



THE CURRENT
HEALTH AND FUTURE
WELL-BEING OF THE
AMERICAN RESEARCH
UNIVERSITY

REPORT BY
THE RESEARCH UNIVERSITIES
FUTURES CONSORTIUM



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Participating Universities

ARIZONA STATE UNIVERSITY	UNIVERSITY OF GEORGIA
CARNEGIE MELLON UNIVERSITY	UNIVERSITY OF MARYLAND - COLLEGE PARK
COLORADO STATE UNIVERSITY	UNIVERSITY OF MINNESOTA
DUKE UNIVERSITY	UNIVERSITY OF ROCHESTER
EMORY UNIVERSITY	UNIVERSITY OF SOUTH FLORIDA
FLORIDA STATE UNIVERSITY	UNIVERSITY OF TENNESSEE - KNOXVILLE
GEORGIA INSTITUTE OF TECHNOLOGY	UNIVERSITY OF TEXAS - AUSTIN
PENNSYLVANIA STATE UNIVERSITY	UNIVERSITY OF UTAH
THE OHIO STATE UNIVERSITY	VANDERBILT UNIVERSITY
UNIVERSITY OF CALIFORNIA - OP	WASHINGTON STATE UNIVERSITY
UNIVERSITY OF CALIFORNIA - RIVERSIDE	WASHINGTON UNIVERSITY IN ST. LOUIS
UNIVERSITY OF KANSAS	YALE UNIVERSITY
UNIVERSITY OF KENTUCKY	

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Directed by Dr. Brad Fenwick², with the support of the University of Tennessee, Knoxville and sponsored by Elsevier, the study is based upon interviews with 25 leading public and private research universities. The preliminary results of the study were presented and discussed at a meeting of the Participating Universities held April 19 - 20, 2012 in Washington, D.C.

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- 1 JISC, Imperial College London, Elsevier; *Research information management: Developing tools to inform the management of research and translating existing good practice* (2010).
 - 2 Dr. Brad Fenwick is Professor and former Vice Chancellor for Research and Engagement at the University of Tennessee, Knoxville.

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EXECUTIVE SUMMARY

Research universities have contributed repeatedly to the development and economic prosperity of the United States (Tassey, 2009). Higher education has evolved in response to internal and external pressures and will continue to do so; the foundation of success of academic research rests on a high degree of programmatic self-direction, a competitive environment that rewards success, and an entrepreneurial approach to attracting the resources necessary to be successful.

Today the future of the American research university is more uncertain than it has been in the last 50 years. During this time there were periods when public funding of academic research paused in its growth. However, never before have research universities faced the combined pressures of: declining federal funding, record reductions in state funding, erosion of endowments, soaring tuition costs reaching unaffordable limits, intensifying, internal as well as global competition, increasing compliance and reporting requirements, as well as the loss of political and public confidence in the value of university-based research.

At the same time expectations for university-based research to produce creative solutions for a growing list of complex problems have never been higher.

Academic research as an enterprise has developed incrementally with little consideration given by funders, regulators, and the universities themselves to maximize functionality and productivity. While the competitive nature of research rewards efficiency and effectiveness at the level of the individual researcher, these same pressures do not apply as strongly at the institutional level. The result is a system that is fragmented at all levels in its approach and lacks an accepted means to rationally assess productivity and efficiency differences.

In the absence of a productivity-based assessment system, each institution (university and sponsor) believes they have the best system or at least the means to discover what changes should be made that would be an improvement over their current processes. Functionally, they lack the means to objectively evaluate the impact of policy alternatives, organizational structure, or different administrative approaches. The result is an academic research enterprise that is recalcitrant to change or experiment, even in the face of impending decline. Such attitudes have long-term implications upon healthy competitive growth and hence the core of the academic enterprise. There is a need for institutionally-based faculty research support systems to provide faculty more time to expand research, reduce the frustration that quells initiative, and invest in the infrastructure that will support competitive opportunities.

The purpose of this study is to conduct a 'bottom up' assessment of the current health of the American research university and to determine what changes could support their collective ability to continue their profound economic and social contributions to the American ideal. In the face of a rapidly changing financial environment this project seeks to identify the processes by which research is conducted, and whether if done differently this would help secure their continued success. A consortium of private

and public research universities has identified key barriers to their current and future growth. With this collective understanding providing focused direction, the next step the consortium will undertake is to explore possible solutions to address some or all of these challenges.

The unique process by which this study was conducted provides a rich collection of challenges and barriers to success, some that are institution specific and some that are cross cutting and more foundational. What is clear is that many of these are closely connected and co-dependent. At the highest level, the current fragmented approach and the absence of a coherent national plan or rational strategy to support university-based research creates uncertainty that casts a long and darkening shadow over the future of the American research university.

The key findings of this collective effort can be reduced to six overarching themes that provide a framework of understanding and appreciation of the current conditions and an outlook on the future. These also serve to focus our future efforts toward finding sustainable solutions.

- I. Scarcity of resources (relative to the demand for them) has engendered a hypercompetitive “winner take all” environment and increased the difficulty of managing academic research activities. Growing regulatory requirements have increased the challenge. To enable impact-oriented research that addresses significant social challenges, universities and research sponsors must work together in providing flexible and adaptive strategies, tactics, and operational structures.
- II. The gradual, ever-increasing growth of government regulation and reporting requirements have exacerbated institutional financial stress and diverted faculty time from research. At the same time, the cost of doing research is not fully recoverable from sponsors.
- III. Innovation requires diversity of high quality research and development of standardized performance metrics that reliably reflect the complexity

and societal expectations of today's research. This should be initiated by the academic research community, in partnership with key stakeholders.

- IV. Enabling the highest impact research requires current and predictive data to assess programs and evaluate key opportunities in a resource-constrained environment. Strategic decision-making at local, state, and national levels requires data that reflects a local, national and international scope.
- V. Translating the value of the research university in serving society, contributing to local and regional economies as well as promoting national innovation and security, needs to be a story well told. University faculty, students, staff, and administrators as well as external supporters need to provide clear, consistent, and focused messages to local and national opinion leaders and decision makers. Highly credible accountability and performance-based data from neutral sources need to drive the conversations.
- VI. The fragility of research administration and leadership is not fully understood nor appreciated within the university community or by sponsors and stakeholders. The staffing requirements, competencies, and professionalization of research administrative and program support staff to reliably enable the efficient and effective conduct of research needs to be understood.

INTRODUCTION

“Keeping public research universities relevant and thriving will be no easy task, and we should start by recognizing that the long-term political winds have shifted.” MARK YUDOF, (2002) PRESIDENT, UNIVERSITY OF CALIFORNIA³

“A tsunami of change is coming and universities don’t react quickly. We can handle changes one by one, but no one has ever seen this much at one time.”

The American research university has long been critical to the economic and social success of the United States. Expectations are high that academic research and innovations will play a central role in addressing current and future national and global challenges. The pace of change in the scope and scale of the academic research enterprise has accelerated and appears likely to change direction. Economic conditions and the erosion of

³ Yudof, MG; *Is the Public Research University Dead?* Chronicle of Higher Education (11 January, 2002).

public and political confidence in university-based research have clouded the future of the American research university.

A university's core business is the discovery, dissemination, and application of new knowledge. Research is key to a university's reputation and increasingly the basis of its academic and financial success. At all levels research and innovation are recognized as critical for expanding the knowledge base and the supply of highly educated individuals who provide economic vitality and competitiveness. Research also drives improvements in teaching and learning which then results in social and individual gains. As universities have sought to increase and diversify revenue streams and reduce their dependency on governmental base-budget appropriations, and as tuition approaches maximum acceptable levels, externally sponsored research has achieved greater prominence.

