# The Privatization of Public Universities: Implications for the Research Mission

*Merrill Series on*
*The Research Mission of Public Universities*

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# TABLE OF CONTENTS

MASC Report No. 110

# Introduction

Mabel Rice

The Fred and Virginia Merrill Distinguished Professor of Advanced Studies and Director, Merrill Advanced Studies Center, The University of Kansas

The following papers each address an aspect of the subject of the tenth annual research policy retreat hosted by the Merrill Center: *The Privatization of Public Universities*. We are pleased to be marking a decade of this program that brings together university administrators and researcher-scientists for informal discussions that lead to the identification of pressing issues, understanding of different perspectives, and the creation of plans of action to enhance research productivity within our institutions. This year's focus is the shifting base of funding sources for higher education. Though the majority of students seeking higher education are educated at public institutions, financial support for these schools from state governments is eroding across the country. Rising tuition and private donations are funding a growing proportion of public university budgets. New revenue through technology transfer rather than simply new knowledge is increasingly promoted as the benefit of research. The ideal promoted by Thomas Jefferson of "a University [established] on a plan so broad and liberal and modern, as to be worth patronizing with the public support" seems to be falling from favor in the nation's priorities. The 2006 Merrill retreat provided an opportune time to consider the implications of these changes in public university funding and how the shift affects research infrastructure.

Benefactors Virginia and Fred Merrill make possible this series of retreats: *The Research Mission of Public Universities*. On behalf of the many participants over a decade, I express deep gratitude to the Merrills for their enlightened endow-ments. On behalf of the Merrill Advanced Studies Center, I extend my appreciation for the contribution of effort and time of the participants and in particular to the authors of this collection of papers who found time in their busy schedules for the preparation of the materials that follow.

Twenty senior administrators and faculty from five institutions in Iowa, Kansas, Missouri, and Nebraska attended; they were joined by members of the Merrill Center board of directors; Jeremy Anderson, from the Kansas Governor's Office, and Reggie Robinson, CEO of the Kansas Board of Regents. Keynote speaker John Wiley, Chancellor

of the University of Wisconsin-Madison, initiated the discussion by presenting his analysis of the changing picture of higher education funding as a framework for the discussions that were to follow. In addition to those presenters whose remarks are published here were participants who served as discussants. These include Kansas State Senator Jean Schődorf, who contributed a valuable perspective as a citizen advocate for higher education. Though not all discussants' remarks are individually documented, their participation was an essential ingredient in the general discussions that ensued and the preparation of the final papers. The list of all conference attendees is at the end of the publication.

The inaugural event in this series of conferences, in 1997, focused on pressures that hinder the research mission of higher education. In 1998, we turned our attention to competing for new resources and to ways to enhance individual and collective productivity. In 1999, we examined in more depth cross-university alliances. The focus of the 2000 retreat was on making research a part of the public agenda and championing the cause of research as a valuable state resource. In 2001, the topic was evaluating research productivity, with a focus on the very important National Research Council (NRC) study from 1995. In the wake of 9/11, the topic for 2002 was "Science at a Time of National Emergency"; participants discussed scientists coming to the aid of the country, such as in joint research on preventing and mitigating bioterrorism, while also recognizing the difficulties our universities face because of increased security measures. In 2003 we focused on graduate education and two keynote speakers addressed key issues about retention of students in the doctoral track, efficiency in time to degree, and making the rules of the game transparent. In 2004 we looked at the leadership challenge of a comprehensive public university to accommodate the fluid nature of scientific initiatives to the world of long-term planning for the teaching and service missions of the universities. Finally, last year we discussed the interface of science and public policy with an eye toward how to move forward in a way that honors both public trust and scientific integrity.

Once again, the texts of this year's Merrill white paper reveal various perspectives on only one of the many complex issues faced by research administrators and scientists every day. It is with pleasure that I encourage you to read the papers from the 2006 Merrill policy retreat on *The Privatization of Public Universities*.

# Executive summary

## Why We Won't See Any Public Universities "Going Private"

John D. Wiley, Chancellor, University of Wisconsin-Madison

- Seemingly popular is the seductive idea of adopting a private school/business model for public schools and detaching them from public support funding sources.
- Not only is it impossible to totally fund public education from private sources, but it is important not to attempt to do so, for the health of public higher education.
- It is not nearly as simple as the oft heard "Why not double tuition and do away with the need for public funding?" implies.
- Though only 40% of higher education institutions are public schools, they educate nearly 80% of all students in higher education; if you look at four-year colleges only, 25% of the institutions enroll 65% of the students.
- There are few truly large private higher-education schools and the private school funding model does not scale up to successfully fund schools with the increasingly large student body populations typical of public institutions, particularly of the state flagship schools.
- Typical current budget funding sources: public schools receive 18% and private schools 24% of income from tuition; public 31%, private 0.3% from state support; public 0.9% and private 32% from endowments.
- The best-funded endowments have $500,000 in the bank per student, thus a 30,000 student body would need a $15 billion endowment; that is not attainable, nor is even half that amount possible to achieve for each large public higher education institution.
- At the pre-school level most education costs are born by the parents; for K–12th grade, an average of $1,400 per capita funds public education; taxpayers generally don't get a return on that investment unless more education follows.
- Currently $220 per year per capita public support in the U.S. makes higher education possible; the actual cost of education is $8,000 to $12,000 per student per year at all levels, preschool to university.
- Public institutions have also taken on new roles concurrent with the decline in public funding support. For example, private industry no longer supports basic research labs, and it is no longer enough that research labs within higher education produce new knowledge, they also must show results that can be translated into technology transfer and additional revenues.
- The G.I. Bill and the dramatic expansion of postsecondary education in the second half of the 20th century powered the U.S. economy.
- The necessity to borrow money for higher education is driving students away from careers vital to society but that have only moderate lifetime earning potential,

including teaching, nursing, family practice medicine, and even medical, legal, or veterinary work in rural areas.

- The distribution of brains, talents, ambition and creativity is independent of family income, yet making public institutions increasingly unaffordable for all but the children of the affluent will leave many of the brightest out of higher education; no society is rich enough to waste these assets.

## Defining the University's Role in Economic Development (better do it, or someone else will)

Jim Roberts, Vice Provost for Research, The University of Kansas

- The impetus for universities to play a key role in economic development is but one example of the new and growing demands on higher education.
- As part of the effort to define the role of The University of Kansas in economic development, the author shares questions generated by KU research-related staff that foster an exploration of the topic. See pages 16-17 for the list of questions.
- A 2006 article in the Chronicle of Higher Education headlined "The University as Economic Savior" reports that higher education is replacing industry as the largest employer in some cities. This leads to "both support and unrealistic expectations."
- Where in the higher education institution should the economic development function be administered? By history or default, and because of a natural connection with technology transfer, the economic development role often is attached to the research office, even if it isn't in the title. Economic development administration may not be within the research office; in reality it may be highly decentralized.
- Economic development and/or bioscience organizations are proliferating in Kansas, as elsewhere.
- "What should we be asking ourselves as we move forward in formally defining the university's role in economic development?" Finding the answers to these questions can be a role-defining exercise for a university.
- Some of these questions:

  "Should we be doing this at all?"

  "How does economic development relate to the mission of the university?"

  "What does the public expect?"

  "What are the outcomes and how do we measure them?"

  "How should economic development play into promotion and tenure decisions?"

  "Where should for-profit companies be located, in relationship to the campus?"

  "Should the economic development activity be independent of the research office?"

  "How far up the commercialization chain should a university go?"
- There is a difference between being an ally with a business and becoming a business.
- As we answer these questions (and others on page 16) we will convey our institutional goals and values to the public to let them better know their public university.

**Privatization of Public Universities: The UNL Experience**

Kimberly Espy, Associate Vice Chancellor for Research, University of Nebraska-Lincoln

- Critical to understand the history of public universities when considering the privatization of public universities. The idea that a fundamental aspect of higher education is the discovery of new knowledge and inquiry—research—came later.
- The Morrill Act of 1862, which established the Land Grant university system, was predicated on the notion that it is in the public's best interest to provide high-quality, widely accessible higher education to all.
- Public universities educate 77% of all post-secondary school students; fulfilling the ideal of comprehensive education available to all.
- Public research universities have contributed substantially to the transformation of our economic system from agrarian to industrial, and industrial to knowledge-based.
- One under-considered aspect is the progressively developed and deep-seated public trust in the integrity of university research and, more broadly, in the institution.
- The intent of the Bayh-Dole Act (1980) was to accelerate the moving of research outcomes into useful products, services, and information to better serve the public who funded the research. The simple strategy was to ascribe ownership of research outcomes to the public research university in order to create better incentives to spur the vested parties to perform. Thus economic development became a central tenet of the mission of public research universities. As a result, industry supported research has risen an average of 8% per annum nationally. The intent of Bayh-Dole was not to address university revenue streams specifically, as in that era most public research universities received more than half of their budgets from state appropriations.
- With the progressive and recent steep declines in state appropriations and rise in the number of enrolled students, enhancing industry-sponsored funding for research and other academic activities has become an important source of revenue to potentially counterbalance other revenue reductions. These forces are particularly acute for universities in the Great Plains states, which have comparatively smaller populations from which to draw students and historically have been under-priced.
- The explicit benefits of industry sponsorship have been substantial: at UNL, for example, both the percentage of research awards sponsored by industry and total sponsored funding doubled in the last 5 years.
- There is no doubt this funding has added value to existing Nebraska companies through licensing, has enhanced private-public partnerships and collaborations, and has created start-up ventures.
- Enhanced research funding, from any source, increases local economic development through job creation; this provides opportunity for creating and retaining a highly educated workforce. Research outcomes have been transferred more rapidly into the private sector. Greater economic opportunities have been provided, which have fostered greater quality of life and technological innovation.
- There also have been more implicit benefits from the trend towards "privatization." Industry sponsorship and shared ownership in the research outcomes have fostered new perspectives in university management that have increased the diversity of ideas and led to greater efficiencies. Adoption of a business model at public research

universities has sharpened the focus of many universities and their programs. This model has enabled deriving a more specific institutional mission and has resulted in more efficient service delivery to students, staff, and the public.

- There also are real costs to the "privatization" approach. Technology transfer and economic development are labor intensive and legally complex. For many universities, these costs exceed the revenues generated from industry sponsorship and licensing. The benefits also are distributed more diffusely; some benefits are accrued directly to private companies who are not charged to best represent the public's interests. Academic units dependent on public support and largesse (often the arts and humanities) fear "downsizing" because of less availability of industry and federal grant funding relative to science/technology-based disciplines.
- There also are under-recognized implicit costs of privatization, including increased conflicts of interest. Proprietary rights and concomitant non-disclosure can be at odds with the long-standing tradition of university academic freedom and public dissemination of findings. The university's gain of financial benefit by restricting access to research outcomes through patents and licensure can conflict with its responsibilities of public access and community stewardship.
- Researchers have a vested interest in outcomes, which can engender latent biases. The effects of such biases are greater in research outcomes in the health and human sciences, where the scientific phenomena require statistical inference and human judgment. Cognitive science can help to clarify how these implicit biases might affect research outcomes; see text for a fuller discussion and references.
- In conclusion, private industry sponsorship of research activities has led to economic benefits, both nationally and locally. Privatization puts at risk the steadily built, longstanding public trust, support, and confidence in the integrity of public research universities and its research outcomes. Without enhanced management of the inherent conflicts of interest that accompany industry sponsorship of research, there is a risk of rapidly eroding the "social compact" between universities and their publics, upon which premier public research universities have been built.

## Paying the Pipeliner: Early Stage Drug Discovery in Academia

Jeff Aubé, Professor, Medicinal Chemistry, The University of Kansas

- Interest in drug discovery research in venues outside of the pharmaceutical industry has burgeoned in recent years.
- New drug development requires a broad spectrum of professionals; scientists and physicians within the academy have played roles since the invention of the field. What is new: universities and other institutions interested in economic development have expanded their activities in *early stage drug discovery* or *preclinical research* as part of larger initiatives in bioscience.
- I conclude that expanded involvement of basic scientists in preclinical research is a welcome trend, but that those investing time and money should carefully ponder their expectations for return on their investments.
- A typical drug discovery program takes 10–12 years between synthesis of a new prospective drug molecule and its entry into the marketplace. A 12-year time frame

between initial synthesis and patenting must be considered in the context of the 20-year limit for drug patents; this leaves only eight years of exclusive marketing to accrue profits to offset the cost of development. Post-patent competition by generic drug firms greatly decreases the sales of name-brand drugs.

- The odds against a given chemical entity making it into the clinic and from there onto the general market are staggering; the author's anecdotal survey indicates that less than 1% of medicinal chemists produce a new drug.
- The average cost for a new drug: $882 million to $1.65 billion dollars. Profits earned from each successful drug are needed to pay for projects that fall short of the market. Given this reality, drug companies typically choose their targets based on market considerations in addition to biomedical need. Thus the emphasis on developing drugs for conditions, often chronic, that afflict large numbers of America's increasingly gray population, such as for cholesterol control, diabetes, or Alzheimer's disease.
- See the text for a full description of the drug discovery process and examples of successful university pharmacology research.
- The Bottom Line: a long-term commitment to drug discovery that makes sense in the vision of the university. All who wish to undertake drug discovery in academia should carefully consider their expectations and commitment. The best reasons to engage in drug discovery are scientific excitement and a desire to do work relevant to human health.

### Privatization of Public Universities: A Risk/Benefit Analysis

Donald Weeks, Professor and Head, Biochemistry, University of Nebraska

- There are both benefits and risks if public universities are to be more private-like and entrepreneurial in their dealings and operations; there are risks and benefits to remaining the same.
- Any changes to be made in the U.S. public university system must be made with great care and deliberation so that the end product is better than, or at least as good as, the present system in serving society.
- To explore this, I conducted a risk/benefit analysis of the privatization of the public university with the attendees of the 2006 Merrill Retreat.
- I selected key functions of university research as well as basic factors that affect it, listed the major risks and major benefits associated with each of these functions and factors, and asked the group to individually measure the degree of risk or benefit associated with each on a –5 to +5 scale. My list: expansion of knowledge/discovery; education and training of students; funding of the research enterprise; betterment of society The results and discussion of the survey are found on page 39.

## Privatizing Public Research Universities: Wealth Creation as a Laudable Goal . . . Not a Sleazy Perversion

Ron Trewyn, Vice Provost/Dean of Research, Kansas State University

- State financial support for higher education has been declining nationally for years; seldom has it kept pace with annual increases in either inflation or state revenue. State revenues in Kansas were substantially higher than inflation in the 1990's economic boom though annual state budgets for higher education were not; consequently, the portion of Kansas public institution operating budgets funded from state monies declined annually. This trend is consistent across most public universities in America.
- Even though research universities have been undergoing a myriad of changes in recent years, there is great pressure on most university campuses to maintain the status quo. College faculties are reluctant "merchants of change," but if they will lend their assistance, privatization can be turned in their favor.
- Since the enactment of the 1980 Bayh-Dole Act, most research universities have become more focused on technology transfer. Nonetheless, few technology transfer offices are major profit centers supporting university privatization. An exception is the University of Wisconsin, which has received intellectual property returns in the millions of dollars annually for decades.
- For those public research universities that have made money, the income has generally been based on a small number of technologies, and wealth creation has not been an institutional mission. In the new millennium, the recognition by faculty, not just university administrators, of the financial challenges facing their universities has increased appreciably. Reinvention (if it's real) will not be a trivial endeavor for institutions steeped in medieval traditions.
- Typically, university deliberations about wealth creation (if they occur) focus on creating wealth for someone else, not the university. Occasionally, faculty entrepreneurs are among the financial beneficiaries of university commercial spinout ventures, but an institution of higher education isn't expected to become wealthy in the process (though it might share in some portion of the revenues).
- States are backing off in their tax support of higher education. That makes privatization a 21st century reality, and as a result, universities must become more entrepreneurial. What's wrong with creating wealth for the purpose of bankrolling privatization and enhancing the institution's financial bottom line significantly?
- One particularly intriguing approach that universities might consider has been described as "rational exuberance" by Michael Mandel: a philosophy touted for an economy based on innovation.
- Cautious economic growth–the alternative–encourages capital accumulation and savings, but because there's less innovation, routine technology-related jobs move offshore and U.S. jobs diminish for those with a college education.
- In all probability, the biggest impediment to adopting rational exuberance is the non-risk taker mentality that permeates most universities.
- Regardless of the reinvention model they choose, public research universities must become more entrepreneurial if they are going to survive privatization. The following

six common principles will likely be required: Challenging the Status Quo; Fostering Flexibility and Fluidity; Crafting Innovation Communities; Managing Conflicts; Enhancing the Status of Commercialization; Facilitating Risk-Taking.

- K-State has been nurturing a more entrepreneurial culture on campus for a long time. As part of this growing institutional activity, K-State recently formed a policy/ oversight group — the Commercialization Leadership Council (CLC). See the text for a full description.

**Clinical Research Resources at The University of Kansas Medical Center: General Clinical Research Centers (GCRC) and Clinical Translation Science Awards (CTSA)**

Richard Barohn, Professor and Chair, Neurology, KU Med Center

- A General Clinical Research Center (GCRC) is a National Institutes of Health (NIH)-supported multidisciplinary research unit to facilitate investigator-initiated clinical studies / trials conducted by full-time faculty at an academic health center (AHC). GCRCs provide clinical research infrastructure to investigators funded from federal agencies, private foundations, and other peer-reviewed sources. The premise for using an infrastructure on a GCRC is that the space, the equipment, and personnel are provided at no cost for investigator-initiated clinical research studies. There are approximately 80 NIH funded GCRC programs throughout the United States. For further information on the GCRC program through the NCRR: www.ncrr.nih.gov.
- We began the process of initiating a GCRC for The University of Kansas Medical Center campus in 2002. See the full text for the reasons behind doing this, the goals set for our GCRC, progress toward those goals, and the benefits of a GCRC. A critical part of a functioning GCRC is a GCRC Advisory Committee (GAC).
- Despite the development of the successful NIH-sponsored GCRC program over the last 50 years, there are still considerable barriers to initiating and completing successful clinical research at academic health centers. Dr. Elias Zerhouni, director of the NIH, has outlined the challenges for clinical research and, in summary, stated that there is no true "HOME" for our clinical research. Based on this recognition, he has proposed a "systems biology approach" to creating a home for clinical and translational sciences.
- In October 2005, the NIH released an Research Funding Announcement for institutional Clinical and Translational Science Awards (CTSA). This was to forge a transformative and integrative academic home for clinical and translational science. Dr. Zerhouni stipulated that these new homes in academic health centers must be a Center, Department, or Institute; they must encompass all components of clinical research, including education, career development, and regulatory components for clinical research infrastructure. Also they are to promote multidisciplinary research teams, create an incubator for innovative research tools, catalyze the application of new knowledge to clinical practice, and have graduate degree-granting capabilities in clinical research.
- With this development, it is anticipated that existing funded GCRC programs will be slowly phased out. However, the clinical research infrastructure provided by GCRCs can be incorporated into the larger CTSA Awards. This will give academic health

centers greater flexibility in modeling clinical research infrastructure space for the future. In this new model, there potentially will be fewer restrictions on collaborations with industry in developing clinical research programs at academic health centers. For example, these appear to be no restriction on number of industry-sponsored studies or in the fund amounts a clinical research center can receive from industry.

- Shortly after the RFA for the new CTSA Awards, a planning process was initiated at KUMC (in October 2005) to develop our response to this new program. The factors behind our decision to submit a planning grant can be found in the full text. The planning grant has been submitted and is currently under review.
- In our CTSA planning grant, we outlined the concept of a Heartland Institute for Clinical Research (HICR) that will be a new integrated home for clinical and translational research, both at KUMC and in the region. See page 56 for a full description of an HICR.
- We are confident that through the CTSA planning process we will create a blueprint for this transformative process that will allow us to join the front ranks of institutions with vibrant clinical research programs.

## All Things in Moderation—Please!

Chris Sorensen, University Distinguished Professor, Physics, Kansas State University

- There are benefits beyond money to the privatization of public universities, including: academe's engagement of a broader community, aligning the roles of the university to the needs of society, and enhancement of opportunity that often comes with a new venture.
- But with any new venture, some caution is warranted and an assessment of what consequences may ensue is in order.
- The rise of electricity is an example of fundamental, curiosity-based research that eventually led to great practical application. The history of science and technology is replete with marvelous examples: Indeed the phrase "science and technology" implies this fertile synergy.
- Also, practical application is not the only consequence of curiosity-based research. Consider the work of Galileo, Brahe, Kepler, and finally Newton to understand motion, gravity, and the eventual explanation of the orbits of the planets. This work not only found great application, but it changed the way we see ourselves.
- These observations led me to ask a series of questions: At a university controlled by private funds, what research will be pursued? Will the practical needs of business and industry shift the balance between fundamental and applied research and too heavily favor the latter? At a university controlled by private funds, how will we measure success? At a university controlled by private funds, who owns the research results? Will our students be able to defend publicly their theses? Will researchers be allowed to publish and thereby disseminate their results? When they travel to meetings, will they be able to discuss in a free and open dialogue their work with other researchers? Or will this dialogue between scholars be suppressed for the private needs of the donor? How will the research directions be decided at a university controlled by private funds? At a university controlled by private money will our relationship with students change? Will we take a business model and treat our students like clients?

Finally, at a university controlled by private money what will the mindset of the professors be? Will they be visionary scholars or intellectual guns for hire? Will they be driven by a passion to understand and create or by the bottom line? Fuller discussion and possible answers to these questions are found in the text.

- I believe too much emphasis already is placed on monetary measures. When the university measures its research success, the first (often only) yardstick is calibrated in dollars. Broadly based parameters, wisely considered, are the best ways to measure success, not the single "bottom line" measures often used in private business.
- Business and industry most often is problem solving for *today*; rarely does the private sector have the luxury to wait for a good thing; if they aren't making money today, they will be gone tomorrow. Yet society needs to plan for tomorrow, too, and the public university has a duty to contribute to society's well being both for today and the future.
- Heavy funding in a particular area can entice scholars to that area, perhaps without regard to other areas that are important but not well funded. The NSF has in the past several years been calling for research in programmatic areas that it considers significant; such an approach causes the scientific academy to chase the same goal and hence diversity is stymied. Heavy pursuit of the industrial moneys that most often support applied research today will give scholars less time for long-term fundamental studies that lay the foundation of tomorrow.
- I also look the proverbial gift horse in the mouth and warn against philanthropic donations that control too much the direction of research or university priorities.
- Most private-sector supported research will involve engineering and the applied sciences, including medicine. The arts, humanities, and social sciences will receive much less private support, causing what I call the "door knob effect"—the imbalance in funding distorts the university's face, with accentuated applied sciences but other areas relatively diminished, especially the arts and humanities.
- So are we to deny the benefits of increased funding from private sources, both business related and philanthropic? No! We should take full advantage of them. But universities must remain independent and autonomous institutions, so we must use these resources in a manner that does not compromise the fundamental mission: To establish an environment where scholars can create new knowledge and from their perspective as scholars teach others to be successful citizens in our civilization.

