

Quality Engines:

The Strategic Principles for Competitive Universities in the Twenty-First Century

John V. Lombardi

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The University and *The Good Life*

It is an article of faith in the United States that a college degree is an essential element in the achievement of a good life. What once was an expected educational trajectory for only those in the upper class or destined for the ministerial elite has become a virtual entitlement for most Americans. Although many people still do not graduate from a four-year college, Americans nonetheless expect that the opportunity to do so will remain accessible to all.

This enthusiasm for higher education has as its perhaps unstated premise an understanding that prosperity of the late twentieth century derived in some fundamental way from the knowledge and expertise developed primarily through America's colleges and universities and disseminated throughout the economy by college graduates in every profession. Advances in business, technology, science, medicine, and even culture and the arts often trace their origins to the research and creative activities of colleges and universities translated into effective national practice by the graduates of these institutions.

In recognition of this general belief, American society has consistently increased its investment in higher education during the second half of the twentieth century, and these first years of the new millennium reflect no reduction in the level of investment. Even more indicative of the widespread commitment to the idea of the college or university as the generator of the basic skills for a good life, this financial support comes from a very wide range of sources. The federal government, through investments in research and through financial aid programs for students, subsidizes both the most advanced aspects of the university and the core instructional programs. State governments invest tax dollars in plant, equipment, personnel, and student support for an ever-increasing number of students and institutions. Corporations of all types invest in the education of their employees and provide support for research and technology development at colleges and universities throughout the country. Students and their parents invest their own funds in the costs of attendance at colleges of every size, character, and type, often accumulating substantial debt as they participate in higher education. And private individuals from all walks of life and at all income levels donate funds to colleges and universities to support the continued expansion and improvement of every kind of higher education institution.

These investments reflect commitment, for nothing demonstrates belief more than the decision to invest. It is one thing for people to express enthusiasm for an idea; it is something else when they choose to spend their own money to achieve it. Americans rightly believe that they own higher education. (1)

[‡] [English version of: "Generadores de Calidad: Los Principios Estratégicos de las Universidades Competitivas en el Siglo XXI." Presented at the *Simposio Evaluación y Reforma de la Educación Superior en Venezuela*, 15 y 16 de Marzo de 2.001. Sala "Francisco de Miranda" Biblioteca Central, Universidad Central de Venezuela]. John Lombardi is the Director of *TheCenter* and Professor of History at the University of Florida. This paper relies on the work of *TheCenter* staff: Diane D. Craig, Elizabeth D. Capaldi, and Denise S. Gater. For complete data see the materials at <http://thecenter.ufl.edu>.

This dramatic expansion of colleges and universities brought with it a variety of challenges and controversies. Because the people believe that they own higher education, and because they believe that it is a required element in the construction of a good life, they take great interest in its operation and criticize its performance with enthusiasm and creativity. Their opinions cover a range of issues. They think that:

- Colleges and universities cost too much;
- The faculty do not teach the students enough;
- Students do not work hard enough;
- Institutions do not graduate a high enough percentage of those who enter;
- More people should have access;
- Colleges and universities value research too highly;
- Institutions should contribute more to their communities.
- Students should learn more math or science or humanities or economics.

In short, because all of us believe ourselves owners of the enterprise of higher education, we all seek to shape it to match our own image of the perfect college.

This criticism, however, is the criticism we reserve for things that are ours rather than for the things that belong to someone else. We criticize higher education institutions at the same time that we increase our investment in them. We criticize higher education institutions the way we criticize our children, to make them better. Indeed, the most critical people nonetheless send their children to the same colleges and universities that receive the most criticism. Most of these critics, for all the intensity of their polemics, accept the fundamental belief that colleges and universities provide the generating engine for America's quality of life and their critical purpose is to improve the university, not replace it. (2)

Colleges and Universities in the United States

Exceptional diversity is one of the defining characteristics of the United States higher education system. At last count 2,340 individual institutions provide four-year undergraduate degrees. These institutions include tiny colleges of less than a thousand students, complex universities with over 50 thousand students, and every size in between. Some are single purpose colleges providing a focused undergraduate program of four years leading to the bachelor's degree. Others are research universities offering hundreds of different undergraduate, professional, and graduate degrees. They range in character from sectarian institutions identified with particular religious denominations (Jewish, Catholic, Protestant, and others) to secular public institutions owned and operated by states. They include private not-for-profit institutions and a few private for-profit colleges. Their academic mission ranges from instruction-intensive to research-intensive in every conceivable combination.

This wide diversity of institutions, with their many differing characteristics, makes it possible to deliver higher education to a equally diverse set of students with an extended range of aspirations, abilities and preferences and who come from differing family backgrounds and economic circumstances. No one size fits all, but in the United States, there is an institution of higher education designed to fit everyone.

Within this panorama of institutions, however, lies a common core of academic substance to which all institutions must respond. Americans expect that wherever their children attend college, they will acquire a standard educational content that prepares them for the "good life." While some may want to include religious or ethical values along with this academic content, they nonetheless expect that the academic substance of a college degree from every accredited institution will teach the skills and information required for successful competition in what they know to be a very competitive world.