Developing and managing a research portfolio is not easy for the individual researcher, and it is equally, if not more difficult, at the institutional level. There are many points of failure and the benefits are often not easy to measure or immediately obvious. The research grants and contracts landscape is highly competitive and this is only likely to intensify as a result of the current financial situation. In recent years, research has become more international and interdisciplinary collaborative, making the development and administration of research increasingly complex. On a broader level, universities are heavily regulated and scrutinized by government, sponsors, and the public who seek transparency, integrity, and measurable value for their investment.

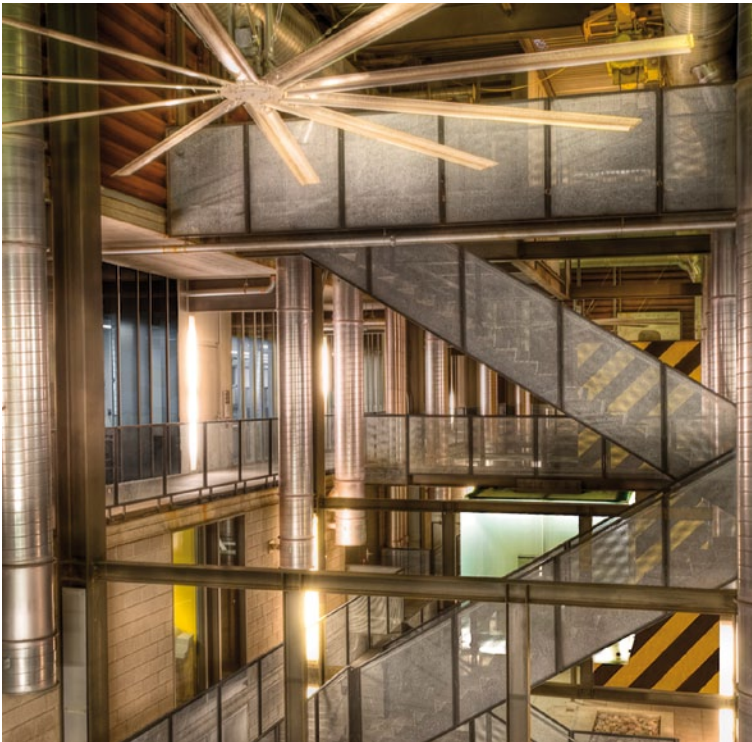
Accountability measures mandated by the American Recovery and Reinvestment Act (ARRA) of 2009 have placed new demands on universities to ensure they demonstrate quality and value-added outcomes of their research. In the face of a bleak financial outlook, these demands are likely to remain, if not increase. Moreover, there is a pressing requirement on the part of universities to efficiently manage and effectively identify opportunities upon which to focus declining institutional resources.

Research management has evolved to varying degrees to fit this dynamic environment. People, processes and systems are key factors in delivering research excellence, both strategically and operationally. The functions of university research offices and the demands on staff working in research program development and administration have become more varied, and have grown to embrace a wider range of activities and responsibilities. Among others, these include intellectual property, economic development, government and community relations, internal and external communications and fundraising.

Research management systems, including electronic systems, have developed to help institutions cope with increasing demands related to compliance, accountability and decision support. Competitive academic environments require efficient and highly responsive evidence-based decision-making that depends on data rich information systems. The increasing breadth and complexity in the research portfolio requires systems to be flexible and able to handle a wide range of different types of research as well as sponsor requirements. Increasing regulations require active management and measurement by both academic and administrative staff. The information that is obtained from these systems is required for a variety of reasons. Strategically, timely research performance data informs an institution of its performance and competitiveness and allows it to make decisions based on facts rather than instinct or opinion. Operationally, information systems are required to support day-to-day administration of research and meet the needs of external stakeholders.

Within the research university community there is a growing recognition of the need for research intelligence and well-established performance and risk management systems. These can help focus institutional strategies on research quality, raise the profile of the institution nationally and internationally, manage talent and resources, and build a high-quality research environment. Yet, there is considerable dissatisfaction with current systems and a lack of coordination within and between institutions as each implement their own solution to what are often common needs.

This study seeks to assess the current health of a cross section of leading research institutions within the current economic and political environment, to ascertain how they are coping with a growing list of pressures and uncertainty, and the prospects for the future success of public and private research universities. At this point it is not a system or solution-specific study. Rather it seeks to develop an understanding of shared institutional needs and barriers to the institutions' ability to sustain current efforts and consider what is necessary for their continued success. A future aim of this project is to develop well-defined solutions and explore how these can be implemented broadly in coordination with sponsors and other stakeholders.



GOALS AND OBJECTIVES

The objective of this study is to identify, raise the level of understanding, and serve as the catalyst for a national discussion among key stakeholders that will allow progress to be made in addressing the most significant challenges faced by American research universities. Specifically, the focus relates to the universities' ability to conduct discovery research, to apply innovative solutions to today's and tomorrow's problems, and to educate and train the next generation of researchers.

The goals of this study are to:

- Assess the current state of the nation's research universities across several institutional types; from mid-sized to large, both public and private universities.
- Identify current and future challenges that threaten the sustainability and future success of the nation's academic research enterprise.
- Compare and share the ways universities have organized their research administration and program development efforts and how these systems have evolved and are functioning.

- Detail how universities are currently coping with structural changes in the way academic research is conducted, supported, and measured and their plans for the future.
- Explore solutions to commonly shared challenges and barriers to the continued success of the academic research enterprise, as well as pathways towards their full evaluation and implementation.
- Compare the findings and recommendations of other relevant studies, both on the national and international level.

STUDY DESIGN AND EXECUTION

To assess the current state and future of the academic research enterprise in the United States, we conducted structured interviews in 2011 and 2012 with a select group of universities who agreed to participate. These universities represent a broad representation of public and private research-intensive universities. Given the assessment and open framework nature of this study, we used an interview-based approach. This format is superior to written or online surveys as it allows for the exploration of topics that would have been difficult to anticipate, or are unique to an individual campus. It also allows for a more open and free-flowing exchange of ideas. This is especially appropriate given the structural and policy differences between research universities and their individual characteristics.

There were no pre-determined expectations as to the potential outcomes, and no specific concepts or hypotheses were tested. Information from each campus interview was evaluated and aggregated and serves as the basis for the core findings that were shared by a majority of the universities. These

and potential solutions were then reviewed and discussed during a meeting⁴ of the Participating Universities.

STUDY BACKGROUND AND DEVELOPMENT

Prior to the initiation of the study, a meeting hosted by the Association of Public and Land-grant Universities (APLU) was convened that included federal science agencies, higher education associations, and advocacy groups. A similar study that was conducted in the U.K.⁵ was reviewed and formed the basis of the discussion about conducting a similar study in the U.S. To help set the stage for the study and to engage invited universities, presentations were made at meetings of the Council on Government Relations (COGR) and the Federal Demonstration Partnership (FDP). These presentations included the basis and rationale for the study; the study aims, objectives and design; and anticipated impact.

There was strong support for conducting the study within the framework of the conditions within which U.S. research universities function. It was determined that the campus visit and interview-based format would be the best approach resulting in a written report for wider distribution. While other studies on the related topics have been conducted such as those by the National Academy of Sciences and the President's Council of Advisors on Science and Technology, the findings of this study would be from a unique, bottom-up, point of view. Furthermore, the involvement of a significant number and types of research universities would lend credibility to the findings.

⁴ Reference to National Meeting in DC, 19 & 20 April 2012.

⁵ JISC, Imperial College London, Elsevier; *Research information management: Developing tools to inform the management of research and translating existing good practice.*

PARTICIPATING UNIVERSITIES AND INTERVIEWS

Given that the focus of the study is university-based research, those with total and federal research expenditures among the top 100 of all universities, both public and private, were viewed as the appropriate pool from which to select Participating Universities. Selection criteria included representation from private and public universities, a balance between large and moderately sized institutions, geographical diversity and empirical data indicating the institution had made significant recent gains in its research portfolio or that new creative efforts were underway in order to do so. The sample size of between 20 to 25 universities representing a cross-section of university types and size was considered to be sufficient to produce a credible assessment of the current state of the academic research enterprise.