## The Entrepreneurial Land Grant: Commercialization within the Educational Milieu

Duane Nellis, Provost, Kansas State University

- The implications for change and higher education in the United States and globally are substantial and occurring at multiple scales; our future success will depend, in part, on how well we adapt to such multi-scale changes and engage in such change in ways that advance our respective institutions. Yet many people at our institutions fear change.
- Entrepreneurial activity conceivably can be positive, negative, or neutral to any given institution, depending on how it is framed within the context of the institution's mission, priorities, culture, geographic setting, and capability.

- We must look to the future in positive ways through what I refer to as constructive engagement, to take advantage of opportunities as they emerge, being prepared to act quickly and effectively, while protecting what is best in our traditions.
- I think those of us at land-grant universities would agree that an important part of our institution's mission involves applied research and outreach; it is inextricably linked with our fundamental educational mission.
- Numerous imperatives face today's land grant institutions and that fundamental mission, as well as the application of our knowledge discoveries toward the benefit of humankind: (a) decreasing state support for higher education; (b) financial necessity to become more self-sustaining and more entrepreneurial—without compromising our land grant and public mission; (c) the need to help drive, protect and sustain economic growth that contributes to the state's overall economic well-being; (d) the necessity for more inter-disciplinary collaborations across campus and among partner institutions; (e) the need to identify and take advantage of niche opportunities; (f) the need to satisfy increasing student demands as consumers of higher education while protecting our land-grant ideals related to accessibility, at the same time that we build new learning environments that engage students in new ways; (g) the need to increase the number of American students in STEM fields at both the undergraduate and graduate levels; (h) the need to be perceived as 'relevant' by the populace, the institution's governing boards, and the local, state and national political leadership—including an ability to demonstrate through 'objective measures' accountability measures of our success; and (i) the need to be more outreach and service oriented.
- Today's populace needs to be reassured regarding the relevance and importance of higher education and its role in society; our needs and those of students are not always readily understood.
- The relevance, importance, and value of higher education is palpable, but we must do a better job of getting this word out to those who need to hear it most, stressing direct and tangible ways that higher education enriches communities, states, and regions, as well as individuals.
- Many of the aforementioned imperatives relate to our need as a land-grant school to be more entrepreneurial; entrepreneurship is another way to think about pursuing a path of enlightened self interest. To be most effective, entrepreneurship should not be generic and unfocused but centered upon an institution's specific areas of expertise (both existing and upcoming) and capitalize on emerging areas of opportunities.
- At the same time, it is my opinion that while land grants of the future must be greater players in this arena, we must do this while protecting and enhancing what is best in our rich and successful educational traditions as state-based institutions.
- Hundreds of institutions have committed to this effort to commercialize—with the result of hundreds of new start-up companies—and more than $1 billion per year in revenues from licensing on a host of new drugs, agricultural products, high tech components, and other breakthrough technology.
- Such opportunities leverage institutional strengths, spur innovation, reap financial benefits for the institutions, and provide incentives for faculty members. At the same time, such activities must be structured without harm to the fundamental aspects of what we are as a student-centered, research extensive, comprehensive university.

- What are some of the attitudes for success for those institutions willing to pursue a strong entrepreneurial approach?: a demonstrated confidence in a vision and the passion to carry it through; seeing challenges as opportunities and not as barriers; inclusive leadership; a willingness to engage diverse constituent groups and to use influence more than position power—a change agent must be able to engage detractors as well as followers; and finally, skill in overcoming cultural obstacles.
- See the text for a history and current progress in entrepreneurship at Kansas State University.
- We face growing pressures at multiple scales regarding the quality of what we do, how we have balanced accessibility with enhancing student success, how we have driven efficiencies into our efforts, and how we have translated knowledge into economic development. Proactive action and effective information sharing are needed as we make our way through these changes.
- Change occurs in response to specific motivators; current economic imperatives dictate that higher education be more self-supporting. Such efforts reinforce our need to be more entrepreneurial while not sacrificing what is best in our traditions.
- Effective entrepreneurial efforts should focus on specific niche areas that allow university strengths to be leveraged most effectively and efficiently.

## Crafting a Culture of Connections and Collaborations

Barbara Atkinson, Executive Vice Chancellor, The University of Kansas Medical Center

- The undeniable superiority of higher education in the United States is no longer undeniable. Many are studying the swift and possibly fundamental changes coming in higher education; texts by Thomas Friedman and. Larry Lauer are quoted.
- It is in these uncertain times that some will write yet another premature obituary for higher education. But Clark Kerr provides hope that far from becoming relics, universities will continue to survive and perhaps even prosper in this new world order, though the fact that universities have proven both resilient and adaptable until now does not guarantee their safety in the future.
- Public higher education enrolls 77% of all students in higher education. These institutions drew about 50% of their operating support from taxpayers in the 1980s. Today money from the state provides about 30% of funding at most, while universities, such as Virginia and Colorado state funding contributes less than 10% of operating support.
- We have not been immune in Kansas from the trends having an impact on public universities throughout the United States. State support as a proportion of the overall budget of our institution also has declined and a larger share of the cost of obtaining an advanced degree has shifted to the student and their family. A study commissioned by Kansas Citizens for Higher Education and conducted by MGT of America concluded that Kansas public financial support for higher education has continued to decline relative to national averages, to levels that are generally lower relative to the Big 12 states than in the prior year. Faculty salaries are farther behind

national average salaries for faculty in similar institutions, and farther behind average salaries in the states around Kansas.

- In fiscal year 2001 the KU Medical Center received $101 million dollars from the state; in fy 2007 that amount is $113 million. Figuring inflation—including significant cost increases for fixed expenses such as employee benefits and utilities—we have actually lost purchasing power during the past decade. By contrast, our tuition revenue has grown from $11 million in fy 2001 to nearly $22.5 million in the current fiscal year.
- We have had to aggressively grow non-state sources of revenue in order to maintain current levels of programming, including externally funded research and clinical income. While federal support for biomedical research has grown significantly over the past decade, this growth has now plateaued and in some instances—such as funding for Title VII programs—been cut, resulting in significant consequences.
- The talent of our faculty fuels the momentum we enjoy. We must compete for this talent with our peer public institutions and private universities. The competitive pressure to acquire top talent continues to create budgetary pressures for us.
- While privatization policies have arisen at least partially from the budget problems that states face and from policymakers' willingness to shift the costs of higher education from taxpayers to students, they also result from the view that forcing the publics to behave more like the privates and compete for resources will lead to increased efficiencies and the elimination of waste. Meanwhile, as state support becomes an increasingly smaller proportion of their budgets, many public institutions want to be freed from governmental constraints that lead to inefficiencies in their operations and to have the freedom to make economic decisions that will improve their ability to compete with the privates.
- The separation of The University of Kansas Hospital from the university and the creation of a separate privatized state authority was the catalyst for the Hospital's renaissance. See the text for the full story.
- Opportunities exist to capitalize on privatization: an exceptional transfer of wealth is occurring; public support for biomedical research is strong; the community and state have embraced life sciences research as an essential economic driver.
- To exploit these trends we must do more as leaders within our institutions to establish a culture of connections and collaborations: collaborate among ourselves; collaborate with others beyond our own institutions; encourage interdisciplinary collaborations; diversify our revenue streams; and engage in a more aggressive advancement strategy.
- We need: greater flexibility in accessing endowment funds; more staff to help cultivate gifts; to seek state support to match some portion of private contributions; to be in "campaign mode" almost continuously; to look beyond traditional endowment constituencies; and to cultivate a wide array of potential donors and expand our efforts to connect with grateful patients.
- We must: continuously and aggressively communicate the purpose of our work and its relevance to the public and encourage their participation and support; extract compelling data and results that underscore the return on investment; protect our

brand and reputation; articulate and commit to core values; and reflect the "character" of an institution in its leadership.

- The leadership of our university—from department chair to CEO—must be change agents.

### Public Universities and State-Level Funding Advocacy

Text by Jeremy Anderson, Kansas Governor's Office; from a panel discussion with Moderator Keith Yehle, KU Director of Governmental Relations; Anderson; Reggie Robinson, CEO, Kansas Board of Regents; Jean Schődorf, Senator, Kansas Legislator

- Funding is the predominant determinant for the future of higher education in the Midwest.
- Changes in revenue sources over the last decade have made higher education more reliant on tuition than on state funding. Increases in the State of Kansas funding for higher education have not equaled the increased costs of higher education.
- In 1996, 51% of the university funding was from the State General Fund while only 14% came from tuition revenue; in 2006, the numbers were 30% and 24% respectively.
- The State of Kansas has worked hard to guarantee that promises made in the Higher Education Reorganization Act of 1999 were kept. In addition, there have been significant increases in the operating grants that Regents institutions receive. These increases have produced a four year trend where both tuition and state funding have increased by 15%.
- The State of Kansas has done much to work to establish more funding for higher education during tough budget times, but the money the state has provided still falls short of many needed services at the Universities.
- Over the past five years, there have been many legislative successes aimed to assist higher education communities and to provide additional funding and infrastructure for the future: (a) 2001/2002 New Facility Funding for a $68 million Life Sciences building at the University of Kansas and $40 million for a Homeland Security Building at Kansas State University; (b) 2004, 2005, 2006 included the completion of the three year commitment to keep the funding increases in the Higher Education Reorganization Act of 1999; (c) 2002 established the beginning of Operating Grants for Regents Institutions which allows them greater flexibility with the spending of funds; (d) 2004 Kansas Economic Growth Act; (e) 2004 Bioscience Authority; (f) 2006 investment in the five year $25 million commitment for Cancer Center at the University of Kansas; (g) 2006 Tuition Ownership changes to be dedicated to deferred maintenance.
- The many successes for higher education over the past few years have not been achieved without a tremendous amount of work.
- Support for higher education in the Kansas Legislature has changed over the years to the point that in 2005 the House of Representatives supported major budget cuts to Regents institutions to cover the cost of other budget items. While this initiative did

not become law, it highlights the fact that higher education is at a crossroads in the arena of funding.

- Most Kansas legislators make just under $20,000 per year tfrom their Legislative pay. The effect of the long hours and limited pay for a Citizen Legislature has changed the look of the Kansas Legislature. Similarly, the face of state legislatures across the Midwest has been altered by increased turnover and term limits in some states.
- Long-term relationships that once solidified a majority support for higher education now require much more outreach. Long-term funding promises like the Kansas 1999 Higher Education Reorganization Act are important steps for the future, but hard to implement when new legislators are elected long after a funding promise has been established.
- The Kansas Citizens for Higher Education released their 2006 voting records for the Kansas Legislature in July 2006 and the numbers highlight the growing divide among pro-higher education legislators and anti-higher education legislators in the state: 61 members of the 125 member House of Representatives received an "A" or "B" grade for their votes on higher education issues in the 2005 and 2006 Legislative Sessions; 56 of the 125 members of the Kansas House of Representatives received a failing grade. This type of accountability is important for voters to see how their Legislators rank on important higher education issues.
- Senator Jean Schodorf (R-Wichita) and Reggie Robinson, CEO of the Kansas Board of Regents, emphasized that continued outreach by the University staff and administrators will be the key to the future of higher education funding. Without the hard work to build stronger relationships with legislators, the fight for additional higher education funding will continue to be an uphill battle.

# Why We Won't See Any Public Universities "Going Private"

John D. Wiley, Ph.D.
Chancellor
University of Wisconsin-Madison

All around the country the story is the same: States are reducing taxpayer support for public higher education and offsetting those reductions with higher tuition. Using Wisconsin as an example, Table 1 illustrates the changes over the last 25 years. In some states, the changes have been even more dramatic; in others, less so. But the trend is essentially universal. Furthermore, the impacts of these changes vary, even within one state. At UW-Madison (flagship institution of the UW System), for example, state appropriations constituted 43.1% and tuition 10.5% of our budget in 1975. Today, those numbers are 19.5% and 15.7% respectively. To make matters worse, nearly a third of our state revenue comes to us with constraints requiring us to return it to the state for specific costs such as our share of the state utility bills, debt service, and mandatory payments to state agencies. Even if we were able to economize or find superior alternatives in any of those areas, we would not be able to reallocate the savings for other purposes. As a result, the state is providing only 13.5% of our base operating budget—the budget for hiring faculty and staff and covering infrastructure and operating costs beyond debt service and utility bills. For the first time in the history of the institution, our students are contributing more to this portion of our operating budget than are the state taxpayers.

Viewing these trends, many faculty, alumni, newspaper editors, and even legislators have urged us to consider "going private." By that, they have in mind that we could agree to forego all state support in our base operating budget and rely on increased tuition, coupled with some unspecified amount of additional student financial aid (what they assume to be "the private model" of high tuition and high financial aid) for ongoing operations. These views are often expressed in terms of a comparison: "You're way under-priced at a resident tuition of $6000/year. I'm

Draft version of a chapter in *What's Happening to Higher Education?*, Ronald G. Ehrenberg editor,

| | 1974–75 | 2004–05 |
|---|---|---|
| State appropriations for UW-System per $1000 of personal income | $12.50 | $5.50 |
| State appropriations for UW-System as a share of total state spending | 11.5% | 3.9% |
| State appropriations for UW-System per FTE student (2004 dollars) | $10,600 | $7,400 |
| State appropriations for UW-System as a percent of UW-System budget | 49.5% | 26% |
| Tuition as a percent of UW-System budget | 12% | 21% |

**Table 1. Illustrations of the changing mix of state funding and tuition in the University of Wisconsin System over the last 25 years.[1]**

paying three times that for my daughter's tuition at [a private school], and the education she's getting is certainly not three times better. Even if you simply doubled your tuition, you would still be a bargain, and you could replace nearly all state funds. What's the problem?" Quite aside from political considerations (unwillingness of states to "let go" of prior investments and ongoing oversight), the larger problem is that the "private model," properly understood, simply cannot be scaled up to the extent required. It's a matter of simple arithmetic, and the numbers just don't work! Before explaining this assertion, it is important to review the overall context and scope of American higher education at the start of the 21st century.

At the beginning of the 20th century, formal education was a relative rarity. Many did not complete what would today be called elementary school, and it wasn't until about 1940 that the percentage of adults over age 25 who had completed high school exceeded 25%. By 1940, the percentage of adults over age 25 who had completed college was still less than 5%. Today, nearly 90% of adults over 25 have high school diplomas, and nearly 30% have college degrees.[2] The great expansion of formal education at all levels, and especially the growth of college attendance, occurred during a 30 year period after the end of WWII, spurred in great part by the GI Bill. It is fair to say that the GI Bill and the dramatic expansion of post-secondary education powered the U.S. economy for the entire second half of the 20th century.

Although the growth rate slowed in about 1975, both high school and college graduation attainment rates have continued to increase to the present date. What has made this dramatic growth possible is the conscious, thoughtful, well-planned expansion of public higher education. By and large, it is these new and expanded institutions, subsidized by the state taxpayers, which have provided the increased access to affordable higher education as a matter of public policy.

Table 2 summarizes the current system of higher education in the United States. Our present system consists of a large number of small private institutions and a smaller number of much larger public institutions. Public schools constitute only 41% of the total,

| Institution Type | Public | Private | % Public |
|---|---|---|---|
| Number of 4-year institutions | 631 | 1835 | 25.6% |
| Enrollments | 6,236,455 | 3,440,953 | 64.4% |
| Average enrollment | 9,883 | 1,875 | — |
| Number of 2-year institutions | 1,081 | 621 | 63.5% |
| Enrollments | 5,996,701 | 253,878 | 95.9% |
| Average enrollment | 5,547 | 409 | — |
| Total # of institutions | 1,721 | 2,456 | 41.1% |
| Total enrollments | 12,233,156 | 3,694,831 | 76.8% |
| Total expenditures | $170,344,841,000 | $85,048,123,000 | 66.7% |
| Average expenditure/student | $13,924.85 | $23,018.14 | — |

**Table 2. Statistical overview of the U.S. system of higher education.[3]**

but they enroll 77% of the students, and educate them at about half the cost per student. Economies of scale are even more striking if you isolate the four-year institutions: Here, only 25% of the institutions enroll 65% of the students. Of the 100 largest post-secondary institutions in the country, 92 are public; and all of the 25 largest institutions are public, including most of the public flagship institutions of the upper Midwest (the "Big Ten" schools).

There are good and simple reasons why there are so few large private colleges and universities, and the reasons have entirely to do with base budget realities. The operational incomes of all colleges and universities derive from only a few sources:

1. Federal revenues—primarily research funds and student financial aid;
2. Program revenues*—from sales of things like athletic tickets, dormitory space, food, books, hospital revenues, fees for continuing adult education, contract research, etc.;
3. Gifts and endowment income*—annual gifts that can be expended immediately, as well as annual earnings on long-term endowments;
4. Tuition—actual revenue received from students and their families, exclusive of institutional assistance; and
5. State support—state appropriations paid directly to the institutions.

The first two categories—federal and program revenues—are not available to support the general operations of the institution. It is not possible, for example, to accept a federal grant for research in geology, and then reallocate those funds to hire a new Spanish instructor. Similarly, no President can sell tickets to a football game and then cancel the game, using the proceeds instead to add new sections of calculus. Many gifts are similarly restricted, but it is possible, over a period of many years, to build endow-

*Depending on the details of the agreement, non-federal research grants and contracts are typically accounted for in one or the other of these categories.

| Funding category | Public 4-year Institution | Private 4-year Institution |
|---|---|---|
| Endowment income | 0.9% | 31.5% |
| State appropriation | 30.9% | 0.3% |
| Tuition income | 18.1% | 24.4% |

**Table 3. Percentage of total institutional operating budgets from the three major categories of base-budget sources for public and private 4-year institutions.[3]**

ments that can support faculty salaries, program operations, and other "base-budget" needs. Thus, the base operating budgets of private and public universities are made up entirely of the same three kinds of revenue: gifts and endowment income, tuition, and state support. Table 3 shows how these three revenue categories contribute to the budgets of public and private colleges and universities.

It's no surprise that private schools derive so little of their revenues from state governments, nor that public schools have so little endowment income. What most people do find surprising is that the contribution of tuition revenues is so similar between public and private institutions. After all, the average tuition at private schools is $16,287/year, and the average tuition at public schools is only $3,746/year.[3] So why isn't this large difference reflected in the budget percentages? The answer is found mostly in the gross revenue numbers. The 3,308,460 students enrolled in private colleges and universities generated $29,257,523,000 in tuition and fees,[3] for an average of $8844 per student, which is only about half the theoretical or "sticker-price" amount. This reflects the substantial tuition discounting that is necessary for institutions having very high sticker-price tuition.

In contrast, the 6,055,398 students enrolled in public institutions generated $23,376,317,0003 for an average of $3681/student—pretty close to the average advertised tuition of $3746.

Therein lies the first lesson for those urging public universities to "go private:" If public universities raised their tuition to private school levels, they would not realize anything like the apparent theoretical increase in tuition revenue, because they would find it necessary to engage in the same tuition discounting as the private institutions. After all, a student or family that is unwilling or unable to pay the sticker-price tuition at private schools is hardly likely to be willing or able to do so at public schools!

The second important point should be obvious from Table 3: As a percentage of their overall budgets, private schools realize as much revenue from gift and endowment income as public schools obtain from state subsidies. Put differently, public funds at public schools play the same role as gift and endowment income at private schools. Thus, even if public schools

were able to raise their tuition to private school levels, they would still need substantially increased private giving and endowment income to offset any loss of public funding.

The percentages in Table 3 are based on averages over hundreds of institutions, and do not apply to any one institution. To illustrate the challenge of moving a specific institution from the public to the private model, I will use the University of Wisconsin-Madison as a concrete example. In 2004, our total budget of $1.9 billion included $369.7 million in state appropriations, $297 million in tuition, and about $120 million in endowment income and the equivalent in annual gifts. Thus, the budget percentages for these categories were 19.5%, 15.7%, and about 6.3% respectively. In round numbers, our undergraduate tuition for nonresidents is $19,000, and for residents is $6,000. Actually, we have lots of different tuitions at various degree levels, but setting all tuitions at the nonresident undergraduate level of $19,000 is a reasonable proxy for taking the first step toward the "private model."

If all tuitions were set at $19,000, our roughly 40,000 students would theoretically generate $70 million/year. Assuming we were forced to do the same level of tuition discounting as the private institutions, however, we would yield only 54.3% of that amount, or about $413 million—an increase of $116 million over current tuition revenues. But if we are to give up all state support, we will still be short $369.7–$116=$253.7 million. The only feasible source for making up that difference is charitable gifts and endowment income. As a rule of thumb, endowments generate only about 4–5% of the principal as expendable income annually. Any earnings in excess of that are typically reinvested to allow the endowment to grow as a compensation for inflation. In order to generate an additional $253.7 million in endowment income, we would need to increase our endowment by at least $5 billion, to a total of about $7 billion. More realistically, we would need at least $8 billion, with most of the new endowment money being unrestricted or restricted for things such as faculty salaries and fringe benefits (endowed chairs).

There are several ways to put a hypothetical UW-Madison endowment of $8 billion in perspective:

1. Currently, only five of the nation's 4,168 colleges and universities have endow-ments that large (Stanford, $8.6 billion; the entire University of Texas System, $8.7 billion; Princeton, $8.7 billion; Yale, $11 billion; and Harvard, $19 billion) and all of these except the UT System are much smaller institutions than UW-Madison. The UT System is, of course, still public and still receives state support.
2. In the 60-year history of the UW-Foundation (our charitable fund-raising foundation), we have raised a total of about $3 billion, including net income and gains on prior investments, and approximately $1 billion of that remains today as a permanent endowment. In addition, we have access to another $1 billion or so in high restricted endowments, for a total of around $2 billion. By the time we raised an additional $6

billion, it would no longer be sufficient because of ongoing inflation.

3. We are currently in a six-year campaign to raise $1.5 billion, and we will succeed in doing that. But a substantial fraction of that total will be restricted for things that have nothing to do with our base operating budget. The thirty best-endowed private universities have per-student endowments in the $500,000/student range, while the best endowed public universities are endowed in the $40,000/student range.[3] Even at an endowment of $8 billion, UW-Madison would still have only $200,000/student—less than half the endowment resources per student of peer private institutions unless we downsized to a student body of perhaps 15–20,000 students, so my estimate of a required $8 billion endowment is very conservative for a school our size. My conclusion is that UW-Madison has essentially no chance of raising an endowment large enough to offset a total loss of state funding. I don't believe any other state flagship institution could do it, either, and most of the smaller public institutions have no present endowments at all, nor any significant fundraising potential.

On a national scale, it would require endowments totaling about $1.3 trillion to generate enough endowment income to replace all state funding of higher education. That is about six times larger than the total of all public and private university endowments today. It is also a nontrivial fraction of the $37 trillion total financial assets of all U.S. households,[4] especially when you consider that much of the $37 trillion is tied up in home equity. Nevertheless, the financial resources do exist, in principle, to create an aggregate "trillion-dollar-plus" higher education endowment from private gifts. In 2002, private philanthropy in the U.S. totaled $240.9 billion, of which $183.7 billion was from gifts by individuals.[5] Of the total giving, $84.3 billion (35%) went to religious organizations, $37.6 billion (16%) to health and human service causes, and $31.6 billion (13%) to education at all levels. There is no reason to believe the patterns or magnitudes of charitable giving can or will change quickly, so from every perspective I can think of, this is a fool's pursuit. Furthermore, it is a pursuit that has not been launched by any form of reasoned public policy debate.