This academic substance, defined in the curriculum, derives its content from knowledge generated primarily by the research and publication of scholars throughout the world. The faculty bring this knowledge together; they abstract, organize, summarize, and deliver it as appropriate through the undergraduate curriculum. Everyone who shares the national belief in American education also expects that the content of that education will be current and will reflect the latest information and knowledge from the world of research. (3)

Research, Knowledge, and National Competition

The belief in the efficacy of higher education also reflects a recognition that economic and material prosperity depend on competitive skills, because one of the primary competitive advantages in the late twentieth century has been the effective application of scientific, technological, and technical knowledge. A corollary to this belief is the recognition that scientific, technological, and technical knowledge represent a competitive universe in which the advantage goes to those who discover new knowledge first.

Many mechanisms exist for developing new knowledge: research institutes, government sponsored research centers, industrial research laboratories, and the like. In America, however, the most effective engine for advancing knowledge (as distinguished from applying knowledge) is the American research university. These institutions, a subset of the many thousand colleges and universities in the country, create the conditions for discovery in all fields of human endeavor ranging across all disciplines of the humanities, arts, and social sciences; the mathematical, physical, and biological sciences; or the professions such as medicine, law, and business.

This commitment to research, derived from the commitment to education, proceeds in much the same way. It is complex, highly diverse, and funded from many sources. The recognition that research is an instrumental activity serving the goals of national policy and contributing to national prosperity, influences the organization of research enterprises in United States universities. Indeed, it is fair to say that research in America is an *ad hoc* constructed environment rather than an explicitly designed system.

As an instrumental activity, then, university research in America justifies itself not on its intrinsic worth but on its competitive success. The goal of research is to create the knowledge that drives competitive national success within a globally competitive environment. With this in mind, research done poorly, done slowly, or done late is not useful in driving competitive success in the world. American researchers, then, are highly competitive, driven by quality, and rewarded for being the first to announce results. These characteristics frustrate some academic faculty who engage in scientific inquiry or pursue research in the humanities and social sciences. They, unlike their supporters outside the academy, believe in research for its own sake. They believe that the results of research justify themselves and do not require an instrumental use for validation. For the scholar, it is enough that the research is good, that it is new, and that it contributes. If society can use it, fine; but utility is not a function of fundamental interest to the humanist or to the basic scientist.

Fortunately, this difference of perspective, while often generating considerable philosophical discussion, does not impede the operation of the university research enterprise. (4)

Research University Model: The Shell and The Guilds

About 600 institutions, out of the 2,340 four-year colleges and universities in America, engage in enough research to report to the National Science Foundation office that collects such statistics. Of these 600 institutions, about 154 reasonably qualify as major research universities. These 154 institutions control about 91% of the total scientific research funding provided by the federal

government to American colleges and universities. An understanding of American research universities necessarily focuses on these 154 institutions.

The Shell: From the outside, these universities look very similar. They all have formal corporate structures whose hierarchical administrative organization includes a president, vice-presidents, deans, department chairs and so on. Each has a financial report, prepared using similar standards that display income and expenses in an orderly fashion. With some exceptions for separately operated medical schools, all of them teach undergraduates, offer master's and professional degrees, and award the highest research degree available, the Ph.D. This formal similarity, however, obscures some important elements.

While all research universities have the same formal organization, this is not the structure that drives and manages the research enterprise of the institution itself. Indeed, this formal organization exists as an external shell that contains the actual academic structure. The units within the academic structure determine the content of undergraduate education and operate the research enterprise. The shell serves as an agent of the internal academic organization to the outside world and as a coordinator to link the disparate and relatively autonomous academic units of the inside world. These mechanisms do not appear clearly to observers on the outside of the shell who often think the shell is the university, when in fact the content of the university is governed and managed inside the shell, in the core, using considerably different mechanisms.