The research team contacted the universities' chief research officer and directors of research offices, explained the purpose and design of the study, and invited them to become part of the project as a Participating University. A total of 30 research-intensive universities were approached with 25 agreeing to become a Participating University (see appendix). Subsequent plans were made for a study team to visit the campus and conduct interviews.

Each campus was asked to convene members of their research administration, program development staff, and other staff appropriate to their specific institution. This ranged from the central research leadership to large groups involving college associate deans and research center directors. At the beginning of the interview an orientation about the purpose of the study was provided with the assurance that all interviews were strictly confidential, and that no individual statements or attributions would be identified in the report or in any presentation that would follow. The quotes used throughout this study are therefore anonymous, as they originated from participants at interview sessions or the National Meeting.

Prior to each campus visit, an institutional profile was developed from publicly available information and campus produced reports. The data included was:

research funding and expenditures, number of students and faculty, total budget and sources of funding, and strategic plans. This background framed the nature of the interview to make it appropriate for each university.

Dr. Brad Fenwick conducted all interviews with support provided by members from the Research Office of the University of Tennessee, Knoxville and Elsevier staff. Each member of the interview team took detailed notes, occasionally asked clarifying questions, and produced an independent meeting report. The value of having multiple staff members involved in each interview was to capture different aspects of the discussion, recognize bias, sensitive topics through body language, and hesitancy to address questions directly. A total of 78 individual meeting reports was produced.

Interviews were conducted using a discussion format and followed a semi-structured design. In order to keep answers spontaneous and direct, the universities were not provided with the questions prior to the interview. Prior to each interview the questions were modestly modified as appropriate to institutional type and circumstance. Depending on the answers and discussion, the nature and types of questions were modified during any individual interview. The interviews typically lasted two-hours and were viewed as being productive and useful by both the interview team and the representatives from the Participating Universities. As required, follow-up questions were directed to the chief research officer as necessary to clarify a particular topic.

FINDINGS EVALUATION AND REPORTING

As university interview reports were completed they were made available to all members of the interview team to review and compare. The interview team reviewed the overall nature of the findings from the interviews and to reduce these to a specific number of core findings that reflected the current situation at a majority of the Participating Universities. Additional staff

members who had not participated in campus interviews participated in this process to prevent interviewer bias.

A day-long report development workshop of the Participating Universities was conducted at a national meeting in Washington, D.C. Representatives from eighteen universities plus members of the interview team from the University of Tennessee, Knoxville, and Elsevier attended. The objective of the national meeting was to validate the key findings exposed during the campus interviews, provide additional context and rationale of their importance, and develop potential solutions.

To guard against bias and initiate engaged discussions, the university representatives were randomly divided into two working groups. Working in parallel, each group was presented with the same core findings. Members of the interview team captured the discussion. At the end of the meeting the working groups came together to present the results of their independent discussions and to reconcile differences. In addition, the process for working together on next steps led to a more detailed exploration and evaluation of the proposed solutions and how they would best be pursued and implemented.

The discussions and findings of the national meeting were used to refine and provide a more robust background and justification behind each of the study's core findings as well as suggested solutions through analysis of the campus interviews from which the final report of this phase of the project was produced.

ACADEMIC RESEARCH ENVIRONMENT IN CONTEXT

The distributed research concept that was the foundation of the U.S. research university system is one of the reasons the U.S. has been so successful economically. That system has been eroding incrementally over the past 40 years, and is likely to reach a tipping point in the next few years when stimulus funds have been spent and the nation's science and technology budget does not increase. Public attitudes, policy-making and the academic research enterprise that these support are dynamic, not static, processes that require constant attention.

Based on a review of a lengthy set of indicators such as the number of scientists and engineers, corporate and government R&D, venture capital, productivity, and trade performance, the *Atlantic Century* report indicates that the U.S. has failed to enhance its global competitiveness since 1999. It now ranks fifth in innovation based on competitiveness according to the World Economic Forum 2011-12 Global Competitiveness report⁶. The

6 Schwab K, *The Global Competitiveness Report 2011-12*, World Economic Forum (2012)

2005 National Academy of Sciences report, *Rising Above the Gathering Storm*⁷, found that the scientific and technological leadership of the U.S. had eroded while other countries were making significant investments that were producing progress. The same committee in 2010 updated their findings in their report, “Rising Above the Gathering Storm, Revisited – Rapidly Approaching Category 5” where they noted, “our nation’s outlook has not improved but rather has worsened.”⁸

Since 1985, state funding of public universities has declined on a per student basis. As tax revenues were reduced, calls for smaller government increased. With other higher priorities to address, states have significantly reduced appropriations in support of higher education. In order for students to receive the same quality education, tuition has increased sharply to replace the loss of public support. This shift towards becoming tuition dependent not only reduces student access to higher education but also shifts attention away from research, particularly at public universities. States rarely recognize research in their funding formulas. Some have recently redone these formulas to emphasize student retention and graduation rates, while simultaneously significantly reducing public support for higher education.

The pace of change in university-based research, particularly publicly supported research, has quickened. The fundamental restructuring now underway relative to how universities are funded (tuition, endowment and research), coupled with the need to address the federal budget deficit, brings an enhanced sense of urgency to highlighting the importance and societal value of higher education in general, and basic research specifically.

As in previous economic downturns, the “great” recession has and will continue to accelerate the restructuring of university research in a fashion

7 National Academy of Sciences, National Academy of Engineering, and Institute of Medicine; *Rising above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future*, National Academies Press (2007).

8 National Academy of Sciences, National Academy of Engineering, and Institute of Medicine; *Rising above the Gathering Storm, Revisited: Rapidly Approaching Category 5*, National Academies Press (2010).

that has not been seen in 50 years. While welcomed, stimulus funding allocated to research and innovation contributed to the differentiation between the healthy and the “at-risk” research university. Many hope that additional federal funds will be appropriated to support academic research. Pragmatically, this seems unlikely for many of the same reasons that the states have reduced their support for higher education.

In contrast to a growing list of countries, the U.S. lacks a cohesive, national strategy to sustain its system of research universities that are collectively the best in the world. At the same time research universities often lack their own realistic strategy. Many engage in not much more than wishful thinking in hopes of maintaining their research portfolios. While not based on any specific policy or priority, it is clear that the U.S. is progressively moving research into fewer but larger universities and the gap between those and the “average” research university is growing at an increasing rate. Expenditures in research increased in the past few years only because universities spent more of their own funds in hopes of staying competitive in what amounts to an “arms race”. Most of those institutions are no longer in a position to continue to do this and many have already been forced to reduce internal investment in their research.

Simply put, it seems likely that a number of the universities at the margins will not be able to bear the costs of supporting competitive research efforts. They will not have the internal funds necessary to support their faculty at a level where they can be competitive for external funds, without which there is essentially no ability to maintain a significant academic research enterprise. Cuts in state support to universities are not evenly distributed when viewed as a percentage of the overall budget. Universities that have large externally funded research programs and/or endowments are fundamentally more resilient. Thus, they have and will continue to claim a greater percentage of the declining amounts of available public research funding.

“Quality” and “value” are terms commonly used to rank all types of activities; research programs are no exception. As has been done with

other publicly funded functions, academic research is entering a time of greater political accountability. In this time of increases in performance and results planning and reporting, the scientific and academic leadership are looking for ways to be more responsive while at the same time mindful that programmatic and funding decisions must be scientifically sound, relevant, and responsive to the public need. Whether at the sponsor level or at the university level, central to this notion is that performance should be based on analytical assessment – both quantitative and qualitative -- of the importance of issues and problems, and that this is then translated into programmatic priorities. Such priority-setting activities must be based on an ongoing assessment of where science is going and what the scientific research community thinks is feasible.