I know of no legislature or other public forum that has concluded and recommended that this massive shift in the finances of higher education from the public to the private sector is good public policy for any state or for the nation. Rather, the shift is occurring incrementally in small, expedient budget decisions that manage to get the states through one more budget year. In effect, the message is this: Instead of supporting public higher education by taxing all 285 million citizens about $220 annually each, let's ask 10 percent of them voluntarily to provide $2,200 a year; or 1 percent of them to pony up $22,000 a year. If there are 285 billionaires out there who would be willing to contribute $220 million/year to save everyone else a $220 tax bill, they

| Highest Degree | Mean Earnings | Years in School | Years Working | Lifetime Earnings |
|---|---|---|---|---|
| No HS Diploma | $18,826 | 11 | 50 | $941,300 |
| HS Diploma | $27,280 | 13 | 48 | $1,309,440 |
| Some College | $29,725 | 14 | 47 | $1,397,075 |
| Associate Degree | $34,177 | 15 | 46 | $1,572,142 |
| Bachelors Degree | $51,194 | 17 | 44 | $2,252,536 |
| Masters Degree | $60,445 | 19 | 42 | $2,538,690 |
| Doctoral Degree | $89,735 | 22 | 39 | $3,499,626 |
| Professional Degree | $112,845 | 22 | 39 | $4,400,955 |

**Table 4. Mean earnings and expected mean lifetime earnings in constant 2002 dollars by degree of educational attainment, assuming retirement at age 65.[5]**

haven't stepped forward to do so. In the meantime, states continue to push their public colleges and universities toward this ultimately impossible goal.

This stark budget reality of our public universities is already diminishing the health of the U.S. system of higher education, and it is something in which every citizen has a huge stake. Access and affordability are not just issues for a few potential students and their families: These are issues on which the entire economy will either thrive or decline. Simple arithmetic confirms it. Today, the public invests a little more than $392 billion annually—nearly $1400 per capita, or about $8,000 per pupil—to provide universal, tuition-free education through grade 12. Multiplying $8,000 times 13 years of K-12 education shows that we taxpayers invest about $100,000 to produce a high school graduate. A glance at Table 4 shows that the average person who enters the workforce with only a high school education is unlikely ever to repay in state and local taxes the cost of his or her diploma. It is only at the bachelors degree level and above that the public can expect to regain their investment in K-12 education from tax revenues. Let me quickly add that many high-school graduates obtain apprenticeship training or other skills that enable them to beat these odds. Similarly, some college graduates will fall far short of the earnings detailed in Table 4. Still, the overall economy consists of the accumulation of those averages, so the above conclusions are important for the economy as a whole.

In the middle of the last century, taxpayers and lawmakers alike seemed to understand this simple math. They wisely invested in a massive expansion of public higher education, and provided affordable access to millions of citizens through the GI bill, low tuition, and abundant scholarship support to those who needed it. Those decisions created the engine that powered the state and national economies for the entire second half of the 20th century. The vast majority of you who are

reading this article benefited personally from that affordable access, as did society at large. Why, then, would we even consider withdrawing it from our children and their children? But that's just what we're doing. Federal scholarships have all but disappeared, replaced by loans. More than three quarters of students now work for paying during the school year when they should be studying – and they are working more hours every year. More than half of all UW-Madison graduates now graduate with student loan debts ranging, on average, from $15,000 at the bachelors level to more than $100,000 for veterinary, law, and medical school. The prospect of starting a career with large debt is now driving students away from careers that have only "average" lifetime earning potential, including teaching, nursing, family practice medicine, rural medical or law practice, and large animal veterinary practice. Even more importantly, the distribution of brains, talents, ambition, and creativity is independent of family income. We will ignore that fact and freeze out the children of average and low-income families at our great peril. No society is rich enough to waste any of these assets.

When setting out on a path that leads toward an impossible goal, only one thing is certain: you won't get there. There is no realistic possibility of providing high-quality postsecondary education for the vast majority of our high school graduates with a purely private financing model. It isn't clear how we will get off this path, but the longer we stay on it the greater the cost in lost talent, lost opportunities, and economic stagnation. What we need is a serious public policy discussion setting out the public as well as private benefits of having a highly educated workforce, and deciding what fraction of the costs of education should be borne by the recipients of that education and what fraction borne by the public at large for the benefits they receive. Continuing to drive blindly in the direction of privatization is a path to ruin.

1. Data pertaining to the UW-System and UW-Madison are from the UW-Madison Office of Budget Planning and Analysis.

2. National Center for Education Statistics, Digest of Education Statistics, 2003.

3. Chronicle Almanac 2003-04, Chronicle of Higher Education, August 29, 2003.

4. New York Times, May 22, 2005.

5. U.S. Census Bureau, Statistical Abstract of the United States: 2004-05 (124th Edition) Washington, D. C. 2004.

***A Concrete Personal Example***
***John D. Wiley***

*In 1960, when I graduated from high school in Evansville, Indiana, my father (a hospital pharmacist) was earning about $10,000 per year, which provided total or partial support for himself, my mother, five children, and a grandmother. Without even considering private schools, I applied to Indiana University—my state university. The tuition for my freshman year was $125, and the total cost of attendance, including room, board, books, and other expenses was about $1000 per year. Through newspaper-route savings and summer jobs, I managed to pay for about one full year of the costs. Scholarships provided the equivalent of another year, and my family paid for the remaining two years. As a result, I graduated in four years totally debt-free. During my senior year, I was joined at IU by one of my sisters. What my parents could foresee for the next fifteen years was that they would always have at least one of us in college, and sometimes up to three at once. Nevertheless, it looked manageable with good planning. Tuition was only 1.25% of their gross income.*

*Using the consumer price index to inflate a 1960 salary of $10,000 to today's dollars, results in a 2005 salary of about $65,000; this is 44% above today's median family income of $45,000. The 2005 resident undergraduate tuition at UW-Madison was about $6,000, or 9.2% of $65,000 and 13% of $45,000. In 2005, my family would have needed an annual income of $480,000 to be in a position comparable to their reality of 1960. Only 1.3% of households have incomes above $250,000/year, so there is no doubt that public higher education has become dramatically less affordable for nearly everyone.*

# Defining the University's Role in Economic Development

Jim Roberts
Vice Provost for Research
The University of Kansas

Better do it…or someone else will" is the tacit subtitle of this paper. There is so much attention today on the role of the research university in economic development that any number of people and organizations, both local and nationwide, think they understand what needs to happen. And to no one's surprise, not all the opinions being put forth agree. So each of us in our own universities needs to be affirmative and thoughtful about this, or others with differing agendas will gladly step in and define our role for us.

Much is being asked of universities today; the impetus for universities to play a key role in economic development is but one of the best examples. As part of an effort to define and publicize, both on and off campus, the role of The University of Kansas in economic development, I will share some questions I solicited on this topic from KU colleagues. The questions will help define the way we want to go or not, as KU assumes a larger role in economic development in the state and the region.

**Setting the stage**

A recent article in the *Chronicle of Higher Education* headlined "The University as Economic Savior" described how higher education is replacing industry in some cities as the largest and most important employer.[1] As a result, we "face both support and unrealistic expectations." An example of the latter is a 2003 op-ed in the Seattle newspaper, declaring that the University of Washington may be bigger than Boeing as a local economic asset.[2] The *Chronicle* article focused on Rochester, New York, where the Rochester Institute of Technology—not Kodak—is now the largest employer.

As universities take on a larger role in economic development, the question arises of where in the institution should this function be administered? For example, the senior research officer's title at Iowa State University is Vice Provost for Research *and Economic Development* (emphasis the author's). By history or default, and because of a natural connection with technology transfer, the economic development role seems attached to the research office in

[1] Fisher, Karin, "The University as Economic Savior," *Chronicle of Higher Education*, July 14, 2006, 52:45, A18.

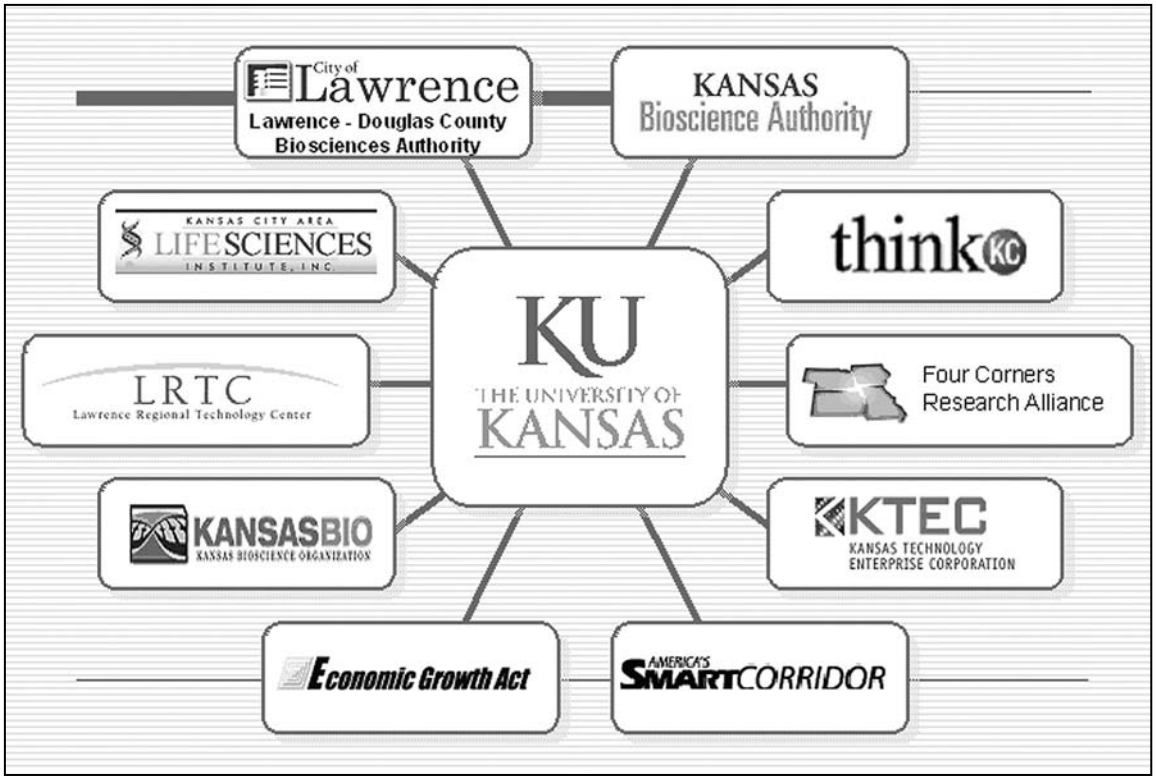
[2] Evans, Dan, "Invest in UW and We Invest in Our Future," *Seattle Post-Intelligencer*, November 9, 2003, F1.

many if not most universities, even if it isn't in the title. That is not necessarily a bad thing, if the research office has the staff, structure, funding, and mandate to be successful. But it may be only an assumption that economic development administration is within the research office; in reality it may be highly decentralized.

At KU, as with many large research universities, there are a number of policies and procedures relating to intellectual property, consulting, research agreements, research center formation, etc. that all relate in part to economic development. And through the work of the faculty and various centers, responsibility for economic development is decentralized. There is no office of economic development per se. For this and other reasons, it is a good time to work through an exercise that helps the university agree on what it is we want to be as an engine of economic development and to make a written record of our conclusions.

Economic development and/or bioscience organizations are proliferating in Kansas. We have the Kansas Bioscience Authority—not to be confused with KansasBIO, a trade association; the Lawrence-Douglas County Bioscience Authority; the Four Corners Research Alliance (Kansas, Nebraska, Iowa, and Missouri); and various initiatives based in Kansas City. One cause of this recent flurry of creation was passage of the Kansas Economic Growth Act that could allocate $580 million over the next 10 years to the state research universities and others to build a strong bioscience research and industrial base.

To illustrate the scope of the flurry: the Tonganoxie Bioscience Authority was created recently. The population of



Tonganoxie, Kansas, is under 4,000. So it does appear that everyone is getting into this game, and at this rate every Kansas City suburb may end up with an authority. It is an exciting time.

**What Questions Should We Ask?**

As we began to think more deeply about this topic at KU, we envisioned a completed description of the university's role in economic development that included the processes, policies, and organization. But to get to that full description, what questions needed to be addressed? To start, we distributed a brief, unscientific survey to many KU faculty active in research, invention, and technology transfer. It was a one question survey: "What should we be asking ourselves as we move forward in formally defining the university's role in economic development?" We received quick responses from this select group—aided no doubt by the brevity of the survey—and from these submissions we distilled about 40 distinct questions.

I will review many of these questions, but I'll not provide answers. The answers arise from the role-defining exercise.

A primary question is, "Should we be doing this at all?" Even when the answer is an immediate and enthusiastic "yes," we ought to explain why. The explanation of why we engage in economic development is an important component of succeeding at it.

Next, though it sounds like a religious question, we have to ask how economic development relates to the mission of the university. Talking about economic development as a new, fourth leg of the mission is one way to look at it. But economic development also can be seen as the central part of our existing mission. We can hang the whole thing on the teaching mission, if we wish to, in terms of entrepreneurial education, as a facet of life we want our students to learn about. KU offers courses in entrepreneurship in cooperation with the Office of Technology Transfer and we host internships and provide other opportunities for students to participate in economic development activities. From a research perspective, having companies allied with the university and having new companies around is important. All of this hinges on having good faculty, and today's faculty are interested in this. It's becoming a significant factor in faculty retention and recruitment, and is a public service.

Another question is, "What does the public expect?" I had lunch with one of our major researchers/innovators. He said all this should be measured in terms of benefit to the state. "How is this benefiting someone in western Kansas? How does this help my life?"

Yet another question is, "Should we write this down?" What we are really talking about is making sure everyone is on the same page and that we state it clearly.

Another KU researcher asked, "What are the outcomes and how do we measure them?" We get all sorts of comments from the public about what we ought to be doing in this realm. We can rattle off factoids such as "The KU Lawrence campus produces spin off companies at about one and a half to two times the national average, in terms of per million dollars of research" or, "We produce 75% of all the start ups in

the state." Several faculty members have been enriched in this process. But we always get a roomful of glazed eyes when we say this. An interesting and inevitable conversation revolves around economic development activities. How should all this play into promotion and tenure decisions? If it does, what are the appropriate incentives and rewards? Usually, when I see the word incentives, I assume that means money. But here is the real money question, and the question I often ask: "Who pays" for the university's economic development activities? We have to answer that question and a related one about whether a university should act as venture capitalist.

Another question: "Would we be better off just turning the intellectual property over to the company in return for an upfront license fee?" There are legal and financial implications to this, but it's a legitimate question. Sometimes faculty complain about the technology transfer process. Sure, it can always be done better, but some difficulties arise when faculty members sometimes don't realize the ball is in their court when working through the tech transfer maze.

The February 2006 issue of *Inc*. contained a provocative article by Carl Schramm, president and CEO of the Ewing Marion Kauffman Foundation in Kansas City;[3] Chancellor Hemenway called it to my attention immediately. Schramm was saying, basically, that all universities—except for five—are greedy, bureaucratic, and other words that the chancellor underlined for my benefit. Schramm gave his list of "five universities you can do business with": UC-Berkeley, Caltech, Stanford, MIT, and UW-Madison. At about the same time, a major chemical company that was part of a consortium involved with one of our major research centers approached KU. They wanted the university to conduct some fundamental research for them and, of course, assign the intellectual property to them as well. The faculty and leaders of the center were basically on board with this, so we were faced with a decision. With Schramm's article fresh in my mind, I asked our technology transfer officer to contact the five favored universities, telling them our situation and asking what they would do in our place. He called all five. One laughed, another said "never, never, never," and the others replied "of course not!" So being "friendly" apparently doesn't involve caving in. (It turned out that our two university partners in this center said that they would not agree to such an arrangement either.)

I was at a meeting in Chicago recently and I brought this up with the speaker, Carl Gulbrandsen, managing director of the justly famous Wisconsin Alumni Research Foundation (WARF). Gulbrandsen laughed about the article and the attention he was getting as a result. He observed that what it really boils down to is, with time, WARF has developed relationships with a set of companies like the one KU was dealing with. He said such companies are a problem for everyone. His advice? Just don't deal with them. That may be fine for a huge operation like WARF, but it may not be for an institution the size of

[3] Schramm, Carl, "Five Universities You Can Do Business With," *Inc*., February 2006, 23.

KU. Being a university you can do business with does have something to do with who you are and the size of your institution. If you're large enough, you can be selective.

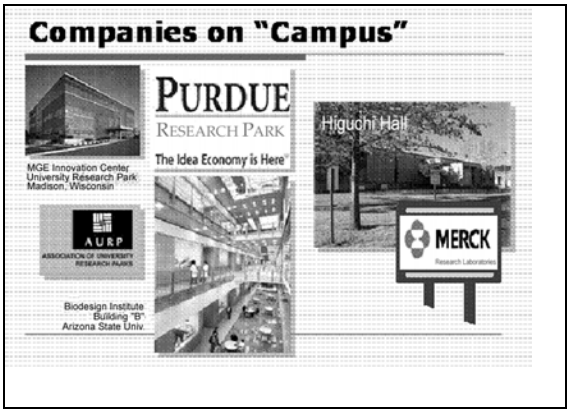

To return to the questions: Should for-profit companies be adjacent to campus? There are various models, including research parks and incubators. At KU, Higuchi Hall once housed a Merck operation. This meant the company was literally on our campus but on property legally owned by the Endowment Association. KU has since taken over the building and converted it for research. Having a company on campus is not novel at KU, but the question is still worth asking.

Should the economic development activity be independent of the research office? If so, to whom should it report? A related question came from one of our research centers that does a lot of innovation: "How far up the commercialization chain should a university go?" We start out inventing and managing intellectual property, but how far do we go before some one else takes over? And should we give preference in this to local companies?

Finally, there was a flurry of questions related to protecting the faculty from conflicts of interest, re-evaluating the conflict of interest policy to allow greater flexibility, the possibility of starting companies in departments and research centers, and the possible involvement of non-tenure track faculty and persons from outside the university. The questions from my survey appear at the end of this article.

This exercise struck me as a good starting point for looking at what's on the minds of our faculty who are starting companies and working with intellectual property. There is a difference, after all, between being an ally with a business and becoming a business. I don't envision companies buying KU's Jayhawk mascot and slapping their logo all over, but there is a question of how far we are willing to go in pursuit of economic development.

As KU moves forward with this initiative, this is a good time to ask these basic questions. As we answer them, we will convey our goals and our values to the public, and we'll be letting them know better what their public university is all about.



## The University and Economic Development: Basic Questions to Consider

(Generated by researchers / research or tech-transfer administrators, KU Lawrence Campus)

Should economic development activities be encouraged, recognized, and counted toward promotion and tenure? If so, what are appropriate incentives and rewards?

Is economic development a good use of faculty time? Should it be viewed as a form of public service?

Can and should faculty participate in start-up opportunities and other commercial endeavors? What about disclosure and management of conflicts of interest?

Should universities consider providing unpaid faculty leave, for up to three years, without jeopardizing the academic career? How would this affect the tenure clock?

Who on campus should pay to support economic development activities?

Should KUCR act as a "venture capitalist" for opportunities coming out of KU?

What is KU's risk threshold when it comes to economic development activities?

What's allowed? Product development vs. incubation vs. full-scale operation?

Would KU be better off allowing companies that sponsor research to own any IP that resulted, in return for an up-front license fee paid before any work is done? Does Bayh-Dole prevent this?

Can a case be made for KU marketing and sometimes selling patents and other IP to the highest bidder outright?

What are the barriers to and the benefits of industry and universities working together? How do they differ in the U.S. from Europe, China, India, etc.?

Does co-location of university, government, and industry activities that foster "economic development" work? If so what are the barriers that prevent the establishment of more formal co-located activities?

Should the university have two kinds of projects, i.e., research that results in discovery, and service that provides commercially useful or valuable data for a fee?

Should KU actively engage in economic development at all? How is it part of KU's mission? Is there a consensus on this?

Should for-profit companies be allowed to locate on or adjacent to the KU campus, even in an incubator?

In an era of increasing globalization, is the role of universities to promote innovation and the competitiveness of U.S. industries only? Does our economic development mandate transcend national (and state) boundaries?

What are the essential elements of a mutually "sustainable" contract between industry and KU that's consistent with their respective missions?

Should the University consider a separate office for industry relations with adequate staff for fostering and nurturing industry/university partnerships?

What are the goals and the definition of economic development? How exactly will it be measured, tracked, and communicated to the campus and the public? Are the outcomes indirect and abstract or direct and tangible

How far up the commercialization chain should the university participate? Invent, protect IP, mature, incubate, invest, market, manage, etc.?

Should KU give preferential treatment to Kansas companies in economic development relationships?

As a public state university, what does the public (State of Kansas, students, industry, various stakeholders) expect of KU in the area of economic development? Is there a consensus?

How can inventors be encouraged to do research with possible industrial applications within the university?

How can tech transfer be streamlined so that licensing to faculty entrepreneurs is quicker and easier?

Should KU engage and expand activities in this domain that tends toward “corporatization” of the public university?

How does KU plan to protect the faculty-scientist from potential conflicts of interest that may result from direct involvement with product development and patent licensure?

Should for-profit companies that have been granted permission to have a physical presence on the KU campus be required to make significant capital investment in new research space?

Can individual KU departments or research laboratories set up revenue-producing LLC’s to promote and distribute their products?

Should KU centralize its economic development efforts for greater efficiency?

Should a centralized economic development effort report at the Vice-Provost or Provost level so as to rise above potential divides between departments, schools, Centers and campuses?

Should KU have a written document describing its internal economic development strategy and process?

Should the KU economic development document carry the full, public endorsement of the Provost?

Should KU's economic development efforts be headed by non-tenure track faculty since tenure track faculty necessarily have their research programs, their departments, and their schools as a primary focus?

Should KU's economic development efforts be headed by individuals who have private sector and product development experience?

Should the School of Business be included as an integral component of KU's economic development effort to provide marketing, valuation and early business plan preparation assistance?

Should KU re-evaluate its Conflict of Interest policy to be more "embracing" of economic development; e.g. allow for greater inventor/PI involvement post-licensing?

Should KU re-evaluate its Conflict of Interest policy to more easily allow for technologies invented at the University to be clinically tested at KUMC?

Should KU take a leading role in local and regional economic development efforts?

# Privatizing Public Research Universities: Experiences at the University of Nebraska-Lincoln

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To consider the impact of privatization on public universities, it is critical to understand their history and what led to the creation of public research universities. Universities were created in Europe and the United Kingdom in the 11th century to bring together faculties of diverse disciplines for comprehensive education and training. Later came the recognition that one fundamental aspect of education and training is the discovery of new knowledge and inquiry—namely research. In the U.S., the Morrill Act of 1862 that established the Land Grant university system was predicated on the notion that it is in the public's best interest to provide high-quality, widely accessible higher education to the "common people."

Currently, public universities provide higher education to 77% of all post-secondary school students. These numbers attest that the model of comprehensive education widely available to the citizenry, focused on inquiry and new knowledge generation, is effective. In fact, public research universities have contributed substantially to the transformation of our economic system from agrarian to industrial, and then from industrial to knowledge-based. Because research conducted at public research universities is funded by public investment independent of the market or other parties with substantial vested private interests, one under-considered aspect of public research universities is the progressively developed and deep-seated public trust in the integrity of research and in the institution, more broadly.

