University of Alabama, I created an "innovation center" at the university and hired several research staff members to conduct research and development on university intellectual property to enhance and to produce innovations that would lead to new commercial products. The involvement of students to gain experience and industry as partners was essential components of the center. I believe that universities need to experiment with such innovation centers and find a way to integrate them into the overall university culture.

In closing I want to thank all of you for the opportunity you have given me to visit your very beautiful country and to see all that you have accomplished. The memory of this visit will remain with me always.

Thank you!