At a time when the nature and complexities of our major global problems require interdisciplinary approaches and calls for such efforts come from all sectors, it is unfortunate that we are in the process of reducing the nation's academic research efforts to a select group of universities of which private universities are over represented. Some might argue that the smaller institutions should adopt a program differentiation and segmentation strategy. However, this is difficult to accomplish on any campus and efforts to focus in order to remain competitive in a few areas have failed repeatedly.

The message is this: university based research that was a driving force in the U.S. becoming a world leader is being recast without giving sufficient thought to the consequences. How the majority of research universities will cope with reductions in public funding for education and recently research is not clear. An important element of any strategy will be to enhance evidence-based decision making with reliable and performance based data focused on maximizing the scholarly potential and research productivity of faculty.

KEY FINDINGS

The on-campus interviews produced a wealth of information and a level of understanding that could not be gained in any other fashion. Individual universities had unique challenges and high priority concerns that were not necessarily shared with all the other universities. However, when all the results were evaluated it was possible to identify frequently recurring areas of concern that could be packaged into topical themes. From these a short list of core findings was developed that included suggestions for possible solutions, and formed the basis of discussion and validation at a national meeting of the Participating Universities.

I. HYPER-COMPETITION AND COMPLEXITY

Scarcity of resources (relative to the demand for them) has engendered a hypercompetitive “winner take all” environment and increased the difficulty of managing academic research activities. Growing regulatory requirements have increased the challenge. To enable impact-oriented research that addresses significant social challenges, universities and research sponsors must work together in providing flexible and adaptive strategies, tactics, and operational structures.

“Our university leaders and board do not understand how different the future of our university could be if we lose the research arms race.”

As described earlier, the academic research enterprise has become hypercompetitive and complex, and faces many combined pressures it has never experienced before. At the same time expectations for university-based research to produce creative solutions to a growing list of complex problems have never been higher.

Research is among the most complicated aspects of higher education. There are many possible points of failure, making it more difficult for institutions to adjust and succeed. The financial resources of an institution, if high, will tend to favor its structural competitive advantage over an institution dependent on public resources. In the absence of a national research strategy, the competition between such disparate universities has begun the trend of consolidating academic research into fewer but larger institutions. As this trend continues, the overall research enterprise loses out. Unsustainable costs for some universities and corrosive hyper-competition between universities have serious consequences, impacting the ability of faculty to be successful researchers in the present and reducing student interest in research careers.

“Most administrators are focused on how to improve the institutions they serve. But few understand what it costs now or will cost in the future to maintain a robust research mission.”

Competition goes far beyond institution versus institution. It also happens within institutions, e.g., research versus teaching, department versus department, sciences versus humanities. A member of the Participating Universities asked, “Is there anything we don’t compete over?” outlining the ferocious “arms race” for resources, position, and prestige. Another complicating factor is the rise of interdisciplinary research involving multiple units within a university. Effective collaboration is often dependent on working out contentious internal politics.

Globalization plays a role in hyper-competition as well. Institutions are rapidly becoming more internationally focused, extending their resources and brands to partners abroad. While this raises international awareness of American achievement and enhances international collaboration, it can also be regarded as a complicated and competitive distraction from the core issues of managing a university. The pressure to be recognized as a player in the globalization of American research and education adds to the complexity of academic leadership’s role.

“It’s not just global competition. Flagships now have to compete with aspiring universities. This is all driven by money and prestige. Every state wants to have competitive research universities. This results in small schools which want to become research universities.”

The threat of decreased funding presents a serious dilemma to many institutions, which would be faced with difficult staffing and priority issues if an implosion occurred. However, it is not only increased funding that is needed in academia today it is an academic research system that is more efficient and effective. Most institutions are left to figure out their own definitions of efficiency and efficacy. However, few institutions have the predictive and program-based comparative data to make well-informed

decisions. Even where data is available, some institutions lack the discipline to use the data to guide them. Data is often not available about the current and future potential productivity of research programs and faculty. This limits an institution's ability to take action in the recruitment, development and retention of faculty, the development of strategic relations with other institutions, as well as to recognize and promote institutional success and capacity to potential sponsors and the public.

Shifting political pressures also contribute to the complexity of the research enterprise. When certain research findings are challenged by political agendas, university leadership must work doubly hard to understand the drivers and, at the same time, manage the university's research mission.



II. COMPLIANCE AND INDIRECT COST RECOVERY

The gradual, ever-increasing growth of government regulation and reporting requirements have exacerbated institutional financial stress and diverted faculty time from research. At the same time, the cost of doing research is not fully recoverable from sponsors.

“The biggest concern is the growing cost and ambiguity of the research compliance requirement.”

“When researchers are spending an estimated 40% time on administrative issues, ‘where’s the time for science?’”

The amount of funding available to support academic research is unlikely to increase and chances are it will suffer from a significant decline. In fact, on an inflation-adjusted basis significant declines have already taken place. At the same time reporting, accountability, and compliance requirements have and are likely to continue to increase. First and foremost, this is driven by pressure from sponsors to comply with ever-increasing regulations and to provide detailed quantitative data on the results of funded research.

To make matters worse, the regulatory requirements vary widely across agencies. Secondly, the increasingly collaborative, interdisciplinary and global nature of research is reinforcing regulatory and administrative complexity. As a result, there is a large and growing burden on faculty and research administrators, diverting faculty time from research and education, wasting valuable federal research dollars, and depressing faculty morale. Research compliance is one of the most pressing concerns of university leadership today, driven by the lack of capacity and capabilities to manage it, and enhanced by the growth of compliance requirements’ intensity and levels of complexity. This is not a case of administrative inefficiency, but a result of the cap on overhead recovery associated with administrative costs, at the same time that the cost of research compliance and reporting requirements have increased.

“The onslaught of research compliance regulation and unfunded mandates has overwhelmed the strong downward pressures of budget cuts and emphasis on administrative efficiency.”

The relationship between research activity and administrative support organization and size is often based on historical norms for an institution. As the number and intricacy of research programs increase, the capacity of internal systems lags behind or is ignored until the lack of administrative support capacity becomes a drag on all research programs. Research administrative support is often viewed as being inadequate and not sufficiently responsive to provide faculty with a competitive advantage in their efforts to attract external funding or in the management of funded research programs. In reality, offices are often understaffed or struggle to hire and retain the qualified staff needed to provide the desired support.

“The specter of research compliance is what really keeps me awake at night.”

“Academic research would be more successful if sponsor compliance requirements were evaluated on a cost (time, effort, dollars) vs. benefit (scientific and engineering discovery and application) model.”

“The regulations are ostensibly intended to prevent the waste of taxpayer money, but it’s worth considering whether a little wasteful spending on the part of researchers might not be cheaper than paying for the legions of researcher administrators, accountants, and lawyers required to implement the regulations.”

The fiscal situation of U.S. universities requires a reexamination and harmonization of regulatory and reporting requirements to ensure a proper balance between accountability and risk management, and to ensure that federal and institutional resources, as well as researchers’ time and effort, are being used effectively and efficiently.

Recovery of indirect costs to pay for research is another thorn in the side of administrators. The time and effort spent to collect and develop the supporting data as part of negotiating an overhead rate has grown significantly, while the odds of receiving the rate that is justified by the data have gone down.

“Overhead calculations and negotiations are not uniformly applied, promote behaviors that may not otherwise be prudent, and create an uneven playing field. Having a single overhead rate would be both save money and be fair.”