In keeping with the public trust model, the intent of the Bayh-Dole Act (1980) was to accelerate the progress of moving research outcomes into useful products, services, and information in order to better serve the interests of the public, who essentially funded the research. The simple strategy was to ascribe ownership of research outcomes to the public research university in order to create better incentives to spur the vested parties to perform. Concomitantly, economic development became a central tenet of the mission of public research universities, including the University of Nebraska-Lincoln (UNL). As a result, industry supported research has risen an average of 8% per

annum nationally, with a similar increase observed at UNL.

Importantly, the intent of Bayh-Dole was not meant to address university revenue streams specifically, as in that era most public research universities received more than half of their budgets from state appropriations. With progressive (and recently steep) declines in state appropriations and rise in the number of enrolled students, enhancing industry-sponsored funding for research and other academic activities has become an important source of revenue to potentially counterbalance other revenue reductions. These forces are particularly acute for universities in the Great Plains states like Nebraska that have comparatively fewer college-age students from which to draw and historically have been under-priced relative to costs.

The explicit benefits of industry sponsorship have been substantial. At UNL, for example, the percentage of research awards sponsored by industry has doubled in the last 5 years, which is particularly compelling given that total sponsored funding in actual dollars also has doubled in this same period. There is no doubt this funding has added value to existing Nebraska companies through licensing, has enhanced private-public partnerships and collaborations, and has created start-up ventures. More simply, enhanced research funding, be it from any source, increases local economic development through job creation that provides opportunities for creating and retaining a highly educated workforce. Taken together, research outcomes have been transferred more rapidly into the private sector. Greater economic opportunities have been provided for local Nebraskans; this has fostered greater quality of life and promoted technological innovation.

Although less well recognized, there also have been more implicit benefits that have resulted from the trend towards "privatization." Industry sponsorship and shared ownership in the research outcomes has fostered new perspectives in university management that have increased the diversity of ideas and lead to greater efficiencies. Public research universities have adopted a business model to varying degrees and in varying segments, which has sharpened the focus of many universities and their programs. This model also has enabled deriving a more specific institutional mission and has resulted in more efficient service delivery to students, staff, and the public.

There also are real costs to this "privatization" approach. Technology transfer and economic development are labor intensive and legally complex. For many universities, these costs exceed the revenues that are generated from industry sponsorship and licensing. At UNL, outside legal fees over the past three years have increased nearly 20% each year. Because the public state taxpayers are now "minority stakeholders" in the research enterprise, the benefits also are distributed more diffusely. That is, some benefits are accrued directly to private companies who are not charged to best represent the public's interests, but rather to represent those of its shareholders. Concomitantly, academic units whose mission is strongly depdendent on

public support and largesse (often the arts and humanities) fear "downsizing" because of less availability of industry and federal grant funding relative to science- and technology-based disciplines.

There also are under-recognized implicit costs of privatization. Conflicts of interest in private-public partnerships are endemic to such collaborations, and these conflicts of interest have not always been well managed. Although the researcher, private industry, and university now have a common vested interest in the research outcome as a result of Bayh-Dole, their other interests and constituencies are not necessarily shared, which can create conflicts and tension. Industry interests are to maintain proprietary rights to research outcomes in order to maintain their own competitive advantage relative to other private companies in the same market. Proprietary rights and concomitant non-disclosure can be at odds with the long-standing tradition of university academic freedom and public dissemination of findings. Within the public research university, the university's interest to gain financial benefit by restricting access to research outcomes through patents and licensure can conflict with its responsibilities for public access and community stewardship.

Finally, researchers have a vested interest in outcomes, as consulting income, licenses, royalties, etc., depend on favorable conclusions, which can engender latent biases. The effects of such biases are greater in research outcomes in the health and human sciences, where the scientific phenomena require statistical inference and human judgment. Cognitive science can help to clarify how these implicit biases might affect research outcomes. Sensitivity to incentives and rewards do vary among individuals (e.g., Knutson & Cooper, 2005), but typically do not lead to data fabrication or falsification (Martinson, Anderon, & DeVries, 2005). Rather, incentives contribute more commonly to the intrinsic lens or interpretive framework the researcher utilizes to approach, understand, and present data and findings.

One of the best studied contexts germane here is the effect of pharmaceutical perquisites on physician attitudes, information recall, and behavior. It has been well documented that the majority (61%) of physicians do not believe that gifts, meals, travel, honoraria, etc., influence their prescription practices, and at the same time, do believe that such perquisites affect the prescription practices of the majority (84%) of other physicians (Steinman, Shlipak, & McPhee, 2001). Physician recall of drug-related information also is affected by pharmaceutical benefits. Inaccurate information recalled was much more likely to be favorable to the promoted drug; where for non-promoted drugs, all information recalled was accurate, but none was favorable to the promoted drug (Ziegler, Lew, & Singer, 1995). Finally, recent findings indicate a direct relationship between the onset of pharmaceutical sales promotional visits and the onset of the promoted drug medication starts, as well a relationship between the frequency of sales visits and the number of patients started on the

promoted medications (Schwartz, Kuhles, Wade, & Masand, 2001). Given the impact of physician attitudes, information recall, and behavior, it is not surprising that authors of industry-funded research projects are 3.6 times more likely to report a finding favorable to industry than are those not funded by industry (Bekelman, Li & Gross, 2003), or that although at least 30% of faculty have conflicts of interest that are related to their research, as low as 2% of faculty report them (Warner & Gluck, 2003). Most universities, scientific journals, and the federal government use disclosure of conflicts of interest as the main mechanism for the public consumer to evaluate the validity of scientific claims in light of the vested private industry interests. Perhaps it is time to formally evaluate the efficacy of these disclosure policies, particularly as less than half of investigators can describe accurately their institution's conflict of interest policies (Boyd, Cho, & Bero, 2003).

In conclusion, private industry sponsorship of research activities has led to substantial economic benefits, both nationally, locally, and specifically at the University of Nebraska-Lincoln. A cautionary note—"privatization" puts at risk the steadily built, longstanding public trust, support, and confidence in the integrity of public research universities and its research outcomes. Without enhanced management of the inherent conflicts of interest that accompany industry sponsorship of research, there is a risk of rapidly eroding the "social compact" between universities and their publics, upon which premier public research universities have been built.

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# Paying the Pipeliner: Academic Investment in Early Stage Drug Discovery

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The development and distribution of new drugs requires the collusion of an extraordinarily broad spectrum of professionals ranging from pharmacologists to nurses to marketing specialists. Because of the intellectual and technical challenges associated with this endeavor and also the potential rewards that accompany success in this field, interest in drug discovery research in non-traditional venues—that is, outside of the pharmaceutical industry—has burgeoned in recent years. Scientists and physicians within the academy, however, have played roles since the invention of the field. John Langley (1852–1925), co-inventor of the receptor theory of drug action still used today, was a professor at Cambridge, and clinical trials of advanced drug candidates are routinely carried out in academic hospitals worldwide. What is new is that universities, hospitals, and state or local governments interested in economic development have greatly expanded their activities relevant to early stage drug discovery or preclinical research as part of larger initiatives in bioscience.

In this paper I consider some of the scientific and economic aspects of this trend. The conclusion will be that expanded involvement of basic scientists in preclinical research is a welcome and exciting trend from a scientific perspective, but that those who invest time and money in these endeavors should ponder carefully their expectations of return on investments.

**The drug discovery pipeline**

The road from laboratory to bedside is fraught with difficulty. A typical drug discovery program takes 10 to 12 years between the initial synthesis of a new prospective drug molecule and its entry into the marketplace. Of course, every campaign is different, and there are some differences between the development of traditional, oral medications and other classes of biological agents such as vaccines. In any event, a time frame of 12 years between initial synthesis and patenting must be considered in the context of the 20-year limit given to drug patents. Thus, a new drug has only about eight years of exclusive marketing to accrue profits to offset the cost of developing the agent. It is well known that post-patent competition by generic drug firms greatly decreases the sales of name-brand drugs. For example, Eli Lilly's Prozac® had $2.6 billion of exclusive sales in 2000; after coming off patent, Lilly's market share of fluoxetine

(the generic name of Prozac®) dropped to where the company grossed $0.73 billion for the same drug in 2003—a drop of over 70%. In addition, the industry depends on its profitable drugs to offset the accumulated costs of all of their unsuccessful drug campaigns, which make up the majority of their efforts.

The odds against a given chemical entity making it into the clinic and from there onto the general market are staggering. It has been estimated that anywhere from 10,000 to 100,000 discrete new chemicals are synthesized en route to successfully introducing a new medicinal agent. Currently, the entire pharmaceutical industry, which employs thousands, is introducing about 30 new drugs into the market per year in the United States. The odds that a given medicinal chemist will produce a new drug are accordingly very low; an anecdotal survey conducted by the author indicates that this fraction is less than 1%.

The costs of developing a drug discovery reflect these odds. A recent analysis of available data suggested that the average cost for a new drug could range anywhere from $882 million to $1.65 billion dollars.1 The escalating cost of the drug discovery process is only one piece of the ongoing public discourse on the escalating cost of the drug discovery process is only one piece of the ongoing public discourse on the financing of the pharmaceutical industry. Other elements of this conversation, in particular the topic of drug pricing, are beyond the scope of this paper. It must be recognized, however, that given our current privatized model of pharmaceutical development, the profits earned from each successful drug are needed to pay for projects that fall short of the market. Given this reality, drug companies typically choose their targets based on market considerations in addition to biomedical need. One ramification of this is big pharma's emphasis on drugs for conditions, often chronic, that afflict large numbers of America's increasingly gray population, such as for cholesterol control, diabetes, or Alzheimer's disease.

What costs so much? The drug discovery process can be considered in two parts: pre-clinical development and clinical trials. This process starts with the identification of both a global goal, such as the treatment of a particular disease, and a specific biological hypothesis, usually involving a target such as an enzyme or particular cellular process. For drug discovery to commence in earnest a lead compound must be found and an appropriate set of biological experiments mounted. This begins an iterative process in which waves of compounds are subjected to different biological assays and the information gleaned is used by chemists to zero in on better compounds. Successive generations of molecules are examined until the team is able to identify 1 to 3 compounds that have the potential to be a drug.

As noted before, many thousands of compounds may be tested before a team is ready to undertake clinical trials, which is the first point at which compounds are dosed in humans. This is because a successful drug must satisfy a broad range of criteria, of which the

[1] http://biag.org/BIAG/art3.htm

ability to act at the originally hypothesized target is only one. These include the study of how a particular compound is metabolized by the body, which is critical in determining whether the blood levels will be high enough for the drug to be efficacious while avoiding toxic levels. Safety, of course, is of paramount concern and is addressed in preclinical research by some in vitro (test tube) experiments but mostly through studies carried out in animals. Although computers play an increasingly important role in pharmaceutical research, it is still beyond the abilities of pharmaceutical scientists to design a drug based wholly on theoretical methods.

A preclinical discovery program will result in the identification of one main candidate compound along with several back-up agents that could be brought forward should problems arise with the candidate. Clinical trials are carried out in phases. The first phase is relatively small and involves the dosing of healthy volunteers with the drug with an eye toward determining the safety of the drug and establishing the appropriate dose for humans. Phase II trials mark the first time a drug is tested for efficacy in its appropriate patient population. This process continues into Phase III, which has the same general purpose as Phase II, but is much larger in scope and will typically involve many different testing sites and hundreds of patients. Even after a drug has made it onto the market, the medical community continues to monitor patients using the drug. It may take exposure to many thousands of patients to discover rare side effects of drugs, for example. Conversely, additional benefi-cial uses of drugs are sometimes found after initial marketing for the primary indication.

To the chagrin of discovery scientists, it sometimes seems as though nothing is too small to knock a potential drug out of consideration or end a program entirely. Some setbacks are obvious, such as unacceptable toxicity. Others are technical issues that nonetheless serve as deal-breakers, like the inability to formulate the drug for oral administration. In some cases, problems with manufacturing or procuring the drug can arise, particularly in the case of complex chemicals derived from nature. A high-profile example of this concerned the anticancer agent Taxol®, which was nearly scuttled due to since-resolved concerns with harvesting the drug from the natural habitat of the Pacific spotted owl.

Despite the cursory nature of this overview, it should be clear that drug discovery requires early stage contributions from a remarkable range of professionals. The list includes, but is not limited to, molecular biologists, biochemists, organic chemists, analytical chemists, pharmacologists, metabolism experts, and physiologists. The participation of physicians and other medical professionals increases as one enters clinical stages, but there is nothing to prevent participation of any of the above professionals throughout the range of drug discovery activities.

**Academic involvement in early stage drug discovery: risks and opportunities**

It should be clear from the above list of disciplines that numerous oppor-tunities exist for the involvement of academics in

drug discovery; the role of currently highest profile is that of academic hospitals in clinical trials. In contrast, the number of drugs that were originally discovered in academia is very small. Ironically, this stands in strong contrast to the commonly held opinion that drugs usually are discovered by academic scientists using public funding for their projects.

Of course, examples of marketed drugs that were originally discovered in academia do exist (there are enough that a full list is beyond our scope; only a few examples will be cited for illustration). An early landmark was the invention of important anticoagulants and other health-related processes at the University of Wisconsin in the early part of the 20th century. This work eventually led to the formation of the Wisconsin Alumni Research Foundation (WARF), which supports UW research to this day. University faculty members have been connected with drug discovery in other ways as well, often leading double lives as academics and entrepreneurs. One common model is for the faculty member to identify a promising line of research in her or his academic work and then to found a small company that is charged with patenting and commercializing the invention. Some academic entrepreneurs have even become famous outside of academic circles, a classic example in chemistry being Carl Djerassi, who has been widely celebrated for his role in the development of the birth control pill.

Several recent cases illustrate how financial participation in a successful drug launch can have a transforming influence at a university able to obtain it. Three cases involving medicinal or organic chemistry bear mention. In 1991, Professor Robert Holton of the University of South Florida was granted a patent for the synthetic process that ultimately solved the Taxol® supply problem, generating a very substantial income stream for FSU and in the process making Professor Holton a millionaire many times over. Two other cases involved anti-HIV drugs and required legal action by the respective universities to receive royalty incomes from the inventions. In one case, the University of Minnesota ultimately settled with GlaxoSmithKline in an amount estimated to exceed $300 million to be split between the university and faculty inventors. A few years later, Emory University and its researchers reached a deal with Gilead Sciences and Royalty Pharma to receive $525 million for the sale of its rights to emtricitabine.

Needless to say, the sheer size of these settlements is enough to put stars in the eyes of potential faculty inventors and university administrators alike. Perhaps spurred on by stories like these, both universities and their sponsors—be they endowments or state governments—have tuned into the economic growth opportunities offered by health science research and development in both the academic and private sectors. In Kansas, the Kansas Economic Growth Act, approved in 2004, designated funds of more than $500 million over 5–10 years to be used for bioscience initiatives. Although most of the action in start-up drug discovery takes place in clustered areas, such as the California Bay Area, San Diego, Boston, and the Research Triangle Park in North Carolina, bioscience businesses are springing up in

many non-traditional sites. Such companies need a well-educated workforce that, although recruited nationally or internationally, typically prefers life in a big-city or college-town environment. Depending on the level of capitalization, access to certain infrastructure is often necessary as well, ranging from high-dollar instrumentation to technical libraries. In those cases where a company is based on technology that had its genesis in a university laboratory, proximity to the inventor (who typically retains an academic appointment but has financial interest and a founder's title in the start-up) may be desirable. In return, such companies add to the tax base in their hometowns, provide well-paying jobs for their employees, and can burnish the overall business environment of their communities.

It is clear that major research universities offer many of these amenities through their own academic/research infrastructure, as a ready source of technically qualified personnel, and by the transforming influence they often have in their home communities. Furthermore, many are waking up to the realization of the value, in hard dollars and cents, that academic discoveries may have in the "real world". The result is that more major universities than ever are seeking to promote drug discovery research, of all types and at all levels, within their walls. In some cases, the goal is clearly to replicate many of the elements needed to bring a molecule from the laboratory to the bedside, all within the academic environment.

A final element is the increasingly difficult funding climate across all areas of science. Always cyclical, as of this writing funding levels are at their lowest levels in many years. Despite the much-vaunted recent doubling of the budget of the National Institutes of Health, funding rates are currently limited to the top 7–12% of proposals considered at a given funding cycle (overall rates are slightly higher because they take multiple submissions of a given project into account). For many academic labs, successfully obtaining this funding is a major determinant whether they will thrive and in some cases even survive. Individual investigators and, by extension, the institutions that employ them, have increasingly looked to drug discovery-related activities as a way of getting a competitive edge in the competition for these critical funding sources.

What are the risks and possible rewards of these endeavors? To what extent is drug discovery work appropriate for faculty, staff, and students in institutions of higher learning? The central argument of this paper is that such work is both appropriate and healthy for universities that have that the will and the way, but that those undertaking it should be aware of the limitations of this work and have a clear view of what they hope to accomplish along the way. I will briefly consider various ramifications of early stage drug discovery in academia in the remainder of this section. All opinions expressed are mine and do not necessarily reflect those of my employer or my colleagues.

Drug discovery research is an exciting field that is appropriate for many traditional academic disciplines—and some new ones. For many scientists, drug discovery is "where it's at". As basic sciences such as chemistry, physiology, and biology have successfully tackled many of their classical challenges, the move toward interdisciplinary bound-aries has increased. "Research at the interface between field X and field Y" (insert specifics as needed) has become a cliché in leading journals and graduate school recruiting brochures alike. In addition, other fields like pharmacology and such hybrid disciplines as medicinal chemistry and chemical biology are of obvious intrinsic relevance to various stages of the drug development process. This excitement extends to NIH funding panels. While NIH reviewers have always understood that basic scientific advances are needed to fuel future advances in human health, they are nonetheless increasingly interested in funding projects with a shorter term for payoff.

Doing cutting edge research serves traditional academic values. Besides the obvious rewards to the faculty researcher, which include publications and greater competitiveness for research funding, strong programs in the field provide an excellent education for graduate student and postdoctoral colleagues, who in turn become more valuable on the job market for either academia or industry. Importantly, such benefits accrue whether or not commercialized products lead to income generated through royalties or licensing.

Researchers who work on the drug discovery pipeline have the responsibility to conduct their work with high ethical standards. A common criticism levied is that researchers seeking to work in drug discovery are seeking to do "trendy" research or are in the pockets of the pharmaceutical industry. In my opinion, this viewpoint is uninformed. First, as argued above, the move toward much "applied" work in drug discovery is mostly a product of the natural evolution of the basic academic disciplines. Secondly, relatively few researchers receive funding from pharmaceutical companies for their work. Those who do enter into collaborative research agreements are generally further down the pipeline, closer to commercial development, and are working to exploit early stage discoveries already made in their laboratories. In still other cases, drug companies sponsor awards or fellowships that are given to high-profile, usually young, investigators. Most of these "beauty contest" grants are designed to generate favorable publicity for the company instead of seeking to prejudice the work in the professorial lab. Although one must always be vigilant about the possibility for misuse, this writer is not personally aware of any case in which a faculty member so honored has been implicated in any kind of tainted study.

There are legitimate concerns that arise when academic researchers seek to adopt a more business-oriented model for their efforts. It only takes a cursory glance at the newspapers to get a drift of the temptations to fudge data in the drug development business and there is no

reason to assume that academics would be immune to the same pressures as their industrial colleagues. It is clearly in the best interest of researchers, universities, and the public for all drug discovery workers—in industry and academia—to adopt the most rigorous scientific standards in their work and nothing less should be tolerated.

In the meantime, it would be appropriate to keep in mind that although drug research is expensive and has the opportunity to bring in valuable grants and possibly other kinds of income, healthy and successful universities benefit from diverse academic discourse across a the whole range of human endeavors. Fine arts, humanities, social sciences, business, and other academic disciplines may often cost less but they are certainly not less important. In the end, there is more to scholarship than money, and scholars should not be judged on the size –or even existence – of their research accounts.

Everybody—government, academia, and the public—should carefully consider their expectations for return on investment in drug discovery efforts. For those working on drug discovery research, perhaps it should go without saying that the ultimate reward is actually succeeding in the overall task and bringing a drug to market. And it does happen: witness the stories above for drugs tied to work at Wisconsin, Minnesota, and Emory. In 2006, Professor E. C. Taylor of Princeton University was honored as a "hero of chemistry" by the American Chemical Society for his role in the development of the Lilly anti-mesothelioma agent Alimta®. Professor Valentino Stella of the University of Kansas is an inventor of fosphenytoin, an injectable anti-epilepsy agent. Such cases can be win–win–win, with a new drug made available to a patient population that needs it and financial rewards accrued to both inventors and their employers. Universities that are beneficiaries of drug royalties can use them to establish ambitious new programs in drug discovery or other fields and, in times of difficult funding for research in particular and higher education in general, such windfalls provide remarkable opportunities for future growth. The WARF program at Wisconsin is an impressive model for the long-term possibilities of drug discovery successes.

This kind of success, however, is still relatively rare, and the road from idea to a new drug is harder than ever. Indeed, all of the cases mentioned in this paper involved an established drug company en route to market. More tellingly, several of them also involved lawsuits, generally settled out of court, to sort out which contributions were made by the academic researchers and what sort of reward was ultimately warranted. To go the distance in the "big pharma" model takes both determination and luck to get one of the ca. 30 drugs approved each year. Overall, it seems unrealistic for universities, their endowments, or state governments to invest in drug discovery research with the expectation that a billion-dollar drug is the natural outcome of these efforts.

Science and medicine typically advance incrementally and alternative models recognize this. Even unsuccessful

drug discovery campaigns provide useful knowledge in basic science and can suggest more fruitful pathways for future endeavors. Consider the way molecules move through the pipeline. The "lead compound" described in a previous section is an essential starting point for the pathway to drug discovery. Far from being a commodity item, useful leads that can be advanced to clinical candidates are very difficult to find, requiring extensive "needle in the haystack" enterprises such as high-throughput screening or natural product prospecting just to get started. Accordingly, promising leads are high-value items from which substantial licensing income can derive. For smaller biotech companies, the discovery of such a lead that is then peddled to major pharma constitutes a significant business success; sometimes the small company is bought outright. It is reasonable to expect that leads discovered in universities, which have access to modern biology and chemistry expertise will continue to be attractive to the pharmaceutical industry that is interested in fresh opportunities.

One can maximize the possibilities of finding drug candidates by looking in unusual places or through renovation of already-existing agents. As noted above, the sheer expense of drug discovery has placed most large drug companies in the position of concentrating on large-market patient populations. Accordingly, a significant unmet need exists for many so-called "orphan diseases". One could argue that work in this area not only represents an opportunity for smaller pharma and academic efforts—both of whom would certainly benefit from the marketing of an agent that might earn "only" 100 millions dollars a year—but that alternative drug prospectors have a moral obligation to serve people who are suffering from non-mainstream conditions. National agencies have also recognized this need. Perversely, one area that has been all but abandoned by mainstream pharma is the discovery of new antibiotics. Despite the threat of emerging resistance and gaps in current treatment capabilities, antibiotic research in big pharma has diminished because it has been deemed financially unsound—thus creating another opportunity for academia to fill a major need.

Despite the focus of this discussion on the molecular aspects of drug discovery per se, other disciplines and skills are equally essential and provide prospects for research in fields ranging from biology to information science. Products and processes invented in such areas have similar potential for scientific advancement and possible commercialization.

All of the above requires a sober-minded approach to the issue of intellectual property. Although relatively straightforward for efforts carried out totally within university walls, the involvement of external collaborators can complicate IP matters rapidly. There are numerous complaints from both sides of the fence, chiefly pertaining to unrealistic expectations on the part of academics regarding the value on unverified leads and concerns that industrial expectations for secrecy will interfere with essential elements of the academic/public mission of universities. Some thought as to how these issues will be considered is essential at the outset of any

collaborative effort between the academic and private sectors.

New funding mechanisms encourage team-based research in academia. Given the sheer diversity of expertise that must come together to effect real drug discovery in academia, modern biomedical research is increasingly looking like the "big science" model that has been prevalent in some areas of physics for quite some time. Real progress in drug development requires not only an array of expertise but also their intersection. This has been increasingly true with the prevalence of new technology that has accelerated drug discovery, but which requires specialized technical knowledge and sophisticated equipment. Two technologies that stand together at the beginning of most drug discovery efforts are high-throughput screening and high-throughput synthesis; both of these seek to accelerate drug discovery by carrying out biological examination of new drug-like substances with the aid of automation. Increasingly, collections of chemical compounds called libraries are synthesized and examined in parallel, helping to decrease the time needed for examining the many thousands of compounds needed for a given drug discovery campaign. Both techniques are ubiquitous in industry but have been more slowly accepted in academia due to cost as well as lack of familiarity. Greater penetration of these techniques into academia would result in an additional benefit, as industry also takes advantage of traditional academic innovation as revealed through the scientific literature.

This issue has been recognized by the National Institutes of Health through parts of the NIH Roadmap for Discovery. This initiative, announced by NIH director Elias Zerhouni in October 2003, is a sprawling enterprise that seeks to coordinate biomedical research to better handle modern, complex problems (the motto is "accelerating medical discovery to improve health"). One major element of the Roadmap is devoted to molecular libraries and screening and has worked to encourage centers in both screening and synthesis throughout the U.S. (Similar initiatives have been mounted in Canada.) Such centers provide the academic community with important resources that would otherwise be unavailable through single-investigator research grants. In addition, the NIH is putting together a model for nationwide collaboration between chemists and biochemists through its screening program, the hope being that it will prove possible to greatly enhance the number of chemical tools available for biological research. It is important to recognize that drug discovery per se is not the stated objective of the NIH in this initiative. Rather, the Roadmap seeks to enable projects in basic biological and pharmacological science and to provide new techniques and tools for biologists and chemists. The differences between this kind of basic biology and drug discovery lie largely in how the knowledge gleaned is applied. Thus, there is no cross-purpose in doing Roadmap biology or in seeking to develop new drugs; excellent science in the former activity leads naturally into the latter.

Not surprisingly, center programs, which also operate by peer-reviewed funding mechanisms, have drawn

criticism for the perceived budgetary harm they do to single-investigator programs. And although center grants are both prestigious and typically bring substantial support, they also make demands on universities that receive them. Specifically, many call for the establishment of core laboratories that do specialized research and in some cases provide scientific services to a larger community. To name one example, a core laboratory in high-throughput synthesis will require sophisticated and expensive robotics (which are considerably more costly than beakers and flasks!).2 In turn, this equipment requires laboratory space, which is always at a premium at academic institutions. Most significantly, the maintenance and operation of core laboratories often requires full-time staff, especially when a service activity is expected. Thus, although large center projects may be attractive from the perspective of bolstering the bottom line, the investment in time and infrastructure that they require mean that it only makes sense to take part such programs if they positively contribute to the long-term interest of the organization and its investigators. In other words, there has to be an exit strategy: why invest years of one's finite active research life and considerable financial costs to build up any given research infrastructure if there is no plan for its continuance beyond the 5–10 years of support that is standard for federal agencies? Although it never makes sense to undertake any line of research only because "that's where the money is," such investments can pay off when there is a confluence between an individual's particular research interests and programmatic opportunities. Given the long term requirements of the great majority of drug discovery campaigns, success requires both patience and long-term institutional commitment.

A number of institutions are taking exactly this approach, sometimes dipping into endowments or courting donors to fund such programs on their own terms. This has been most commonly associated with medical schools (Vanderbilt's, Sloan–Kettering's and St. Jude's Children's Research Hospital's programs stand out). There is also the "nothing succeeds like success" approach, in which those programs that have already established an income stream from drug royalties have committed them to long-term activities in biomedical research. None of these models is open to more than a handful of universities, meaning that a combination of grant success (which is to a degree self-perpetuating) and shrewd, focused investment of overhead return or endowment will be the most common approach. In the event that an actual drug launch becomes a possibility, private sector involvement is eventually necessary with the concomitant issue of intellectual property.

**The Bottom Line**: There has to be a long-term commitment to drug discovery that makes sense in the overall vision of the university. Drug discovery is an exciting, contemporary activity that attracts the attention of an increasing number of academic scientists. All who wish to undertake drug discovery in academia, however, should carefully

[2] The author discloses that he is the director of such a center at The University of Kansas funded by the NIH (www.cmld.ku.edu).

consider their expectations and commitment. The chance that any given investigator—in big pharma, biotech, or academia—will bring a new drug to market is small. However, much is to be gained by engaging in basic science related to human health. The best reasons to engage in drug discovery are scientific excitement and a desire to do work that is relevant to human health—both of which are available to a great range of disciplines and academic temperaments. Bringing drug discovery into the academic setting provides an opportunity to contribute to human health in areas that are underappreciated in the global pharmaceutical industry and to train a new generation of scholars who are committed to contributing to the betterment of humanity.

# Privatization of the Public University: A Risk/Benefit Analysis

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The privatization of the public university is seen by some as a major step forward, while others view it as a great danger to the very structure of a university system that has yielded significant benefits to modern society. That is to say, there are both benefits and risks if public universities are to be more private-like and entrepreneurial in their dealings and operations. Likewise, it can be said that there are risks and benefits to remaining the same. Thus, caution dictates that any changes to be made in the public university system in the United States must be made with great care and deliberation so that the end product is better than, or at least as good as, the present system in serving society. To explore this further, I conducted a risk/benefit analysis of the "privatization of the public university with the attendees of the 2006 Merrill Retreat, a distinguished set of public university administrators and professors with many years experience in higher education.

To accomplish this, I selected what I think are key functions of university research as well as basic factors that affect it. I provided a list of what I see as the major risks and major benefits associated with each of these functions or factors and had the group individually measure the degree of risk or benefit associated with each. These evaluations were compiled and used to determine if there are functions of university research that are perceived as being in great danger from privatization or if there are promising clear-cut rewards to the university and society if privatization proceeds.

**Perspectives**

Each of the "evaluators" in our risk/benefit analysis came from various locations, have diverse educational experiences, and hold differing values. As the selector of the items to be evaluated and the commentator on the criteria, I need to disclose my background so the reader can better judge if I come with built-in biases that could have flavored the discussion.

Briefly, I was brought up in a very small farming community where individual accountability was highly important and where everyone was expected to "pull their own weight." I was educated in public schools and received my advanced degrees from two land-grant universities: Purdue Univer-

sity and the University of Illinois. I was a scientist for nearly 15 years at the Institute for Cancer Research, Fox Chase Cancer Center, Philadelphia, where I was engaged in fundamental studies of protein synthesis and gene regulation. Because this work involved pioneering explorations into the newly emerging field of molecular biology, I soon realized from my early training in agriculture and biochemistry that the techniques I was developing held great promise for agriculture and food production. For this reason, I moved to a small start-up company where the promise of plant molecular biology was being formed into what emerged as plant biotechnology. After nearly ten years in industry, I was offered the opportunity to assist in establishing the Center for Biotechnology at the University of Nebraska. Thus, I became a Professor and administrator in a land-grant public university. It is important to know also that the research programs I established at the University of Nebraska have always involved both very basic studies of an area along with potential applications of that research to improving agriculture and food production. For example, our work in developing herbicide (i.e., dicamba)-resistant plants has advanced side-by-side with studies of the biochemistry, molecular biology, cell biology and ecology of the bacteria, bacterial genes and plant systems employed in our studies. Likewise, our fundamental studies of the mechanisms and regulation of the carbon-concentrating mechanism in eukaryotic green algae are undertaken with a close eye to the long-term potential of portions of this mechanism being transferred to crop plants where it may increase internal CO2 levels and allow for higher biomass and/or food production for people throughout the world. Thus, the person who assembled this risk/benefit analysis can be seen as a chimera—a beast with many parts and many different perspectives.

**Food for thought**

As noted above, before beginning a risk/benefit analysis and the evaluation of the results of such an analysis, it is important to realize that different people have different attitudes toward risks and benefits. This is exemplified by the bits of advice provided in the following statements: *If the turtle does not stick out his neck, he goes nowhere.; Better safe than sorry.; With nearly all benefits come risks. The opposite is* not *true.; Without risks, there rarely are benefits.; Don't take strong risks without the potential for strong benefits*. In the end, risk/benefit analysis is largely a subjective, qualitative exercise—but an important exercise in a rational society.

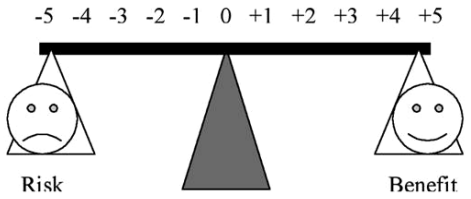
**Functions of university research and factors affecting it**

What are the major risks and benefits associated with privatization of university research? To answer this question, we must also ask, "What are the functions of university research and the factors that affect it"? My list:

- Expansion of knowledge / discovery
- Education and training of students
- Funding of the research enterprise
- Betterment of society

For each of these, I have listed some of the risks and benefits I see as important to consider. After group

discussion, I asked each retreat participant to provide their assessment of the degree of danger or opportunity (i.e., risk or benefit) privatization offers to university research. Specifically, participants were asked to consider each of the risks and benefits below, along with others that may have come to mind, and to decide if overall the risks are greater than the benefits, or vice versa. To provide a semi-quantitative analysis, I had the participants rank the degree of risk or benefit on a –5 to +5 scale.




**Expansion of knowledge/ discovery**

| *Risks of Privatization* | *Benefits of Privatization* |
|---|---|
| Stymies the creative process | Focuses discoveries on societal needs |
| Ignores "unimportant" areas | More "efficient" use of funds |
| Rewards the "money makers," not the innovators or pioneers of new fields | Rewards those who benefit society most (in the short term) |
| "Outsiders" have influence | "Outsiders" have influence |
| Money drives goals | Money available to achieve goals |

**Student education and training**

| *Risks of Privatization* | *Benefits of Privatization* |
|---|---|
| Students narrowly trained | Students ready for jobs |
| Liberal education deemphasized | In-depth training for specialization |
| Technology changes (specialization dangers & obsolescence) | Technology advances (job creation) |
| Narrow perspectives | Focused goals |

**Funding of the Research Enterprise**

Funding is essential for all university research; the question is, will privatization of university research offer greater opportunities or greater dangers to this factor in the relative success or failure of future university research?

| *Risks of Privatization* | *Benefits of Privatization* |
|---|---|
| Government funding may decrease | Private funds may increase |
| Increased "mission oriented" research | Rapid progress in chosen areas |
| Business leaders help choose directions | Business leaders help choose directions |
| More "fickle," short-term funding | Potentially more funds in chosen areas |
| Government has less say in goals | Government has less say in goals |

**Betterment of Society**

The reason taxpayers invest money in universities is their belief that the university will yield dividends by providing well-educated people and by generating knowledge that is beneficial to society. So, how will privatization of

research in public universities affect the payoff in this investment? Here are factors on both side of the issue.

| *Risks of Privatization* | *Benefits of Privatization* |
|---|---|
| Decisions made for profit, not to address "unprofitable" societal challenges | Directs resources to important human or environmental problems |
| Feeds the body, but not the soul | Feeds, heals and soothes personal wants and needs |
| A few make important decisions | Decisions are made efficiently |
| Bad decisions may be made for society | New goods, services delivered efficiently and inexpensively to society |
| The rich get richer | Wealth is created |

**Another important risk**

A strong case can be made that the phenomenal economic success of the United States, since World War II particularly, has evolved due to the production, largely through public universities, of well-trained, innovative and motivated individuals from almost the entire economic strata of society. This was made possible in large part by the fact that public education was affordable by almost all families. With a sharp decline in funding of the public universities by state governments, that situation has changed dramatically. A university education now is affordable to many students only with part-time or full-time jobs during college and/or by encumbering long-term debt that impedes their economic progress until mid-career. This comes at a high cost to our society and presents a significant risk to our continued prosperity that few citizens or state governments, recognize. Such a situation deserves a separate, serious risk/benefit analysis of its own. See the keynote address of this Merrill Retreat, by Dr. John Wiley, Chancellor of the University of Wisconsin, for an insightful perspective on this issue.

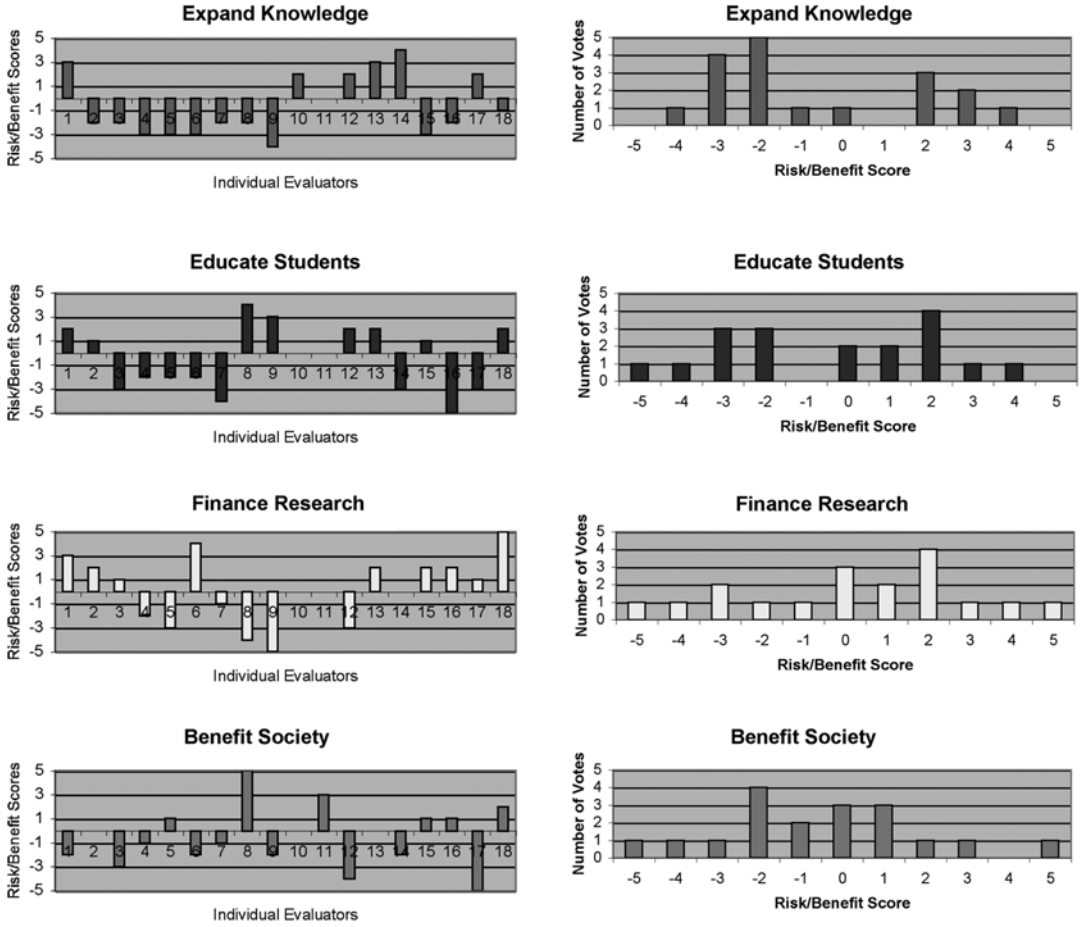
**Results of the Evaluation**

Eighteen people participated in the risk/benefit analysis at the Merrill Retreat; the summary data is below. Again, the ratings ranged from –5 indicating an extremely high level of risks to +5 signifying very strong benefits. The averages of evaluation scores for each category were as follows:

- **Expansion of knowledge / discovery**
  Evaluation ± -0.61 ±2.57 (SD)
- **Education and training of students**
  Evaluation ± -0.39 ±2.66
- **Funding of the research enterprise**
  Evaluation ± +0.22 ±2.78
- **Betterment of society**
  Evaluation ± -0.50 ±2.48

At first glance, the average score for each category might lead one to believe that the group of university administrators, technology transfer specialists, and professors saw neither great risks nor great benefits from the privatization of university research. A second examination, however, of the standard deviation of opinions immediately indicates a wide range of opinions regarding risks and benefits. This dramatic mix of opinions regarding the hazards and opportunities of privatization is more clearly seen in the histograms on the next page. The left column depicts the scores given by

individuals (presented in a semi-randomized fashion) in regard to risks and benefits privatization offers in each category. The right column offers perhaps a better view of the spread of opinions, ranging in two cases from –5 (very high risk) to +5 (very great benefit). There appears to be a bimodal distribution of votes cast in the categories of "expand knowledge" and "educate students" indicating perhaps two camps with potentially distinctly diverging views. In the "finance research" category there certainly appears to be no general consensus, but, nonetheless a slight majority opinion that there may be more benefits than risks associated with financing research under a more privatized system. The positive leanings here are perhaps not so surprising given that increased external funding is one of the virtues trumpeted




**Left column of graphs**: Evaluations from eighteen participants in regard to risks and benefits for each of four major functions and factors associated with university research. The order of depiction of evaluations by individuals has been semi-randomized between histograms so that all evaluations by any one person cannot be deduced. **Right column**: Distribution of evaluation scores on the –5 to +5 risk/benefit scale for each of four major functions and factors associated with university research**.**

by advocates for more involvement of industry in university research. However, the perception of somewhat greater risks for universities in the other three categories may reflect a more conservative view of dangers inherent in universities becoming more financially independent of state governments and more closely affiliated with the corporate world.

Although the voters in this evaluation, on average, expressed some concern about the contributions university research will make to society under a more privatized system, there was stronger concern in respect to the traditional role of a university in expanding knowledge through discovery-focused basic research. In other words, there may be some timidity that we may begin to starve the goose that has routinely produced golden eggs for society in favor of diverting feed to fatten the turkey we can have on the table next week. Or is this simply a reflection of the slow pace at which universities are willing to change even though they are part of a society that, at times, appears to be subject to an ever increasing pace of change and upheaval?

In the end, one person's risk may be another person's opportunity and vice versa. Indeed, a cold-hearted risk/benefit analysis may leave out even more important factors ultimately leading to success or failure. Is it more important that we, as research universities, create visions for a better world and a determined plan to get to that better world? There will be no benefits without risks, but an unwavering will to achieve lofty goals in spite of perceived obstacles, in the end, may be a more important factor than all the risks laid out before us. This has been better articulated by others.

> "It is only by risking our persons from one hour to another that we live at all. And often enough our faith beforehand in an uncertified result is the only thing that makes the result come true."
>
> William James, *The Principles of Psychology* (ch. 4), 1890

# Privatizing Public Research Universities:
## Wealth Creation as a Laudable Goal and Not a Sleazy Perversion

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State financial support for higher education has been declining nationally for years. Seldom has it kept pace with annual increases in either inflation or state revenue. During the economic boom of the 1990s, state revenues in Kansas were substantially higher than inflation; annual state budgets for higher education were not. As a result, the state proportion of the operating budget at Kansas State University and other Kansas public institutions declined annually, a trend consistent across most public universities in America. Clearly, privatization of public universities is a reality that institutions now must recognize and act upon.

**20th-Century Mission Impossible: Creating Wealth in Public Universities**

Research universities have been undergoing a myriad of changes in recent years, as I detailed in my 2004 Merrill article.[1] As I noted then, "institutions not moving forward strategically—changing with the times—will soon be left behind, becoming ever less relevant and underutilized." Even so, there is great pressure on most university campuses to maintain the status quo. College faculties are reluctant "merchants of change," but if they will lend their assistance, privatization can be turned in their favor.

Since the enactment of the Bayh-Dole Act in 1980, most research universities have become more focused on technology transfer, i.e., they have attempted to capture value on the intellectual property (IP) developed at the institution. "Prior to 1980, the federal government retained title to IP created on federally funded research projects, and the IP was lost to commercialization. The Bayh-Dole Act changed that by allowing universities to retain title and requiring that commercialization efforts be explored."[2] Nonetheless, few technology transfer offices are major profit centers supporting university privatization.

There are exceptions though, and the University of Wisconsin is a great example. Intellectual property returns to that university have been in the millions of dollars annually for decades—from Warfarin, Vitamin D, and a few other big-dollar patents—beginning well in

advance of Bayh-Dole. Wisconsin is one of but a few success stories, however.

For those public research universities that have made money, the income has generally been based on a small number of technologies, and wealth creation has not been an institutional mission. In fact, creating wealth—*at a public university*—tended to be an alien and perverse concept to most faculty members during the 20th century.

**Creating Wealth in 21st Century Public Universities: Mission Possible?**

In the new millennium, the recognition by faculty, not just university administrators, of the financial challenges facing their universities has increased appreciably. International conferences held on the topic—for example, the Glion Colloquium in Switzerland in 2003 on *Reinventing the Research University*—illustrate the level of concern. Reinvention (if it's real) will not be a trivial endeavor for institutions steeped in medieval traditions.

There is hope. The then-Chancellor of North Carolina State University, Marye Anne Fox (now chancellor of the University of California San Diego), wrote in her Glion reinvention article on financing: "American public higher education has entered a new era characterized by rapidly increasing enrollment, declining state support, and rising expectations for involvement in wealth creation."[3] Higher education is moving forward when a university chancellor can talk openly about the need for wealth creation.

But, how does a public university institutionalize the new goal of creating wealth? And creating wealth for whom? Typically, university deliberations about wealth creation (if they occur) focus on creating wealth for someone else, not the university. Most such discussions revolve around technology-based economic development and the role universities can play in that process . . . offshoots of Bayh-Dole.

Occasionally, faculty entrepreneurs are among the financial beneficiaries of university commercial spinout ventures, but an institution of higher education isn't expected to become wealthy in the process. It might share in some portion of the revenues, possibly, but it should certainly not become tarnished by affluence.

And why not? Wouldn't that provide needed resources for privatization reinvention?

States are backing off in their tax support of higher education. That makes privatization a 21st century reality, and as a result, universities must become more entrepreneurial.

Given the new reality, why must public universities be entrepreneurial on the cheap? Why not think big? What's wrong with creating wealth for the purpose of bankrolling privatization *and* enhancing the institution's financial bottom line significantly?

Sure it might not work. The Colorado Institute of Technology found that out, having to close its doors in 2006 after just 6 years in existence. [4] Training 10,000 high tech workers in an industrial sector that lost 40,000 jobs is less than optimal and not very profitable.