Furthermore, the basis for the considerable difference in overhead rates between similar universities can be difficult to understand. Difference in overhead recovery rates provide a significant financial competitive advantage and incentivize universities to make research expenditures that may exceed what is actually required. The need for universities to use their own resources to subsidize sponsored research contributes to the consolidation of university research into fewer but larger institutions, and benefits those who have large endowments.

“Academic research would be more successful if F&A returns truly mirrored the cost of conducting research. When such cost cannot be fully recovered, the research must be subsidized through other means which eventually increases the cost of other areas in the institution.”

III. RESEARCH QUALITY AND IMPACT

Innovation requires diversity of high quality research and development of standardized performance metrics that reliably reflect the complexity and societal expectations of today's research. This should be initiated by the academic research community, in partnership with key stakeholders.

“Research is irrationally only measured as an output, number of grants and dollars awarded. This fails to recognize the costs to produce these and whether or not it was efficient or wasteful. And, it has little relation to quality or impact.”

Universities need to effectively and accurately collect and manage the information about the research conducted on their campus. This includes both externally and internally funded research including that which is expensive and scholarship that has little cost. It includes research conducted across disciplines regardless of the output, from scholarly papers and books to art, music, and dance.

Internal assessment and impact analysis is not done in any systemic fashion but rather relies on the department or college level reviews which focus on the performance of the individual faculty member rather than the institution. The scholarly value of international collaboration, interdisciplinary and translational research is generally assumed but not proven with empirical data. Much of how we organize, manage, and reward research is based on habit rather than critical assessment or best practice.

“We have data about our research, but I would not call it comprehensive or accurate.”

University level information necessary to inform strategic, organizational, or management decisions about research quality or productivity is not

available. Comparative data between institutions is of little value and discipline specific accreditation programs are generally not evidence-based and are not trusted, particularly when they are critical. Even when valid, the ability to redirect resources is challenging.

“For the future of research universities and their faculty we must shift and place greater emphasis on quality rather than quantity and realign our rewards systems. But first, we need to do the hard work of agreeing on discipline specific definitions of quality.”

While there are differences, universities generally have systems and processes that provide summary information on their research via HR, grant management, and financial systems. Rarely do universities relate resource allocations to research and scholarly outputs, e.g. publications, performances, etc. except in relation to the review of individual faculty productivity at the time of their promotion and tenure.

Trustworthy data related to comparative organizational and management performance is generally not available. The rationale for this is that it is too complex and each university is different, yet internal and external comparisons of individual faculty research productivity are standard practice.

“The lack of established data standards similar to what is required for undergraduate education causes problems in generating meaningful research performance metrics between universities.”

Objective quality and impact-driven means to measure a university's current and future research strengths and areas of leadership are generally not available. Systems to recognize, evaluate, and proactively develop faculty research capacity in a focused way are not available or widely used. Universities often portray their research successes locally but do not have the ability to accurately gauge these in comparison to other universities.

In an external context, research rankings are important to universities because they are the basis of institutional reputation, they signal a presumption of excellence and capacity to sponsors, and they serve to attract faculty, students, and donors. Often it is the relative research ranking among peers that establishes and maintains a university within a certain institutional classification or type e.g. on national level with the Carnegie Classification or AAU membership⁹.

There are several systems that currently rank universities in relation to their research intensity and, to a lesser degree, performance. These involve both public and self-reported data. Other national measures of research activity related to federal total funding obligations and self-reported total research expenditures are more subjective rankings and reward size rather than productivity, quality, or impact.

Both on internal and external levels there are a number of central issues at play, such as the lack of data standards and definitions that are shared broadly among universities, as well as the inability to create or measure research outputs as a reflection of inputs. To be meaningful, measuring research quality and impact in general and particularly between universities must take into account institutional, discipline specific, structural, functional, and financial differences. Current measures of outcomes are of limited value and, in the absence of measures of productivity and quality, reward size over organizational or individual efficacy or effectiveness.

9 ⁹ The Association of American Universities (AAU) is an association of 61 leading public and private research universities in the U.S. and Canada. Membership is by invitation and is based on the high quality of programs of academic research and scholarship and undergraduate, graduate, and professional education in a number of fields, as well as general recognition that a university is outstanding by reason of the excellence of its research and education programs.

IV. PLANNING AND DECISION SUPPORT

Enabling the highest impact research requires current and predictive data to assess programs and evaluate key opportunities in a resource-constrained environment. Strategic decision-making at local, state, and national levels requires data that reflects a local, national and international scope.

“Higher education is generally not all that competitive, except when it comes to research. In research we compete for everything, grants, faculty, graduate students, publications, reputation, etc.”

Universities have a growing need to gather and manage information about the research they conduct. Doing this well enables more informed strategic decisions to be made about how to sustain and advance their research mission in a coordinated fashion. Additionally, this makes the reporting of research performance to internal and external stakeholders, such as sponsors and boards, easier, transparent and more accurate.

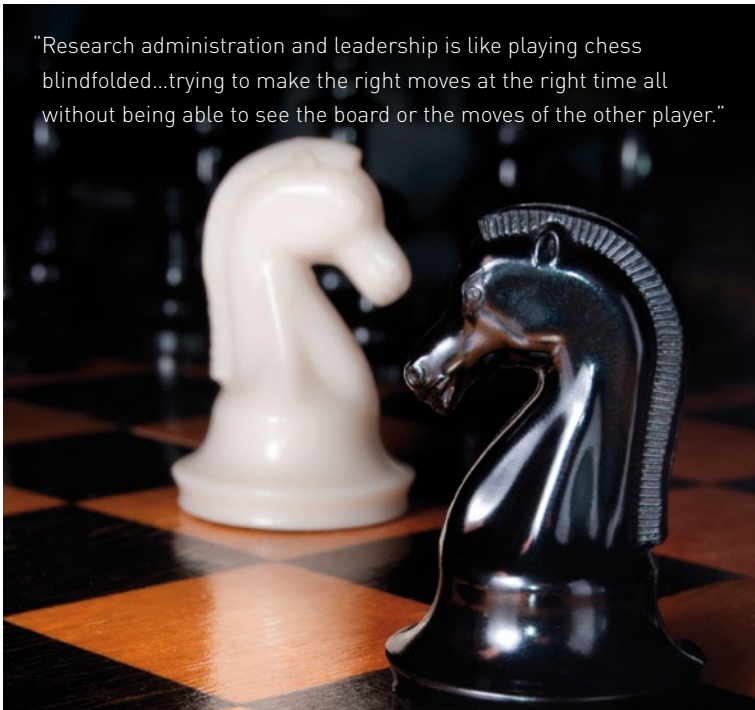
Universities have developed a range of systems and processes to collect and evaluate research related information. Such systems may be an institutional priority, but are often developed independently or as an add-on to other institutional information and management systems. To varying degrees the research information systems can be integrated into other systems (e.g. HR, finance, compliance, facilities, etc.). These systems are historical in nature, and have not evolved in response to the current research environment; they are rarely viewed as being adequate or sufficiently credible to support well-informed decisions.

Seldom are they capable of conducting detailed multi-factorial scenario analysis or providing a reliable forecast of institutional or program level research performance based on a set of assumptions, including targeted institutional investments or administrative restructuring. As a result,

institutional research related strategic plans and performance goals, while critically important and high stakes, are at best wishful thinking. Increasing levels of performance accountability require planning and resource allocation decisions to be based on sound objective data.

Universities have a difficult time objectively assessing their comparative research strengths and weaknesses in relation to their peers on both a program as well as on an overall institutional basis. The result is that rather than having the ability to conduct the analysis internally, institutions turn to external consultants to provide guidance on strategic planning decisions. Consultants often only have access to public information about other universities, but have time and experience in evaluating performance between universities.