**Rational Exuberance: Seeking "Mission Compatible" Wealth**

Nevertheless, there are some economic strategies that universities

might consider to create wealth. One particularly intriguing approach has been described as "rational exuberance" by Michael Mandel, a philosophy touted for an economy based on innovation.[5] An exuberant growth economy is driven by new technologies, and new technologies are developed routinely at public research universities. They are what such universities are all about, especially when the new mission of economic development is factored in. Moreover, exuberant economic growth sustains high rates of employment for a college educated workforce, and "jobs for graduates" is a vital university outcome metric.

Cautious economic growth—the alternative—encourages capital accumulation and savings, but because there's less innovation, routine technology-related jobs move offshore—to China, India, and elsewhere. U.S. jobs diminish for those with a college education. Thus, public research universities are ill advised to advocate a cautious approach. That being the case, why couldn't universities adopt rational exuberance as an economic philosophy by which to operate henceforth?

In all probability, the biggest impediment is going to be the non-risk taker mentality that permeates most universities. As noted by *Rational Exuberance* author Michael Mandel: "An innovative economy demands the willingness to experiment, the ability to take risks and commit money into promising opportunities, and the intestinal fortitude to fail and keep going."[6] The "intestinal fortitude" attribute is likely to present problems at most public research universities . . . at least if the fail part occurs within the institution.

Of course, the failure outcome might be lessened by adopting a General George S. Patton leadership principle touted for corporations by Alan Axelrod: "You are never beaten until you admit it. Hence, don't."[7] So perhaps the way for universities will be a melding of Mandel's and Patton's philosophies: Take risks, never admit defeat, never fail—"irrational exuberance."

Such an amalgamation isn't publishable though. *Irrational Exuberance* is already the subject of a book by an economist more risk averse and less enthusiastic than Mandel.[8]

**Creating an Entrepreneurial University Culture**

Regardless of the reinvention model they choose, public research universities must become more entrepreneurial if they are going to survive privatization. The following six common principles will likely be required:

- *Challenging the Status Quo:* In the absence of external pressures to transform, the status quo tends to prevail. Therefore, it is incumbent on university leaders to apply necessary force in the new direction. Reinvention is going to require defined strategies and tactics. Once those are identified, university leaders must lead, monitor follow-through, and continuously adjust. Leaders must challenge the status quo daily.
- *Fostering Flexibility and Fluidity:* Breaking down disciplinary silos is a critical early step if an institution is to respond to emerging opportunities—especially to

emerging opportunities with the private sector.[9] In the new millennium, all universities are talking about multidisciplinary research, but most still lack the fundamentals—flexibility and fluidity—to react quickly to new initiatives as they emerge. Agility has not been the prevailing watchword, but it must become the mantra in order to exploit entrepreneurial opportunities. Barriers must be removed; agility enhanced.

- *Crafting Innovation Communities:* Universities should promote the creation of "innovation communities," associations similar to the non-academic settings described by von Hippel in *Democratizing Innovation*.[10] He writes about innovation "nodes consisting of individuals or firms interconnected by information transfer links which may involve face-to-face, electronic, or other communication." If we can create public/private innovation communities—linking academic and other public sector expertise to complementary private sector expertise—it could turbocharge innovation. In the process, it could also reinvigorate relationships with local, state, and federal EcoDevo partners.
- *Managing Conflicts:* Public universities—by their very nature of being public—must operate in the open; transparency is crucial. Thus, potential or perceived conflicts of interest must be managed in an open, transparent manner to preserve institutional integrity in an entrepreneurial environment. We have only to look to the infamous Enron-Anderson duo; both had policies that should have managed conflicts of interest and brought problematic issues to the fore.[11] The policies obviously didn't prevail. Universities should learn from these corporate fiascos, given that many university conflict of interest policies may be no better than those of Enron and Anderson. The efficacy of institutional policies must be *frequently* evaluated during privatization reinvention.
- *Enhancing the Status of Commercialization:* Support for an on-campus private enterprise culture is beginning to grow. Texas A&M University took a major step recently when its Board of Regents—for the purpose of promotion and tenure—elevated the stature of patents and commercialization of university research to a level comparable to teaching, research, and service.[12] This break from tradition should be the wave of the future, since it will finally reward, rather than penalize, faculty for being entrepreneurial. Coupled to the recruitment of wealth creating faculty, it should propel a change in institutional culture.
- *Facilitating Risk-Taking:* Taking risks is not common at public research universities. And while it might be nice to believe that most entrepreneurial activities could occur inside the hallowed halls, that is unlikely to be the case on most

campuses. Six figure bonuses can raise the ire of non-participating faculty, particularly when such incentives are added to only a handful of state salaries.[13] Money-losing ventures would be worse: Heads would roll. Thus, entrepreneurial efforts are often best handled by university affiliated non-profit or for-profit entities.[14] Moving risks *and rewards* off-campus is the safest bet.

**A New K-State Initiative: The Commercialization Leadership Council**

Always exuberant, K-State is intentionally heading onto the wealth creation highway, hoping to build some logical predictability into its travels while anticipating potholes and detours along the way. Fostering and facilitating innovation via *rational* exuberance is the goal, but we'll accept *irrational* exuberance (the Mandel/Patton variety) if it gets us where we need to go. Cautious growth—emulating France and Germany[15]—won't cut it.

K-State has been nurturing a more entrepreneurial culture on campus for a long time. That has become a top priority in the past few years. We have focused on the six principles listed earlier for creating an entrepreneurial university culture and they all require ongoing effort. As part of this growing institutional activity, K-State recently formed a policy/ oversight group —the Commercialization Leadership Council (CLC).

*Formation of the CLC:* The Boards of Directors of the KSU Research Foundation (KSURF) and the National Institute for Strategic Technology Acquisition and Commercialization (NISTAC) created the CLC at K-State. KSURF and NISTAC are both not-for-profit, 501(c)(3) corporations created to support K-State; KSURF protects, holds title, and licenses K-State intellectual property, and NISTAC facilitates the development of regional value propositions, including the launching of technology-based ventures.

*CLC Membership:* K-State administrators on the Boards of KSURF and NISTAC serve on the CLC, which is chaired by the Provost. Table 1 below lists the membership. Other CLC members include the presidents of NISTAC, the KSU Foundation, Kansas Technology Enterprise Corporation (KTEC), and Manhattan Area Chamber of Commerce, and the Manhattan city manager. KSURF and NISTAC provide staff to the CLC.

*CLC Mission:* To "facilitate commercialization activities involving university intellectual property, university infrastructure, university personnel, and/or other university resources. Inherent in its mission is providing leadership to enhance communication, coordination and leveraging of university, community, and other external assets and establishing university procedures whereby appro-priate affiliated not-for-profit and for-profit entities which provide a return on investment to the university may be created." The CLC is about entrepreneurship and wealth creation.

*CLC Strategic Wealth Acquisition Targeting (SWAT) Teams:* Venture-specific SWAT Teams represent the nucleus of CLC activities. As structured now, seven core members are included.

| TABLE 1: COMMERCIALIZATION LEADERSHIP COUNCIL | |
|---|---|
| K-STATE MEMBERS | NON-UNIVERSITY MEMBERS |
| Provost / Vice President for Academic Affairs | NISTAC President* |
| Vice President for Administration & Finance | KSU Foundation President |
| Vice President for Institutional Advancement* | KTEC President |
| Vice Provost for Research / KSURF President* | Manhattan Chamber of Commerce President* |
| Senior University Attorney | Manhattan City Manager* |
| Dean of Agriculture | |
| Dean of Arts and Sciences | |
| Dean of Business Administration | |
| Dean of Engineering | |
| Dean of Veterinary Medicine | {Policy Staff: NISTAC/KSURF} |

| TABLE 2: VENTURE-SPECIFIC SWAT TEAMS | |
|---|---|
| CORE MEMBERS | VENTURE-SPECIFIC MEMBERS |
| Vice President for Institutional Advancement* | College CLC Members |
| Vice Provost for Research / KSURF President* | Other University Affiliated Expertise |
| NISTAC President* | Other Non-University Affiliated Expertise |
| Manhattan Chamber of Commerce President* | |
| Manhattan City Manager* | |
| University Entrepreneurial Leadership Director | |
| University Government Relations Director | {Innovation Staff: NISTAC/KSURF/ Colleges} |

(five from the CLC*) with significant variability possible among the venture-specific members. The SWAT Team efforts are led by the K-State Vice President for Institutional Advancement. NISTAC, KSURF, and the colleges provide SWAT staff. A key element of any SWAT team is its ability to assemble particular expertise required for a specific venture. And because these ventures could roll out of the university or be recruited externally, the skill sets are highly variable. Thus, flexibility is crucial. Figure 1, page 49, illustrates where these skills may be acquired though the list is not exhaustive.

An overall operational schematic for the CLC is also depicted in Figure 1. KSURF and NISTAC provide necessary staffing, and the K-State colleges are primary stakeholders and providers of IP and expertise for ventures. External ventures are also facilitated.

*CLC Strategic Leveraging of Resources:* Universities must be thoughtful and strategic in acquiring resources for any purpose, including (and, perhaps, especially) resources for commercialization ventures. The stakeholder makeup of the CLC is designed to ensure that the required resources are leveraged in a coordinated fashion, not haphazardly.

*CLC Wealth Creation:* K-State must realize substantial returns on investment if this new initiative with the CLC is to be a success. The efforts must create wealth for the institution to cover the

costs of privatization and to grow the financial bottom line appreciably.

Big numbers will be needed for faculty as well, perhaps on the order of the now-dated chapter "Getting by on $875,000 a Year" in *The Wall Street Journal Book of Chief Executive Style*.[16] Entrepreneurial faculty must have access to fractional appointments (partially inside the university, partially outside), where a "sky's the limit" income philosophy prevails on the non-university side. The goal is no longer a living wage or some level of enhanced living wage for faculty. The new objective is prosperity.

In the spirit of rational exuberance, equity positions in innovation-driven ventures are likely to be where the most significant returns of investment can be generated. CLC members are in discussion with a number of major corporations about joint startup ventures, and we anticipate that these will be a major near-term focus. Some may involve only university-generated IP, but corporate IP is likely to be linked to most such ventures.

**In Search of Rainbows ... and Bullion-Laden Vessels**

Finding a pot of gold isn't easy regardless of where the search for it takes place. However, any sane individual working inside academe would deem it hopeless to find one buried at a public university. The Ivory in the Towers has worn thin after decades of under-funding; any reserves were depleted long ago. So why even bother digging for ingots?

K-State is trying a new approach with the CLC — we're not searching for obscure pots of gold; we're scanning the horizon for rainbows. They're rare but easier to spot. The CLC is attempting to identify the most inspired, multihued success stories—the clusters of IP, the natural innovation communities, the leading multidisciplinary research arenas, the unique analytical services—to then structure innovation ventures on the foundations they provide. By doing so, the CLC expects to harvest the occasional bullion-laden vessel.

The Click's role after sanctioning the venture is to support risk-taking, while attempting to manage the risks taken and zealous type-A folks taking them. The tasks are nontrivial.

Time will tell whether K-State's rational exuberance tactics will generate the sought after revenues. But, we hope not too much time. Privatization resources are needed now!

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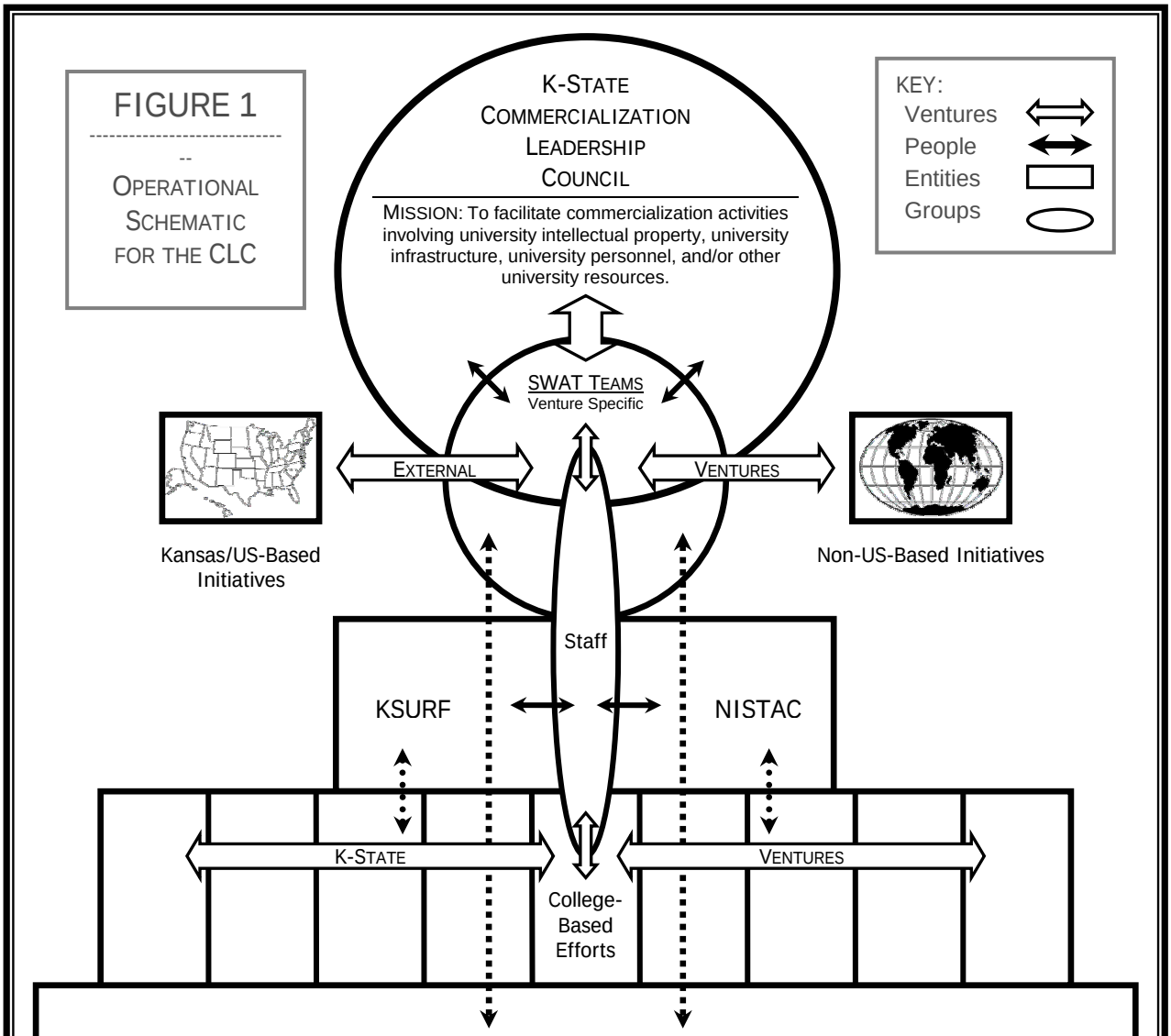


STRATEGIC WEALTH ACQUISITION TARGETING (SWAT) RESOURCES, ASSETS, AND TOOLS

| UNIVERSITY AFFILIATED | FEDERAL, STATE, AND CITY AFFILIATED |
|---|---|
| President's Staff | Kansas Congressional Delegation |
| Provost's Staff | U.S. Department of Commerce |
| Deans' Council | U.S. Department of Labor |
| Associate Deans for Research Council | U.S. Department of Agriculture |
| Department Heads | U.S. Department of Homeland Security |
| Faculty Senate | Economic Development Administration |
| KSU Foundation | Small Business Administration |
| Alumni Association | Kansas Department of Commerce |
| Center for Leadership | Kansas Technology Enterprise Corporation |
| Advanced Manufacturing Institute | Kansas Bioscience Authority |
| K-State Research and Extension | Riley County |
| Bio-Processing & Industrial Value Added Program | Pottawatomie County |
| Center for Engagement & Community Development | City of Manhattan |
| Office of Research and Sponsored Programs | Manhattan Area Chamber of Commerce |
| Biosecurity Research Institute | Kansas City Area Chamber of Commerce |
| Federal Relations Committee | Kansas City Area Development Council |
| Intellectual Property Advisory Committee | Kansas City Area Life Sciences Institute |
| (Others as Appropriate/Needed) | (Others as Appropriate/Needed) |

# Clinical Research Resources at The University of Kansas Medical Center: General Clinical Research Centers (GCRC) and Clinical Translation Science Awards (CTSA)

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The University of Kansas Medical Center

The federally funded General Clinical Research Centers program (GCRC) has been in existence for nearly 50 years. What is a GCRC? It is a National Institutes of Health (NIH)-supported multidisciplinary research unit that facilitates investigator-initiated clinical studies and trials conducted by full-time faculty at an academic health center (AHC). GCRCs provide clinical research infrastructure to investigators who receive funding from federal agencies, private foundations, and other peer-reviewed sources. A GCRC can also provide support for investigator-initiated, unfunded pilot studies and, to a limited extent, for industry-sponsored studies. The premise for usina an infrastructure on a GCRC is that the space, the equipment, and personnel are provided at no cost for investigator-initiated clinical research studies.

There are now approximately 80 NIH funded GCRC programs throughout the United States. These programs are funded through the National Center for Research Resources (NCRR) arm of the NIH. There are NIH-funded GCRCs at Washington University in St. Louis School of Medicine, St. Louis, Missouri; University of Iowa Health Care, Iowa City; and University of Oklahoma College of Medicine in Oklahoma City. Further information on the GCRC program through the NCRR can be found at their web site: www.ncrr.nih.gov.

**Development of a GCRC at the University of Kansas Medical Center**

We began the process of initiating a GCRC for The University of Kansas Medical Center (KUMC) campus in 2002. At that time we established four goals:

- Provide clinical investigators from the School of Medicine, School of Nursing and School of Allied health with a modern, state of the art facility in which clinical research could be conducted.
- Enhance multidisciplinary research across departments and the three schools.
- Enable and train junior faculty and trainees to become more involved in clinical research.

- To apply for federal funding to support the GCRC.

We have accomplished each of these goals. At the present time, though our GCRC is not yet federally funded, we have set up the infrastructure for a typical GCRC and are operating under the NCRR guidelines for funded GCRCs.

The typical organizational structure for a GCRC is outlined in Figure 1. The Executive Dean of the School of Medicine, Barbara Atkinson, MD, serves as the overall principal investigator for the GCRC and I serve as the Program Director. The GCRC at KU Medical Center currently is an exclusively outpatient GCRC unit. NIH-funded GCRCs often have fixed inpatient beds for overnight stays as part of the GCRC, or can accommodate overnight patients in the university hospital through a scatter-bed system. In our NIH grant proposal for funding for our GCRC (see below), we have adopted the scatter-bed model. The GCRC grant will then provide funds for our overnight inpatient stays for our investigator-initiated trials. We do have a core laboratory on our GCRC for specimen processing, centrifugation, and temporary storage in a –70 C freezer. We can measure serum glucoses using an YSI instrument.

We also have a modern, fully functioning metabolic kitchen that can be utilized by investigators, primarily those in the Department of Nutrition. The Department of Bioinformatics provides study design and biostatistical and data management support.

**The GCRC Advisory Committee (GAC)**

A critical part of a functioning GCRC is a GCRC Advisory Committee (GAC). Investigators must submit their protocols to the GAC, which meets monthly. The GAC reviews all protocols for scientific content as well as for the need for utilization of the GCRC infrastructure. The GAC at The University of Kansas Medical Center is co-chaired by Matthew Mayo, PhD, and Jared Grantham, M.D. There are currently 20 voting members on the GAC, as well as a dozen ex officio members. One ex officio member serves as a research subject advocate (RSA) and reviews each protocol to ensure subject safety. This is an additional layer of safety review above and beyond that done by the human subjects committee (HSC). A research subject advocate is a mandatory component of all NIH funded GCRCs. There is also a biostatistician on the GAC who reviews each protocol for biostatistical research considerations. A GAC provides direct feedback to the investigators after the protocol is reviewed. Once a protocol is approved, the investigator can utilize the resources of the GCRC to perform the research.

**What can the GCRC do to facilitate clinical research?**

For GAC-approved studies, GCRC can:

1. Provide space to see patients.
2. Provide biostatistical support and study design.
3. Provide data management.
4. Provide nurse support.
5. Provide specimen collection and storage.

6. Provide some equipment that can be used in common by multiple investigators.
7. Provide some laboratory studies that can be performed on the GCRC or they can be performed at another laboratory which GCRC funds. As mentioned above, there is no cost to the investigator for the services for investigator-initiated studies. If a clinical research study is initiated by industry, and is being performed by a local investigator, there is a charge for the GCRC space and resources.

There are some services the GCRC cannot provide. We cannot provide research coordinators to investigators for their clinical research studies. The investigators must cover these costs through their grant funding. Under current NIH guidelines, the GCRC cannot provide significant resources for industry-initiated clinical research. Only approximately 10% to 15% of all protocols performed in an NIH-funded GCRC can be initiated and sponsored by industry. While the GCRC charges the industry grant for space and resources, under current guidelines, only $25,000 annually can be received by a GCRC for these projects. Any amounts received over that level will result in a decrease in funds provided by the NIH/NCRR grant.

Currently the GCRC is located in approximately 6000 square feet of newly remodeled space on the ground floor of the Delp Pavilion at The University of Kansas Medical Center. There are six patient examination rooms; a large infusion / procedure area; a specimen processing laboratory; cognitive testing room; patient lounge; exercise physiology suite with a metabolic cart; metabolic kitchen; computer laboratory; conference room for our GCRC and other clinical research related meeting; and administrative rooms for the biostatistician, nursing and administrative personnel, the program director, and associate and assistant program directors.

**The GCRC Timeline at KUMC**

A GCRC planning committee was formed in 2002. This committee met monthly for two years in order to develop the infrastructure needs for the GCRC. The space in the Delp Pavilion was identifie; remodeling began in June 2004 and was completed October 2004. Doctors Atkinson and Barohn announced the formation of the GAC in the summer of 2004 and notice went out to all clinical investigators on the KU Medical Center Campus to indicate that research applications could be submitted. The GAC began reviewing protocols in September 2004.

The GCRC officially opened its doors in January 2005. The GAC continues to review protocols monthly and as of August 2005, there are currently 57 approved protocols. Simultaneous with the development of a functioning GCRC, a grant application was prepared. The NCRR had been notified of the development of our GCRC at KU Medical Center when we began the planning process in 2002 and they had scheduled us to submit our proposal in June 2006. The KU Medical Center GCRC NIH grant application was submitted on June 1, 2006, and is currently under review.

Two primary sources have provided the funding for the KU Medical Center GCRC since its inception. The majority of the funds have been supplied through the executive vice chancellor office at KUMC. Funds were provided for renovation of space, office supplies and computers, and most significantly nursing, administrative and biostatistical personnel. In addition, The University of Kansas Hospital generously provided all initial equipment and medical supplies in the clinical research areas, including such equipment as a metabolic cart, electrocardiogram, freezers, centrifuges, and all one-time-use disposable medical supplies. All of this financial support was provided in anticipation of an NIH grant submission.

**CLINICAL TRANSLATIONAL SCIENCE AWARDS (CTSA)**

*Barriers to Clinical Research*

Despite the development of the successful NIH-sponsored GCRC program over the last 50 years, there are still considerable barriers to initiating and completing successful clinical research at academic health centers. Dr. Elias Zerhouni, director of the NIH, has outlined the challenges for clinical research.[1] Dr. Zerhouni has pointed out that there has been an explosion in clinical demands with reduced financial margins so that clinicians have less time to devote to training as a clinical researcher, and then to ultimately perform clinical research studies. The training that is available is very fragmented for young researchers, is divided between multiple university components, and it is difficult for a young investigator or to attain the required training in an easily accessible fashion. There is an increased regulatory burden that provides another major barrier to clinical research. The regulatory burdens have become increasingly complex and time consuming and these mandates often prolong an already lengthy research trajectory. The resulting delay in generating results from clinical and translational studies additionally contributes to difficulties with promotion and tenure decisions for clinical investigators.