“Research administration and leadership is like playing chess blindfolded...trying to make the right moves at the right time all without being able to see the board or the moves of the other player.”



Standardized processes are not available to connect, evaluate and share credible research performance data between universities. Standard definitions and information management systems are often available at the institutional level but are often unique to the individual university and of value only in evaluating changes in performance over time. When comparative benchmarking takes place it is often as a snapshot of a point in time and is not performed on an ongoing basis, so the university then returns to internal comparisons of progress on a yearly basis. It is common to see universities noting growth in research funding over five to ten years but failing to indicate whether their rate of progress is more or less than comparable institutions and whether this is merely a reflection of a growth in overall availability of external funding, e.g. doubling of the National Institute of Health (NIH) budget between 1999 and 2003.

While some modest improvements have been made, the credibility and validity of ranking systems is not strong because they fail to recognize and account for differences between how universities are structured and how critical data elements are defined differently between institutions. In addition, differences between universities (particularly related to whether or not they have research-focused medical schools, agriculture, or large endowments) are not taken into account. Increasingly, these rankings are viewed as being contrived and not to be taken seriously because they do not rationally recognize differences between universities and fundamentally are not based on research productivity as measured by publications, patents or student success. At the institutional level, there is little reward or recognition for getting the most impactful research from the available resources.

The ability to make better decisions related to the development and sustainability of increasingly costly research infrastructure -- people, space, equipment, and operational funding -- is now critically important. However, few universities have the predictive and program-based comparative performance data required to make well-informed coordinated decisions. The research data that would provide a more comprehensive picture of institutional performance are limited by not being deeply

integrated into other information and institutional management systems and often are only input-based with essentially no connection to scholarly outputs, e.g. grants, publications, patents, graduate education, etc.

“Automated research management systems can be helpful but rarely provide the kind of information that is necessary to made decisions or predict outcomes.”

When performance data is available, current systems often do not have predictive power and even when they do, institutions often lack the discipline or political will to openly use the information to guide decisions. In the absence of good data, decisions are made on instinct or the popularity of what other institutions are doing. A recent example is the rapid growth in schools of public health and medical schools without an understanding that they cannot all be successful, at least in terms of having robust research programs. As a result, unsustainable programs are created and programs that are not particularly productive continued to receive institutional support.



Data is also not available concerning the current and future potential productivity of research programs and individual faculty. How these measure up against others on a national basis is lacking, and whether the trend is positive or negative is not known. The same lack of credible productivity data limits the ability to act proactively in the recruitment, development, and retention of faculty; the development of strategic relations with other institutions; and to recognize and promote institutional success and capacity to potential sponsors and the public.

“We play a cat and mouse game with our department and research programs related to their productivity in comparison to similar programs at other universities. We ask questions, they provide predictably positive answers, and we have to trust them because an independent source of credible data is generally not available.”

The research data that is available relates to grant applications, external funding, and sponsor required compliance functions. Data on the research interests, expertise and productivity of individual faculty is known and connected at the department and research unit level, but seldom collected in a uniform fashion and not available on institutional level. Few universities have systems that can identify the relative ranking of faculty within their discipline either on campus or within the field. Program and department leaders and faculty do not place research performance data as a priority because of concern about its validity or how it might be used to inform resource allocation decisions.

V. VALUE OF THE RESEARCH UNIVERSITY

Translating the value of the research university in serving society, contributing to local and regional economies as well as promoting national innovation and security, needs to be a story well told. University faculty, students, staff, and administrators as well as external supporters need to provide clear, consistent, and focused messages to local and national opinion leaders and decision makers. Highly credible accountability and performance-based data from neutral sources need to drive the conversations.

“We are just now perceiving that the university’s invisible product, knowledge, may be the most powerful single element in our culture, affecting the rise and fall of professions and social classes regions, and even nations.” CLARK KERR, FORMER PRESIDENT OF THE UNIVERSITY OF CALIFORNIA (1963)

The advance of the human race is predicated on the notion of our greater intelligence and the ability to solve complex problems and learn. There is no doubt that the scientific revolution has been, and will continue to be, the source of understanding and new knowledge necessary to solve the major challenges of our time and those which will undoubtedly arise in the future. Yet, academic science and engineering research continues to struggle to be viewed as a priority worthy of the level of public support necessary to enable it to achieve its potential.

The U.S. broke with traditions of the time when over 150 years ago higher education was made widely available through the Morrill Land-Grant Act of 1862. In addition to providing access to advanced education, the creation of the land-grant universities was a significant investment in a highly distributed academic research model. There is little doubt that academic research has been a powerful transformative force and the cornerstone in the foundation of American economic success (Tassey, 2009). Research has

a well-documented positive impact on student education and continues to evolve in the form of more interdisciplinary and translational approaches. The question is whether in the face of other societal priorities, academic research will be viewed again as the pathway of continued prosperity.

“The academic research environment is entering Phase III, with Phase I being pre-WWII, and Phase II being post-WWII.”

The central problem, which brings the future of academic research into question, is inadequate funding. Simply put, the current size and scope of the academic research enterprise cannot be sustained in the absence of additional financial support. A high percentage of the general public and politicians support higher education and academic research, but do not hold it as a priority in relation to other needs and have not been willing to provide funding to sustain the current enterprise let alone support for new efforts in emerging fields. Since the 1960s, federal funding of research has declined as a percentage of national GDP, and state support for research, in the form of infrastructure and faculty and staff compensation, has also been reduced as a percentage of their budgets.

Beyond funding there are a number of additional pressures that threaten the future of university-based research, particularly at public institutions. Most prominent among these are a lack of general appreciation of the scientific process and evidence-based public policy decisions, the lack of trust in scientific process and data, and greater levels of oversight and accountability, including economic impact.

Generally, universities that have their research mission and priorities well engrained within their identity have an easier time convincing internal and external stakeholders of the importance of continued investment. This is particularly the case at private universities where research is a relatively high percentage of the overall revenue. To be successful the research enterprise requires understanding and support from all administrative units. University leadership, e.g. Chief Operating, Financial and Technology

Offers and HR directors may not have academic research backgrounds or experience that provide a holistic understanding of the current challenges.

The outlook of a 10-15% reduction in research award funding is generally viewed as being a very significant problem resulting in the loss of research capacity. Reflecting the importance of rankings, greater significance was placed on a reduction in the institution's relative research funding position among its peers. In some cases the appreciation of the cost to develop and maintain a research information and management system is lacking, particularly in relation to similar systems in other administrative areas. This gap tends to promote conservative approaches to risk management and subsequently additional administrative oversight, which has the potential to detract from research.

“We need to get others to tell and promote our story.”

Research universities need to work together to make their collective voice heard by the public and sponsors. It is important to use different methods to deliver the message to different audiences. An element of this must be evidence that the resources invested in R&D are efficiently being used and have impact. To be credible, this data need to be systemically connected and provided by third parties who are not viewed as having a conflict of interest.

One of the consequences of declining funding support can, and should be, a thoughtful re-examination of priorities and whether there are ways to improve the efficiency of the research and innovation process while maintaining quality. Political and social pressures continue to increase relative to questioning the efficiency and economic value of academic research. Politically driven assessments of faculty time and productivity, measured purely in economic terms, have taken place. New accountability programs at the federal level have been developed in the hope of relating science funding to job creation.

“Research and development is a complex process so comparing different systems will not be easy. Yet, a critical comparative evaluation of the productivity difference between how universities are organized is required.”

As a starting point, the dollar amount invested and the number of researchers involved, are critical inputs, and publications and patents are reasonable measures of research outputs and can be supplemented with impact analysis once developed. The inability to relate inputs and output as a measure of the efficiency of the research and innovation process, particularly between the same disciplines at different institutions, is a serious source of concern.