In summary, Dr. Zerhouni has stated that there is no true "HOME" for our clinical research. Based on this recognition, he has proposed a "systems biology approach" to creating a home for clinical and translational sciences.

*Announcement of the Clinical and Translational Science Award Program*

In October 2005, the NIH released an RFA announcement for institutional Clinical and Translational Science Awards (CTSA). The stated purpose for the CTSA project was to forge a transformative and integrative academic home for clinical and translational science. Dr. Zerhouni has stipulated that these new homes in academic health centers must be a Center, Department, or Institute. These clinical research units must encompass all components of clinical research, including education, career development, and regulatory components for clinical research infrastructure. These new clinical research units must promote multi-disciplinary research teams, create an incubator for innovative research tools, and catalyze the application of new

knowledge to clinical practice. These clinical research units must also provide degree-granting capabilities in clinical research that will lead a trainee to either a Masters or a PhD degree.

With regard to the existing GCRC program, it is anticipated that existing funded GCRC programs will be slowly phased out. However, the clinical research infrastructure provided by GCRCs can be incorporated into the larger CTSA Awards. By doing so, this will give academic health centers greater flexibility in modeling clinical research infrastructure space for the future. In this new model, there will potentially be fewer restrictions on collaborations with industry in developing clinical research programs at academic health centers. For example, these appear to be no restriction on number of industry sponsored studies or in the amount of funds that a clinical research center can receive from industry.

*Planning Process for the CTSA at KUMC and the Kansas City Region*

Shortly after the RFA for the new CTSA Awards, a planning process was initiated at KU Medical Center to develop our university's response to this new program. The various planning committees and subcommittees were established in October 2005 (see Table 1) and began meeting regularly. The timeline of the RFA was that applications had to be submitted to the NIH by March 27, 2006. At that time, the NIH was accepting two types of applications. The first was a planning grant for $150,000 that would allow academic health centers time and some resources to further develop a global CTSA application. The second type of grant was a full CTSA application that could be as large as 6 million dollars per year (if pediatric clinical research was involved; up to 4 million dollars without clinical pediatric research). In addition to the 6 million dollar per year CTSA award, all existing K30, T32, and GCRC grants were to be rolled into the CTSA application. By doing so, a full CTSA application would become one of the largest institutional research grants that an academic health center could receive. The stated goal of the NIH was to fund 60 small CTSA planning grants and five to seven full CTSA grants in the first round of applications. Their ultimate goal is to fund 60 full CTSA awards throughout the United States by 2012.

As our planning committees met, we recognized there would be a number of weaknesses and strengths for KU Medical Center CTSA application. The weaknesses included:

- No current GCRC NIH funding.
- No clinical T32 training grants.
- Relatively small clinical mentors and mentors of current clinical R1 grants.

The strength of KU Medical Center CTSA application included:

1. The existing NIH funded K30 program and the Masters of Science and Clinical Research Program.
2. The current existing GCRC infrastructure.
3. The Research Institute at KU Medical Center.
4. The multidisciplinary and collaborative research efforts between the School of Medicine, School of Nursing and School of Allied Health.
5. A strong bioinformatics center.

6. Strong ties with programs at the University of Kansas-Lawrence Campus, particularly drug development and the Lifespan Institute.
7. Potential strong ties with partners in the community, other regional academic centers and in private industry.

As a result of the CTSA planning process, it was decided to submit a CTSA planning grant before the March 2006 deadline. The planning grant has been submitted and is currently under review.

Our goal is to recruit a project manager and administrative assistant who will assist us in the CTSA planning committee process. All of the committees will meet regularly over the next year to determine the timing and content of KU Medical Center's full CTSA application.

**Concept of a Heartland Institute for Clinical Research**

Our CTSA planning grant application outlined the concept of a new Heartland Institute for Clinical Research (HICR) that will be a new integrated home for clinical and translational research, both at KU Medical Center and in the region. We anticipate that the HICR will consist of many centers, and within each center will be a number of cores or programs (see Figures 2 and 3). For example, within the education center there will be the existing Masters of Clinical Research and K30 programs and new additional K12 and T32 career development awards that can provide significant salary support and thus release time so that young investi-gators can pursue training in clinical research. The education center will also encompass developmental programs including the recently initiated Intro-duction to Clinical Research course that was launched in the fall of 2006 semester, as well as a proposed Research Coordinator Training Program that is under development. The current GCRC will be incorporated into a new Clinical Research Resource Center (CRRC). The CRRC will also include a Clinical Research Pilot Grant Program where a junior investigator can apply for up to $50,000 seed funds for a new clinical research project. The CRRC will also contain a new protocol development/ assistance core to aid a new investigator in preparing a grant submission. Within the Novel Methodology and Translational Technologies Center will be cores that will house technologies to facilitate translational research. An investigator will be able to apply to the Novel Methodology and Translational Technologies Center for access to these individual cores for their research protocols. For example, if a pilot project required brain imaging at the Hoglund Brain Imaging Center, the investigator would apply to the Novel Methodology and Translational Technologies Center for funding and intellectual support. In addition we plan to establish four important committees that will bring in partners from the external scientific community, the regional academic centers, the private sector, and lay community organizations and institutions.

Through the CTSA planning process, we plan to visit one or more academic health centers who successfully obtained a full CTSA during

the first one or two rounds of funding. In addition, our External Scientific Advisory Committee will serve as a sounding board for ideas and proposals that are generated through the planning process.

We are excited that the new clinical and translational science award can indeed provide the resources that could medically advance the clinical research agenda at KU Medical Center and throughout our region. We are confident that through the CTSA planning process we will create a blueprint for this transformative process that will allow us to join the front ranks of institutions with vibrant clinical research programs.

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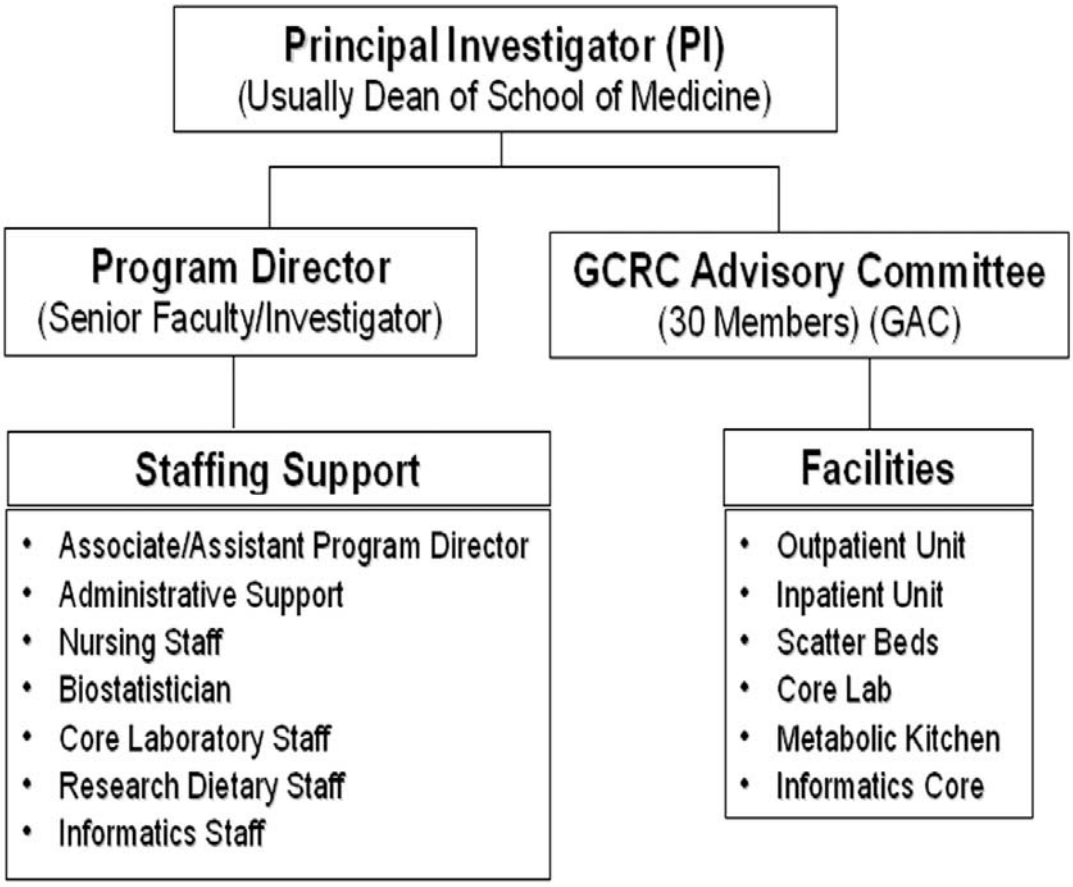
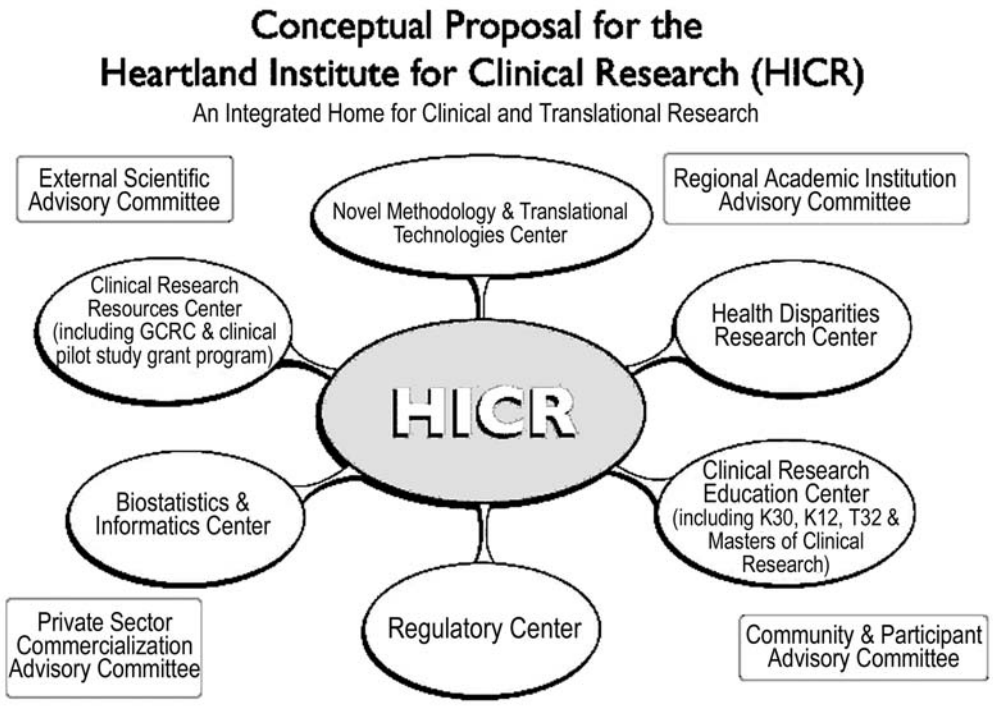
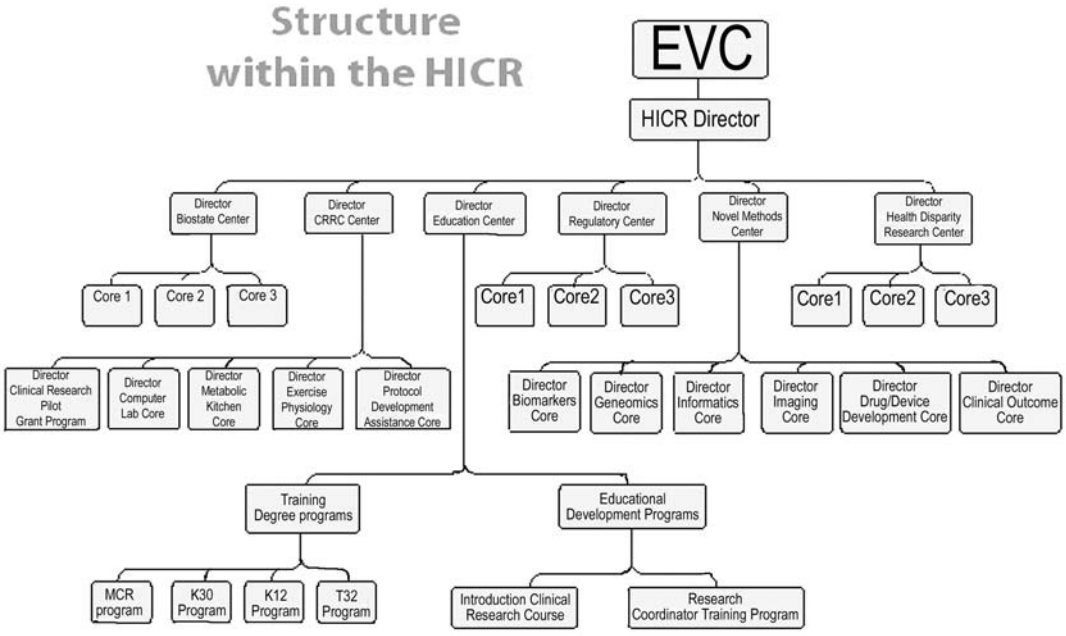



Conceptual Proposal for the
Heartland Institute for Clinical Research (HICR)
An Integrated Home for Clinical and Translational Research
External Scientific Advisory Committee
Novel Methodology & Translational Technologies Center
Regional Academic Institution Advisory Committee
Clinical Research Resources Center (including GCRC & clinical pilot study grant program)
HICR
Health Disparities Research Center
Biostatistics & Informatics Center
Clinical Research Education Center (including K30, K12, T32 & Masters of Clinical Research)
Private Sector Commercialization Advisory Committee
Regulatory Center
Community & Participant Advisory Committee


Structure within the HICR
EVC
HICR Director
Director Biostate Center
Director CRRC Center
Director Education Center
Director Regulatory Center
Director Novel Methods Center
Director Health Disparity Research Center
Core 1
Core 2
Core 3
Core1
Core2
Core3
Core1
Core2
Core3
Director Clinical Research Pilot Grant Program
Director Computer Lab Core
Director Metabolic Kitchen Core
Director Exercise Physiology Core
Director Protocol Development Assistance Core
Director Biomarkers Core
Director Geneomics Core
Director Informatics Core
Director Imaging Core
Director Drug/Device Development Core
Director Clinical Outcome Core
Training Degree programs
Educational Development Programs
MCR program
K30 Program
K12 Program
T32 Program
Introduction Clinical Research Course
Research Coordinator Training Program

## CTSA Planning Committees and Sub-Committees

| CTSA COMMITTEE | CHAIR(S) | PURPOSE |
|---|---|---|
| Planning Steering Committee | Barbara Atkinson, MD<br>Richard Barohn, MD | Direct and oversee entire planning process |
| Governance Planning Sub-Committee | Richard Barohn, MD<br>Barbara Atkinson, MD | Develop and propose overall governance and structure of HICR |
| Grant Writing Planning Sub-Committee | Richard Barohn, MD<br>Lauren Aaronson, PhD, RN | Write the full NIH CTSA application |
| Education Planning | Ed Ellerbeck, MD, MPH | Develop K-12 and T-32 training programs for the full CTSA application; propose mechanisms to coordinate and incorporate existing training programs (e.g., K30, other T32s) |
| Clinical Research Resources Planning | Richard Barohn, MD | Expand current GCRC to include additional service resources for investigators (e.g., protocol development, peer review assistance, pilot grant program); create new Clinical Research Resource Center (CRRC) |
| Clinical Pilots Planning Sub-Committee | John Ferraro, PhD<br>Ted Knous, PhD | Create policies & procedures for support of clinical & pilot studies in priority areas within the CRRC |
| Biostatistics & Informatics Planning | Matt Mayo, PhD | Design expanded infrastructure and procedures for biostatistician and informatics support |
| Regulatory Planning | Jim Voogt, PhD<br>John Finley, JD | Develop mechanisms to support investigators with regulatory requirements |
| Novel Methods & Translational Technologies Planning | Curt Hagedorn, MD<br>Paul Terranova, PhD | Coordinate use of technologies applicable to clinical research and propose new methodologies |
| Health Disparities Research Planning | Patricia Thomas, MD<br>Kirby Randolph, PhD | Design Health Disparities Research Center with resources and services to integrate disparities issues in all clinical research |
| Community & Participant Planning | Joshua Freeman, MD<br>Lauren Aaronson, PhD, RN | Create policies and procedures for provider and study participant involvement in the HICR and mechanisms for regular communication |
| Regional Academic Institution Planning | Jim Voogt, PhD | Develop formal partnership agreements with current partners and explore inclusion of other institutions from the KC area |
| Private Sector Commercialization Planning | Scott Weir, PhD | Identify opportunities for clinical & translational research with private industry |

# All Things in Moderation—Please!

Chris Sorensen
University Distinguished Professor, Physics
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To find financial support beyond the traditional public sources of state legislatures and tuition, public universities have increasingly looked to alternative sources in the private sector, most notably industrial and philanthropic. The primary driver of this privatization of our public universities is money, the flux of commerce. However, other benefits can be perceived, including academe's engagement of a broader community, matching the roles of the university more directly to the needs of society, and a general enhancement of opportunity that often comes with any new venture. These are all positive factors that bode well for this new tack. But with any new venture, some caution is warranted and hence an assessment of what consequences might ensue is in order. I will attempt to foresee some of the more obvious consequences and describe their ramifications; essentially in this text I will ask, "What could go wrong?"

In the late 18th century, electrical phenomena were little more than parlor games for the well to do. A few scientists, including Benjamin Franklin, saw electricity as a serious and mysterious natural phenomenon worthy of experimentation. No practical application could be seen and the primary reason for its study was a simple curiosity and desire to understand Nature. These humble researches led deeper and deeper throughout the 19th century, until by the beginning of the 20th century, electricity (and all it entails—an understanding of light, electronics, radio and TV) was poised to become the single most important technological factor of our civilization.

The rise of electricity is an example of fundamental, curiosity-based research that eventually led to great practical application. The history of science and technology is replete with marvelous examples: Indeed the phrase "science and technology" implies this fertile synergy. Also, practical application is not the only consequence of curiosity-based research. Consider the work of Galileo, Brahe, Kepler, and finally Newton to understand motion, gravity, and the eventual explanation of the orbits of the planets. This work not only found great application, but it changed the way we see ourselves. We are no

longer at the center of the universe, but on a small, insignificant, but wonderful, planet near a common ordinary star, one of billions.

These observations led me to ask a series of questions: At a university controlled by private funds, what research will be pursued? Will the practical needs of business and industry, that could be supplying a major fraction of support, shift the balance between fundamental and applied research and too heavily favor the latter? At a university controlled by private funds, how will we measure success?

Already, I believe, too much emphasis is placed on monetary measures. When the university measures its research success, the first, and often only, yardstick is calibrated in dollars. When we evaluate young faculty for tenure, we ask how much grant support has been won. Certainly grants indicate peer acknowledgement that one's research is worth investment. But very often grand ideas remain long in the incubator and find slow recognition by the mainstream. As always, broadly based parameters, wisely considered, are the best ways to measure success, not the single "bottom line" measures often used in private business.

Another characteristic of business and industrial needs is problem solving for today. Rarely does the private sector have the luxury to wait on a good thing because if they aren't making money today, they will be gone tomorrow. Hence their support most often, and rightfully, is for today, not tomorrow. Yet society needs to plan for tomorrow too and here the fundamental, curiosity-based research makes its impact. The public university has a duty to contribute to society's well being for both today and the future.

At a university controlled by private funds, who owns the research results? Will our students be able to defend publicly their theses? Will researchers be allowed to publish and thereby disseminate their results? When they travel to meetings, will they be able to discuss in a free and open dialogue their work with other researchers? Or will this dialogue between scholars be suppressed for the private needs of the donor?

How will the research directions be decided at a university controlled by private funds? Heavy funding in a particular area can entice scholars to that area, perhaps without regard to other areas that while important, are not well funded. This trend is already present at the NSF, which has in the past several years been calling for research in programmatic areas that it considers significant. No doubt the directions NSF chooses are based on judicious use of panel suggestions, but such an approach causes the entire scientific academy to chase the same goal and hence diversity is stymied. Heavy pursuit of the industrial moneys that most often support applied research today will give scholars less time for long-term fundamental studies that lay the foundation of tomorrow.

I also look the proverbial gift horse in the mouth and warn against philanthropic donations. As an example, the Kansas State University physics department has no astronomers currently on staff nor plans to hire. Suppose a donor were to come to us

with significant money to start an endowed chair in astronomy. What sounds great has possible ramifications. If the endowment is not large enough, the department might try to leverage the endowment money to gain extra university money to create the position for an astronomer. But the university has a long memory and very likely when the department in the following year or so tries to hire in another area, one consistent with their long term plan, they won't be able to because the university has already given the resources for the astronomy position. Another scenario could be that the endowment is large enough and no commitment is drawn from the university. But now we have an astronomer and soon he or she will grow lonely and want the department to hire another one or two or many. These positions come at the expense of hires in other areas that had been the original plan. We find that the department now has an astronomy group when in fact it had had other plans.

Most research supported by the private sector will involve engineering and the applied sciences, including medicine. The arts, humanities, and social sciences will receive much less private support, causing what I call the "door knob effect." When one looks into a shiny brass convex door knob, one sees one's face out of proportion, with accentuated nose and eyes and diminished chin, ears, and forehead. So too will the imbalance in funding distort the university's face, resulting in accentuated applied sciences but other areas relatively diminished, especially the arts and humanities.

At a university controlled by private money will our relationship with students change? Will we take a business model and treat our students like clients? Doctors and lawyers have clients, but it seems to me that teachers have students and that is a different relationship. Students are trained. Students require mentoring and guidance. Stick a toothpick in a student; it will come out wet. Put her or him back in the oven; they are not done yet.

Finally, at a university controlled by private money what will the mindset of the professors be? Will they be visionary scholars or intellectual guns for hire? Will they be driven by a passion to understand and create or by the bottom line? I think that most of us in the academy are here for the former reasons rather than the latter. And indeed where else but the academy can people with such motives find a livelihood? As for scientists, I can quote Holton and Brush[1] who wrote:

> "To this day many scientists would probably reject the ever-present lure of increased standards of living in uncreative positions, and instead follow their chosen work without restrictions, although with relatively few material rewards."

So what are we to do? Deny the benefits of increased funding from private sources, both business related and philanthropic? No! We should take full advantage of them. But universities must remain independent and autonomous institutions, so we must use these resources in a manner that does not compromise the fundamental mission. And what is that fundamental

mission? It is to establish an environment where scholars can create new knowledge and from their perspective as scholars teach others to be successful citizens in our civilization.

1. G. Holton and S. G. Brush, *Physics, the Human Adventure: From Copernicus to Einstein and Beyond,* Rutgers University Press, New Brunswick, NJ, 2001.

# The Entrepreneurial Land Grant: Commercialization within the Education Milieu

Duane Nellis
Provost
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Change is an ever-increasing factor in our dynamic world; the implications for higher education in the United States and globally are substantial. As I summarized in my 2005 Merrill paper, such change and its implications for higher education are occurring at multiple scales—yet our success as we look to the future will depend, in part, on how well we adapt to such multi-scale changes and embrace and engage in such change in ways that advance our respective institutions. For example, speaking before an audience of university officials in Hawai, columnist Thomas Friedman stated that the United States will be challenged by India and China as potential superpowers in the 21st century and that the U. S. will "not win by default."[1] He added, "Less and less universities should be training students for specific jobs—many of which could be outsourced in the future." Rather, he suggested that students will need to be synthesizers, explainers, and adaptors, as well as leveragers, who can figure out how one person can do the job of twenty, and localizers who can discover local angles to global business."[2] To accomplish this, we in higher education are called upon not just to understand this imperative, but to take action to bring it about in order to insure the success and competitiveness of our graduates.

Yet, as we all know, many people at our institutions fear change—and sometimes for good reason. Entrepreneurial activity, for example, can conceivably be positive, negative, or neutral to any given institution, depending on how it is framed within the context of the institution's mission, priorities, culture, geographic setting, and capability. And some people seem committed to pursuing yesterday's opportunities today, when in many cases such pursuits are neither prudent nor workable. We must look to the future in positive ways, through what I refer to as constructive engagement, to take advantage of opportunities as they emerge and be prepared to act quickly and effectively while protecting what is best in our traditions. As hockey great Wayne Gretzky stated so aptly on the secret of his success, "Skate toward where the puck will be, not where it is."[3]

We in higher education need to do just that.

I think those of us at land-grant universities would agree that an important part of our institution's mission involves applied research and outreach. Yet, as Louis Pasteur noted in 1871, "There does not exist a category of science to which one can give the name applied science. There are science and the application of science, bound together by the fruit of the tree which bears it."[4] This is such a prescient observation and one which underscores the numerous imperatives that face today's land grant institutions and the linkages between our fundamental educational mission, as well as the application of our knowledge discoveries toward the benefit of humankind. These imperatives include:

a) decreasing state support for higher education (at K-State the state proportion of our total budget is now 25%);
b) financial necessity to become more self-sustaining, and thus, at least in part, more entrepreneurial—without compromising our land grant and public mission;
c) the need to help drive, protect, and sustain economic growth that contributes to the state's overall economic well-being and beyond;
d) the necessity for more inter-disciplinary collaborations across campus and among partner institutions (the key research questions that we face today are at the interface of disciplines);
e) the need to identify and take advantage of niche opportunities (we at K-State, for example, believe we have one of the leading bioscience food safety and security programs in the United States with over 160 faculty in 5 colleges committed to this effort);
f) the need to satisfy increasing demands from students as consumers of higher education while protecting land-grant ideals related to accessibility, as we build new learning environments that engage students in new ways;
g) the need to increase the number of American students in STEM fields at both the undergraduate and graduate levels as has recently been emphasized in reports such as the federal government's "American Competitiveness Initiative: Leading the World in Innovation";[5]
h) the need to be perceived as 'relevant' by the populace, the institution's governing boards, and the local, state, and national political leadership (including an ability to demonstrate through 'objective measures' accountability measures of our success—one only needs to read some of the recent press on U.S. Secretary of Education Margaret Spellings' Commission on the Future of Higher Education to see what we are and will be facing in the near term; and
i) the need to be more outreach and service oriented—more engaged with community. (I have recently created a new Center for Engagement and Community Development at K-State, to at least in part, help enhance our commitment in this area).

To be sure, today's populace needs to be reassured regarding the relevance and importance of higher education and its role in society. Our needs and those of students are not always readily understood. For example, as Adelphi University's president Robert A. Scott noted, "The apparent desire to reduce total aid spending for students in part stems from a desire by members of Congress and other political bodies to cut back on any public spending, and they view higher education more as a private gain rather than a public good."[6] The relevance, importance, and value of higher education is palpable, but we must do a better job of getting this word out to those who need to hear it most, stressing direct and tangible ways that higher education enriches communities, states, and regions, as well as individuals. Meanwhile, entrepreneurship is a must.

**Being More Entrepreneurial**

I would argue that a number of these aforementioned imperatives relate, at least in part, to our need as a land grant to be more entrepreneurial. In many ways, entrepreneurship is another way to think about pursuing a path of enlightened self interest. The etymological root of entrepreneur means 'to undertake.' This suggests a journey, and implicit in that is the notion of a specific destination. To be most effective, this undertaking should not be generic and unfocused but centered upon an institution's specific areas of expertise (both existing and upcoming) and capitalize on emerging areas of opportunities. Such opportunities can lead us, at least in part, toward more commercialization ventures and risk linked to stimulating private enterprise. But at the same time, it is my opinion that while land-grants of the future must be greater players in this arena, we must do this while protecting and enhancing what is best in our rich and successful educational traditions as state-based institutions. As Pasteur noted over 150 years ago, "In the fields of observation, chance favors only those minds which are prepared."[7] Said another way, "Chance favors those institutions that are ready and waiting for opportunities for positive change."

And hundreds of institutions have committed to this effort to commercialize—with the result of hundreds of new start-up companies—and more than $1 billion per year in revenues from licensing on a host of new drugs, agricultural products, high tech components, and other breakthrough technology.[8] Such opportunities leverage institutional strengths, spur innovation, reap financial benefits for the institutions, and provide incentives for faculty members. Texas A & M even recently initiated efforts to include patents as part of their consideration for faculty tenure profiles.[9] At the same time such activities must be structured without harm to the fundamental aspects of what we are as a student-centered, research extensive, comprehensive university. Clearly there are those examples which argue that if not thought through carefully, such activities can do potential harm to academe's traditional values with low rates of return for start-ups. But others would argue that such entrepreneurial activities create new and real

opportunities for students at both the undergraduate and graduate levels, can spur economic development at the community level, and complete our mission as a land grant highly research active university.

For those of us willing to pursue a strong entrepreneurial approach at our institutions, what seem to be some of the attitudes for success?[10] One is a demonstrated confidence in a vision and the passion to carry it through. In these times of dwindling resources and support, it is critical that we focus on challenges as opportunities and not as barriers. Secondly, inclusive leadership is essential. A willingness to engage diverse constituent groups is essential. Having a vision is not enough if it is not articulated in a way that resonates for and mobilizes key support groups. A third important attitude is where we use influence more than position power. A change agent must be willing and able to engage detractors as well as followers. And finally, a fourth attitude is skill in overcoming cultural obstacles. One needs to understand where in the institution people are married to the status quo and what it will take for them to see things differently.

We all know examples, as well, where leaders promoting institutional change through entrepreneurial initiatives have gone down the wrong path--the "Lone Ranger" behavior, underestimating the level of resistance to change, and underestimating cherished values of programs are clear examples of pursuing land mines.[11]

**The Approach at Kansas State University**

At Kansas State University, our institution has had a long standing interest in commercialization through such entities as NISTAC (National Institute for Strategic Technology Acquisition and Commercialization), and the (AMI) Advanced Manufacturing Institute linking with our institutional strengths in such areas as animal health, biotechnology, and nanoscale material sciences. Such efforts have created start-up companies and positioned us to capitalize upon such broader statewide efforts as the Kansas Bioscience Authority.

As the institution's culture has started to change, we also have seen the need for greater coordination of research discovery and the development of response teams to support incubator businesses and related commercialization ventures. Thus, we have created the Commercialization Leadership Council (CLC), which Ron Trewyn spoke about earlier, that has facilitated a unique partnership between the City of Manhattan, the Manhattan Chamber of Commerce, NISTAC, KTEC, and the KSU Foundation, as well as the KSU Research Foundation. Beyond this coordinating council, we have focused a key component of our efforts on niche opportunities where we have particular institutional strengths. We realize we can't be all things to all people and are best served to focus in such areas as animal health, food safety and security, nanoscale technologies, and resource sustainability issues (e.g. implications related to limited water resources in parts of our state). Fortunately, and coincidentally, these niche areas for K-

State are of strategic importance to both the nation and the world and have the potential to be leveraged to good advantage for the benefit of the university and the global citizenry.

So what have been the implications for change at KSU? First, as we have worked toward a more entrepreneurial model, it has forced us to think new thoughts, communicate and interact with one another in new ways, and organize ourselves structurally to our best advantage. For one thing, our coordinated efforts have (at least theoretically) encouraged all key members of the university leadership to be pulling on the same oar. Secondly, such efforts have involved colleges in ways that have minimized turf battles as we have incentivized and maximized interdisciplinary interactions through a $2 million per year targeted excellence program to elevate already strong programs to new levels of success. And lastly, these efforts have created new dialogue on how we can accomplish these entrepreneurial imperatives without losing academic integrity or compromising core institutional values as a result of what some have called 'commercial pressures to produce marketable products.'

**Conclusions**

Overall, these are times of great change in higher education. We are all facing growing pressures at multiple scales regarding the quality of what we do, how we have balanced accessibility with enhancing student success, how we have driven efficiencies into our efforts, and how we have translated knowledge into economic development. Proactive action and effective information sharing are needed as we make our way through these changes, and this mode of thought is exemplified by NASULGC's proposed accountability plan, spearheaded by former KU Provost Dave Shulenburger, for we are much better served in helping to define our own course of action than in responding to outside mandates.[12]

In summary, change occurs in response to specific motivators. At K-State and for many institutions like us, current economic imperatives dictate that higher education be more self-supporting. Such efforts reinforce our need to be more entrepreneurial while not sacrificing what is best in our traditions, as we support a broad range of programs and efforts that positively impact our students, the state of Kansas, and beyond. At the same time, effective entrepreneurial efforts should focus on specific niche areas that allow university strengths to be leveraged most effectively and efficiently. The added payback is that these efforts have the potential to strengthen and stimulate the related programmatic areas of the university in many positive ways. And finally, KSU thinking and planning to date has been both tightly focused, and in the case of donated technologies, opportunistic and more broadly conceived. This 3-way mix has laid the groundwork for creation of effective technology transfer operations that have the potential to financially benefit the university, strengthen our research capacity, and be of direct, experiential benefit to our students. Thus the fruit that we bear is a direct result of the fact that we as an institution are constantly changing and adapting to the myriad

economic and social conditions that we face in today's world. We are committed to maintaining our tradition of excellence in service to our students, our stakeholders, and the people of Kansas.

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# Crafting a Culture of Connections and Collaborations

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Tom Friedman's bestseller *The World is Flat* provides a clarion call to every educator and researcher in the United States to respond to a changing world order—one in which the undeniable superiority of higher education in the United States is no longer undeniable. Many are studying the swift and possibly fundamental changes coming in higher education. One author, Larry Lauer, in his 2006 book, *Uncertain Times,* states, "There is a different attitude toward the role of governments, who should support education, the responsibilities of students and parents, higher education as a competitive industry, and even the declining reputation of American institutions. Some would say it is an industry at risk. At minimum, it is an industry about to change—and change dramatically worldwide."

As Lauer notes, "most people agree that academic institutions are essential to the success of their individual careers. When pressed, they also recognize the role of academia in improving their overall quality of life. And most acknowledge that these institutions must be called upon to produce the resourceful and learned leaders who will solve the problems of a world in turmoil. But political leaders responsible for dealing with these conflicts are the very people who are cutting back support for the industry that must ultimately find solutions to these problems. It is a terrible irony, but it is reality nonetheless."

It is in these uncertain times that some will write yet another premature obituary for higher education. But we can also benefit from the context provided by Clark Kerr who provides hope that far from becoming relics, universities will continue to survive and perhaps even prosper in this new world order. He wrote, "About eighty-five institutions in the Western World established by 1520 still exist in recognizable forms, with similar functions and with unbroken histories, including the Catholic Church, the Parliaments of the Isle of Man, of Iceland and of Great Britain, several Swiss Cantons and seventy universities." But the fact that universities have proven both resilient and adaptable until now does not guarantee their safety in the future.

Public higher education enrolls 77% of all students in higher education. These institutions drew about 50% of their operating support from taxpayers

in the 1980s. Today money from the state provides about 30% of funding. At some universities, such as Virginia and Colorado state funding contributes less than 10% of operating support.

**Privatization in Kansas:**

We have not been immune in Kansasfrom the trends that have impacted public universities throughout the United States. State support as a proportion of the overall budget of our institution has also declined and a larger share of the cost of obtaining an advanced degree has shifted to the student and their family. In Fiscal Year 1990 the state appropriated 16.3% of its budget to fund higher education. By FY 2003 that amount had declined to 11.83%.

Results of a study commissioned by Kansas Citizens for Higher Education and conducted by MGT of America concluded that Kansas public financial support for higher education has continued to decline relative to national averages, to levels that are generally lower relative to the Big 12 states than in the prior year. Faculty salaries are farther behind national average salaries for faculty in similar institutions, and farther behind average salaries in the states located around Kansas.

In fiscal year 2001 the KU Medical Center received $101 million dollars from the state; in fiscal year 2007 that amount is now $113 million. Figuring inflation—including significant cost increases for fixed expenses such as employee benefits and utilities—we have actually lost purchasing power during the past decade. By contrast, our tuition revenue has grown from $11 million in Fiscal Year 2001 to nearly $22.5 million in the current Fiscal Year.

We have had to aggressively grow non-state sources of revenue in order to maintain current levels of programming including externally funded research and clinical income. While federal support for biomedical research has grown significantly over the past decade, this growth has now plateaued and in some instances—such as funding for Title VII programs—been cut with significant consequences.

The talent of our faculty fuels the momentum we enjoy. Great students want to study with great scholars. Great scholars can demand competitive salaries, excellent space and support. Their work earns external grants and awards. The results of their research enhance the reputation of the institution and advances human health. We must compete for this talent with our peer public institutions and private universities. The competitive pressure to acquire top talent continues to create budgetary pressures for us.

**Challenges and Opportunities**

While privatization policies have arisen at least partially from the budget problems that states face, as well as from policymakers' willingness to shift the costs of higher education from taxpayers to students, they also arise from the view that forcing the publics to behave more like the privates and compete for resources will lead to increased efficiencies and the elimination of waste. Meanwhile, as state support becomes an increasingly smaller proportion of their budgets, many public institutions want to be freed from governmental

constraints that lead to inefficiencies in their operations and to have the freedom to make economic decisions that will improve their ability to compete with the privates.

**Privatization can Work**

The separation of The University of Kansas Hospital from the university and the creation of a separate privatized state authority was the catalyst for the Hospital's renaissance. The utilization of "private" entities such as the KU Research Institute, Inc. and Kansas University Physicians, Inc., KU Health Partners, Inc. have provided the medical center with valuable tools for flexibility in resource management and for expediency in planning and managing the research and clinical enterprises.

Privatization has also grown our *research infrastructure*. Under legislation approved by the Kansas Legislature a new $57 million *biomedical research center* was constructed on our campus. A $19 million gift from the Hall Family Foundation and a guarantee from the state to pay the first five years of bonded indebtedness made the building and its furnishings a reality. But the financial plan for the building requires the "indirects" from grants earned by researchers in the building to pay off the remaining 15 years of debt. In essence, the building will allow us to attract and retain top scientific talent. This talent will allow us to successfully compete for research grants and awards. A portion of those grants will be dedicated to retiring the debt on the space.

The Kansas Bioscience Authority also provides a valuable tool for potential funding of university research through its statutory mission to support the development of rising scholars and eminent scientific talent in Kansas universities. The funds for these initiatives are derived from growth in the bioscience sector of the Kansas economy.

**Opportunities Exist to Capitalize on Privatization**

***Exceptional Transfer of Wealth***: Over the next 50 years, between $41 trillion and $136 trillion will be passed down from one generation to the next constituting the largest intergenerational transfer of wealth in American history. The opportunity to leverage this transfer of wealth to support biomedical research is strong.

***Public support for biomedical research is strong.*** Research!America poll results indicate that 76% of Americans value research designed to improve health care and 63% are even willing to pay more taxes to support medical research; 79% support basic research as well. When asked to select national priorities, 95% of Americans selected health-related research as among their top priorities. That was tied for 5th place with national defense, behind only education, jobs, social security/medicare, and disaster preparedness. Homeland security was ranked as a top priority by 92% but tax cuts only by 79%

The community and state have embraced life sciences research as an essential economic driver—the most powerful tool available to help transform the regional economy into a knowledge-based economy capable of competing in the global economy.

**Creating a Culture of Connections and Collaborations:**

To exploit these trends we must do more as leaders within our institutions to establish a culture of connections and collaborations.

First we must *collaborate among ourselves*—to achieve efficiencies and to maximize results. The NIH is increasingly looking for big projects to fund—projects that benefit from the insights of many researchers looking at the same problem from different perspectives. The extent to which we are capable of creating robust communities of researchers committed to networking with each other may determine our success at competing for increasingly competitive federal grants.

Next we must *collaborate with others beyond our own institutions*. The KU Medical Center's collaboration with the Stowers Institute is paying dividends for us—and is the single most important factor in positioning us favorably in the minds of Kansas City civic leadership.

Silos that define the academy must become more transparent and more porous. The leadership of within the university must *encourage interdisciplinary collaborations* and accelerate research that crosses traditional boundaries.

We must also *diversify our revenue streams*. This will require a greater capacity at our medical center to earn revenue from translational and clinical research including clinical trials. While most research does not "pay" there are some forms of research funded by private enterprise that can augment the research enterprise in valuable ways. We must engage knowledgeable managers to help us take better advantage of commercialization opportunities and work directly with the economic development community to be a partner whose expertise is valued and supported.

We must also engage in *a more aggressive advancement strategy*. If we are being privatized by state policy we must act more like private institutions in the way we cultivate connections with our alumni and in the way we raise private funds to support our mission.

- We need greater flexibility in accessing *endowment funds* and more staff to help cultivate gifts. We need to seek state support to match some portion of private contributions. We need to be in "campaign mode" almost continuously—at least when it comes to medical research fundraising. And we must look beyond traditional endowment constituencies—to cultivate a wide array of potential donors whose affinity to cure disease exceeds their traditional higher education loyalties.
- We must significantly expand our efforts to connect with *grateful patients*—and allow them to support our work as a part of their legacy.
- We must *continuously and aggressively communicate* the purpose of our work and its relevance to the public and encourage their participation and support. To create a sound basis for this communication we must "research" our research—and extract compelling data and results that underscore the return on investment.
- We must *protect our brand and reputation—people want to connect with excellence*. Any scandal or impropriety

affects the standing of the institution and diminishes the ability to leverage the brand into private support. *Core values* must be articulated and the "character" of an institution must be reflected in and modeled by its leadership. There must be an authentic commitment to core values—not just lip service—if donors are to be expected to build their legacy on the platform of the institution. This may mean saying no to some gifts or programs—in order to remain true to the mission.

Reward systems must reward true performance and not just longevity. *Experience in corporate and other "real world" venues must be accommodated in tenure and faculty appointment systems.*

*The leadership of our university—from department chair to CEO—must be change agents,* prepared to embrace the possibilities of the future and skilled at making the connections and encouraging the collaborations that will fuel real results and provide real returns in this emerging era of privatized public higher education.

# Public Universities and State-level Funding Advocacy

Jeremy Anderson
Kansas Governor's Office

From a panel discusion with
Keith Yehle, moderator
Director of Governmental Relations, The University of Kansas
Reggie Robinson
CEO, Kansas Board of Regents
Jean Schődorf
Senator, Kansas Legislature

The future of higher education in the Midwest will be determined by a host of factors, the predominant of which will be funding. Changes in revenue sources over the last decade have made higher education more reliant on tuition than on state funding. While the State of Kansas has increased funding for higher education through operating grants, those increases have not been enough to cover the increased costs of higher education.

It is important to look carefully at the changes in funding for Kansas higher education institutions over the past ten years. In 1996, 51% of the university funding was from the State General Fund while only 14% came from tuition revenue.[1]. In 2006, less than 30% of the funding arrives from the State General Fund while more than 24% of the funding is tuition related.[2]

The State of Kansas has worked hard to guarantee that promises made in the Higher Education Reorganization Act of 1999 were kept. In addition, there have been significant increases in the operating grants that Regents institutions receive. These increases have produced a four year trend where both tuition and state funding have increased by 15%.[3] The State of Kansas has done much to work to establish more funding for higher education during tough budget times, but the money the state has provided still falls short of many needed services at the Universities.

**Financial Successes in Higher Education Budgeting:**

Over the past five years, there have been many legislative successes aimed to assist higher education communities and provide additional funding and infrastructure for the future. Some highlights are:

- 2001/2002 New Facility Funding for a $68 million for a Life Sciences building at the University of Kansas and $40 million for a Homeland Security Building at Kansas State University
- 2004, 2005, 2006 included the completion of the three year commitment to keep the funding increases in the Higher Education Reorganization Act of 1999
- 2002 established the beginning of Operating Grants for Regents Institutions which allows them greater flexibility with the spending of funds
- 2004 Kansas Economic Growth Act
- 2004 Bioscience Authority
- 2006 investment in the five year $25 million commitment for Cancer Center at the University of Kansas
- Do you want to add this year's Tuition Ownership changes that will be dedicated to deferred maintenance?

**Political Realities of Legislative Budgeting**

While there have been many success for higher education over the past few years, they have not been achieved without a tremendous amount of work. The support for higher education in the Legislature has changed over the years to the point that in 2005, the House of Representatives in Kansas supported major budget cuts to Regents institutions as a way to cover the cost of other items in the budget. While this initiative did not become law, it highlights the fact that higher education is at a crossroads in the arena of funding.

Kansas like many Midwestern states has a "Citizen Legislature." While many Legislators view their responsibilities as a full time job, the salary alone is not enough to be their only source of income. Most Kansas Legislators make just under $20,000 per year through their Legislative pay. The effect of the long hours and limited pay for a Citizen Legislature has changed the look of the Kansas Legislature.

The face of Legislatures across the Midwest has been plagued by increased turnover and term limits in some states. Long-term relationships that once solidified a majority support for higher education now require much more outreach as new legislators have been elected. Long term funding promises like the Kansas 1999 Higher Education Reorganization Act are important steps for the future, but hard to implement when new legislators are elected long after a funding promise has been established. The outreach to these new legislators by higher education institutions is of paramount importance if funding commitments are to be continued.

The changing face of the Kansas Legislature has been highlighted by a public organization that is working to lobby legislators on the importance of higher education in Kansas. The Citizens for Higher Education released their 2006 voting records for the Kansas Legislature in July of 2006 and the numbers highlight the growing divide among pro-higher education legislators and anti-higher education

legislators in Kansas. In their initial report, 61 members of the 125 member House of Representatives received an "A" or "B" grade for their votes on higher education issues in the 2005 and 2006 Legislative Sessions. In contrast, 56 of the 125 members of the Kansas House of Representatives received an "F" in a comprehensive analysis of 43 different votes taken during the 2005 and 2006 Legislative Sessions.[4] This type of accountability is important for voters to see how their Legislators rank on important higher education issues.

Senator Jean Schodorf of Wichita and Reggie Robinson from the Kansas Board of Regents highlighted the fact that continued outreach by the University staff and administrators will be the key to the future of higher education funding. Without the hard work to build stronger relationships with legislators, the fight for additional higher education funding will continue to be an uphill battle.

## References


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2. Ibid
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