On a national basis, the scientific output per U.S. researcher is about the same as that of German scientists, but less than their peers in the U.K. However, the U.S. is well behind Germany and the U.K. when measured by publication per dollar invested. Similarly the U.S. global share of articles per researcher and per dollar investment is significantly below that of the U.K. and Canada and was consistently so between 2005 and 2009, declining on a compounded basis by approximately 1.5%⁸. This loss in share of global total R&D was taken up by growth in the productivity of the R&D enterprises in other countries. In short, the U.S. is ahead in R&D output because of its size (invests more dollars and has more researchers) rather than because it is particularly efficient or effective and, more significantly, the U.S. is becoming comparatively less productive¹⁰.

Basing success of an R&D system on federal dollars awarded and patents only, without an appreciation of the efficiency and effectiveness of the system's ability to produce new knowledge and innovations, is neither rational nor sustainable, particularly during difficult economic times. If the U.S. were close to being as productive as the U.K., its lead in R&D

¹⁰ Department of Business, Innovation and Skills; *International Comparative Performance of the UK Research Base – 2011*

outputs would be far less of a concern. The concern should be not only that other countries are increasing their investments in R&D, but also that for each dollar they invest they produce a greater return than a similar U.S. investment would produce.

“In order to ensure that R&D funding is being spent wisely, it is crucial that meaningful measurement tools are developed to track the effectiveness of this spending. Currently, such measures generally do not exist or are not collected on a regular, systematic basis.” U.S. DEPARTMENT OF COMMERCE AND THE NATIONAL ECONOMIC COUNCIL, 2012.

The prosperity of a nation relates to the products of its R&D and innovation efforts, in large part from its research universities. The amount invested represents the confidence that a nation has in the process. Regardless of the amount or the number of researchers involved, an R&D system that is as productive as possible provides a critical and sustained competitive advantage. Shifting productivity towards being more efficient and effective by changing how the system functions is a sensible first step in maintaining the health of research universities.



VI. FRAGILITY OF THE ACADEMIC RESEARCH ENTERPRISE

The fragility of research administration and leadership is not fully understood nor appreciated within the university community or by sponsors and stakeholders. The staffing requirements, competencies, and professionalization of research administrative and program support staff to reliably enable the efficient and effective conduct of research need to be understood.

“The academic research enterprise has, is, and always will be changing.”

“All administrators (well most) are focused on how to improve the institution they serve. But few understand what it costs now or will cost in the future to maintain a robust research mission.”

In the current environment and particularly in the future, research requires the dedicated support of all administrative units within a university to be successful. It is the most externally engaged of all administrative areas and often responsible for more than a third of the institution’s budget and in some cases a much larger percentage of its discretionary funds. On the other hand, there is a fundamental lack of appreciation or understanding of how complex and fragile research administration is by senior administrators, faculty and governing boards. Too frequently, restructuring, additional staff and higher priority is placed on research administration programs only after a significant problem takes place, which may have been avoidable.

“Academic Research would be more successful if the complexities, challenges and value of research administration and program development were more widely understood by campus administrators and faculty.”

The relationship between research activity and administrative support organization and size is often based on historical norms for an institution.

As the number and complexity of research programs increase, the capacity of administrative systems lags behind or is ignored until the lack of administrative support capacity becomes a drag on all research programs. It is often viewed as being inadequate and not sufficiently responsive to provide faculty with a competitive advantage in their efforts to attract external funding or in the management of funded research programs. In the current economic environment, the resiliency of research universities that lack a broad-based research portfolio, significant non-tuition based sources of revenue, and the administrative systems necessary to enable success of current and new research programs is increasingly at risk.

“Rarely are research administrative offices adequately staffed, creative enough, or proactive enough to fully enable the success of the faculty.”

Research funding has become so competitive, proposal preparation so time consuming, and awards management so complicated, that in order to be successful universities are increasingly required to have dedicated professional staffs organized as proposal and program support units. This becomes more important as greater emphasis is placed on interdisciplinary research and large center-sized multi-institutional proposals and programs become more common and important. Private universities with large endowments and medical schools where faculty has limited teaching and service responsibilities have generally been slower to adopt this strategy.

There is also a degree of institutional denial involved where university leaders with little related experience assume they understand how research administration should function. In the absence of objective data, they assert that how their respective university is structured and supports research is the best because that is how it has always been done. This attitude may continue even when it is recognized that the research enterprise has rapidly grown more competitive and more complex, and in some cases even when research portfolio has declined.

“Cuts to research administration undermined our ability to maintain or protect the research portfolio.”

“The research office is working beyond its capacity.”

“I have seen the consequences of taking this {research administration} for granted and the false economy of expecting faculty to be productive without adequate administrative support.”

There are many points of failure along the research administration support chain from opportunity identification, to proposal preparation and submission, to project management and compliance, to reporting and closeout, to publication and intellectual property protection. Only when there is a serious problem are the structure, function, and operations of research administration given attention.

Often this is triggered as a result of an external review or a problem that puts significant funding and the reputation of the institution at risk. Poorly organized and inadequately staffed research administrative units can present a significant barrier to the success of the faculty. On the other hand, exceptional research administrative units can promote and enable institutional success by providing the faculty with a significant competitive advantage. This approach is particularly important at institutions where faculty have a comparatively high teaching load (as in public universities) and in research areas where compliance systems are particularly complicated, e.g. medical research.

“Administrative burdens continue to increase while budgets decrease. More people would definitely be useful. Do more with less should become do less with less in order to avoid costly mistakes.”

“Our research administration staff is overworked, underappreciated, and cannot be replaced.”

Research information systems and related managers are becoming increasingly important. Their relationship with their colleagues and systems in other administrative units is often not clear. The lack of standard definitions and structured data to support academic and financial management activities rather than research, complicates the ability to develop research performance management systems.

“I have no idea what is the most productive balance between centralized or decentralized research administrative support. We do what we are doing only because that is what we have always done.”

A goal should be to professionalize research administrators so that they can be of greater value in enabling faculty success. Among other approaches, efforts should be made to reduce the clerical burden on faculty and staff by using electronic processes and shifting research administration towards development. The Faculty Burden Survey conducted by the FDP¹¹ found that on average research-active faculty spend over 40 percent of their time on administrative activities rather than conducting research.

“There can be little doubt that the faculty would be more successful researchers if the research administration staff were trained, viewed, and treated as professionals.”

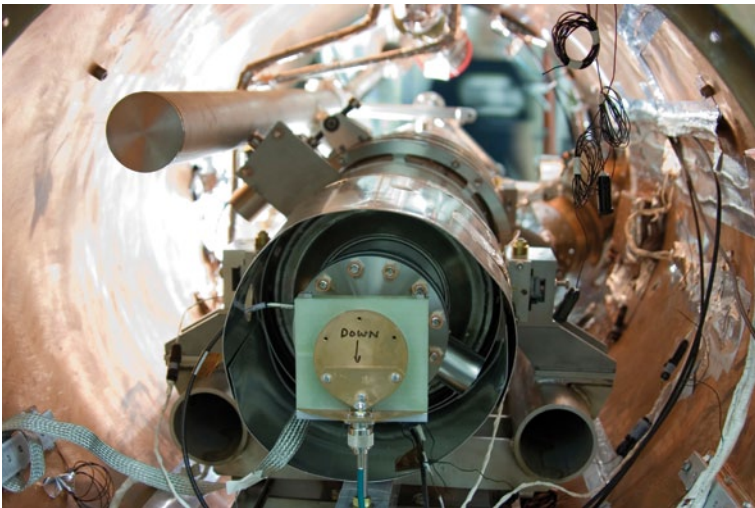
11 Decker RS, *A Profile of Federal-Grant Administrative Burden Among Federal Demonstration Partnership Faculty: A Report of the Faculty Standing Committee of the Federal Demonstration Partnership*. (January 2007).

NEXT STEPS

The purpose of this study was to identify the concerns and common barriers that limit the success of American research universities. In contrast to similar efforts, this study involved direct engagement at the campus level and the involvement of those on the front lines at both public and private universities. The key findings, as well as their analysis and potential solutions, provide the foundation for the Participating Universities involved in this effort to collectively add to and influence the discussion on developing a national strategy that will sustain and enhance the ability of the nation's research universities to fulfill their mission of creating new knowledge and applying it innovatively to address current and future needs and challenges. But identifying the barriers and challenges is just the first step.

We want to maintain the momentum by engaging a wider network of stakeholders in exploring solutions for the next stage of this study. As the agenda established by this project shifts towards implementation, success will require the continued involvement of the universities involved

plus others, as well as the dedicated support of various higher education associations, research sponsors and regulatory agencies. A community effort of those who value and recognize the many direct and indirect benefits of academic research is required to secure the future of the American research university.



CONCLUSIONS

Research is the most competitive, and should be the most easily measured and certain of all the functions and activities of a university. It is also the means by which universities enhance their reputations, balance their budgets, and attract high-caliber students and faculty. The discoveries and training of scientists and engineers that occur at research universities have been, and will continue to be, critically important in the economic health and global competitiveness of the United States.

The academic research enterprise is moving into a new period of increasingly limited resources, greater levels of accountability and assessment, and higher performance expectations. If it is to be successful, barriers to success must be identified and reduced, sponsors and universities must work more closely together to increase researcher productivity, and administrative systems and management approaches must be developed and uniformly applied to promote a greater level of efficiency and effectiveness of the academic research enterprise at all levels.

A consortium of leading research universities has cooperatively identified the core challenge and barriers that many institutions now face limiting the success of their research efforts. While the level of concern naturally varies, the study consistently revealed a number of core issues, that can be categorized into six categories; 1) Hyper-competition and Complexity, 2) Compliance and Indirect Cost Recovery, 3) Research Quality and Impact, 4) Planning and Decision Support, 5) Value of the Research University, and 6) Fragility of Research Administration and Leadership.

The consortium's next step is to develop ideas on how to positively address these issues. For the universities that are now involved as well as others who will be engaged, the focus will be shifted to achieving the ultimate goal of sustaining and enhancing the current health and future well-being of the American research university.

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APPENDIX

PARTICIPATING UNIVERSITIES

Arizona State University
Carnegie Mellon University
Colorado State University
Duke University
Emory University
Florida State University
Georgia Institute of Technology
Pennsylvania State University
The Ohio State University
University of California - OP
University of California - Riverside
University of Kansas
University of Kentucky
University of Georgia
University of Maryland - College Park

University of Minnesota
University of Rochester
University of South Florida
University of Tennessee - Knoxville
University of Texas - Austin
University of Utah
Vanderbilt University
Washington State University
Washington University in St. Louis
Yale University

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HISTORICAL PERSPECTIVE

To fully appreciate the current circumstance of the American research university and to envision its future, it is helpful to briefly review key aspects of its development and continued evolution. As is the case today, changes to the structure and function of research universities were largely in response to changes in public and political expectations.

Based on the traditions of Cambridge and Oxford, the first American universities (William and Mary, Princeton, Harvard, Yale) were established in the “colonies” and followed a tightly controlled curriculum focused on the classics, philosophy, ethics, and to a more limited degree mathematics and science. These private institutions were dependent on tuition and gifts and research was not the focus. The mission of these institutions was the transmission of knowledge and the development of social and political leaders among males of the privileged class. Later they expanded their educational and research programs to include science and engineering.

The great American experiment with the democratization of higher education was the passage of the Morrill Act of 1863, which through the granting of Federal land to each state provided the funding necessary to establish a network of universities. The focus of these “land-grant” universities was to provide the opportunity for more people to gain a comprehensive higher education, but more importantly to also conduct research on topics of high importance in their region, often agriculture and engineering. State funding support was generous by today’s standards, which kept tuition low and access high. During the same period, the private universities were strongly influenced by the strength and reputations of European research universities and turned their attention to the creation of new knowledge through original research.

Federal investment in academic research began in earnest during World War II. Universities and their faculty were called on to collaborate with emerging federal laboratories to develop critical technologies. Based on this

experience the potential of harnessing the creative potential of university-based research for the economic benefit of the country was championed by Vannevar Bush, who as science advisor to President Truman submitted the now famous report, “Science, The Endless Frontier.”¹²

Bush drew a distinction between “basic” and “applied” research and made the case that universities were in the best position to conduct basic research because of the connection to graduate education. Bush noted, “New products, new industries, and more jobs require continuous additions to knowledge. This essential new knowledge can be obtained only through basic research”. He argued that this was a worthwhile investment of federal funds as industry was not likely to make the necessary investments and federal funds would be leveraged by the contribution of the states through the infrastructure they provide at their universities and the faculty they hired. From this followed over time the founding of the federal science agencies (National Science Foundation, Office of Naval Research, National Institutes of Health, NASA, etc.) and provisions within mission agencies (Defense, Energy, Agriculture, etc.) for the funding of university based research. A series of legislation including among others the GI Bill (1944) and the National Defense Education Act (1958) contributed to the growth in the scope and scale of research universities.

During the 1960’s and 70’s higher education enjoyed a remarkable period of expansion. It was not uncommon for universities to double in size during this period. The foundation of this growth was strong public support based on the view that universities functioned to the benefit of the public and that the funding of higher education was an investment that returned significant value. The partnership between the federal government to fund the direct cost of research and a portion of the associated infrastructure; the states providing funding for facilities, equipment, and faculty; and students funding a modest portion of the cost of their education through tuition

12. Bush V, Science; *The Endless Frontier, Office of Scientific Research and Development*. (Washington, D.C.: U.S. Government Printing Office, 1945).

provided an environment in which higher education prospered, as did the economy. Private research universities also benefited, but made up for the lack of base budget support from the state through gifts and higher tuition but with significantly smaller numbers of students.

Beginning in the 1980's a significant shift in the relationship between higher education and the public started that continues today. The view that universities were important in national defense eroded and was replaced with the idea that universities, especially research universities, needed to demonstrate an economic benefit. The benefit of higher education shifted from one of being a "public good" to benefiting the individual and thus, the individual should shoulder a greater share of the cost. Finally, a series of unfunded federal mandates (health care and welfare) shifted significant costs from the federal level to the states.

States with higher costs but facing public pushback against higher taxes, turned to cutting funding for higher education and shifting the cost to students through higher tuition and fees. A series of economic recessions put additional pressure on state budgets, particularly those required to have a balanced budget. In response, federal funding of research became an increasingly important component of university's ability to conduct research and Congress responded by providing significantly greater funding to the science agencies, particularly NIH. The arms race to compete for these funds caused universities to invest increasing amounts of their own funds in order to remain competitive.

During this period and contributing to the pressures on higher education and its research mission was the re-emergence of the conservative political view first promoted during the McCarthy era that universities were more the cause of social and economic problems than a source of solutions. A number of conservative foundations were created during this period and books written that focused their energies on promoting the idea that higher education had a liberal agenda and public funding for higher education was a poor use of taxpayer dollars.

The implication was that higher education was wasteful and that faculty members are lazy and overpaid. The core principles of academic freedom, tenure, and the value of investing in basic research were attacked. The value of scientifically derived, evidence-based conclusions on topics such as evolution and climate change was refuted on religious, ideological, and political grounds. In short, this was and continues to be a direct challenge to the principles developed by Vannevar Bush and under which American research universities have over the past 50 years become the unchallenged global leaders in research and graduate education and in doing so contributed mightily to the technological and economic superiority of the United States.



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