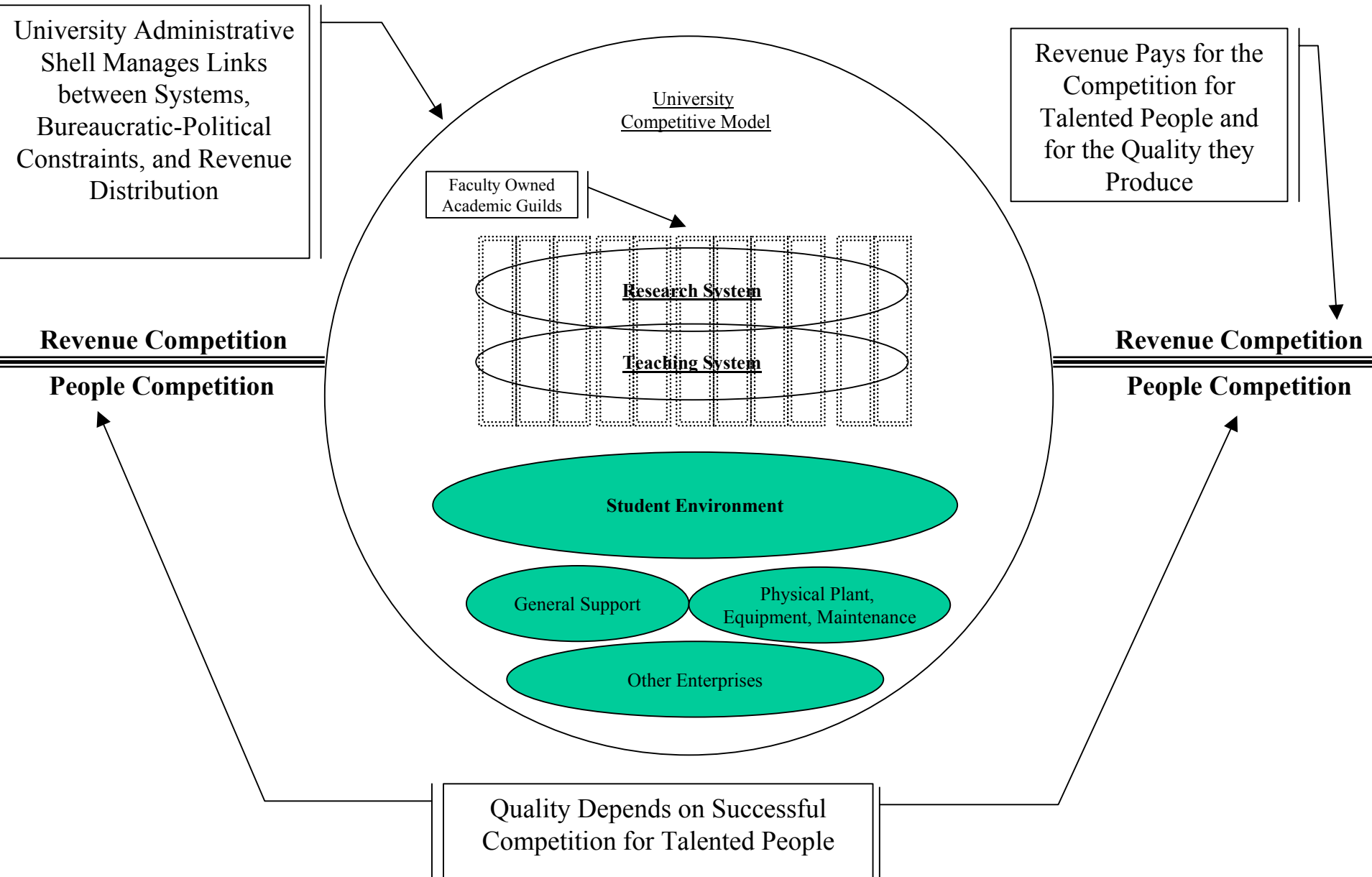
Another element the shell obscures is the remarkable diversity of the institutions that deliver research in America. Even though they form a special subset of all American universities, these research institutions nevertheless range in size (excluding separately operated medical schools) from universities with undergraduate populations as small as 907 and as large as 37,000. Their owners differ: some are publicly owned by states (but except for the US Naval Academy, none by the federal government) and the rest belong to private not-for-profit corporations. Some receive large portions of their funding from state agencies and operate with low tuition payments. Others receive a small part of their funding from state agencies and operate with high tuition and substantial revenue from private gifts and endowments. Some contain large public service enterprises in support of agriculture or industry, while others have no significant public service component at all. Many have medical schools and hospitals; many others do not. All of this complexity and diversity makes the domain of American research universities a resilient, flexible, and competitive environment. (5)

The continuing success of the American research university from the last half of the twentieth century, as well as its contribution to the material and competitive success of the United States, rests on its remarkable system for generating quality results.

The Academic Guilds: The core structure of American research is the academic guild. Of course, the guilds do not actually call themselves "guilds." They call themselves disciplines or departments, but guilds they are. Each guild organizes itself around an intellectual discipline: history, chemistry, microbiology, philosophy, mechanical engineering, and the like. The defining feature of the guild stems from the criteria it uses to judge the intellectual research product of its members. Chemists have one set of criteria, and historians have a completely different one. These criteria for judging the quality and productivity of individual scholars within a discipline define the guild. Although there is some overlap from one guild to another, most academics become part of a guild through the process of acquiring a Ph.D. (which takes place within the guild itself). The historian and the chemist may both earn a Ph.D. but this is actually a guild specific credential. A chemist's Ph.D. carries no authority in the history guild. The Ph.D. degree certifies that an individual has the entry level training to aspire to enter a branch of the guild at any university in the country.

These guilds function in ways that historians of medieval society would easily understand. Guilds are self-regulating and self-perpetuating organizations. They admit novices (those just acquiring a

Quality Engine: The Administrative Shell



Ph.D.) on a provisional basis. They require an extended period of apprenticeship and probation while the novice demonstrates skill and creativity in the discipline of the guild. At the end of the probationary period, the guild masters meet and review the quality and productivity of the candidate, measured against the guild criteria (which are national), and determine whether the candidate is of sufficient promise and achievement to be granted permanent status within that branch of the guild. If the answer is positive, then the candidate receives tenure, a form of permanent employment. If the answer is negative, then the candidate must leave the guild within a year and find alternative employment. This simplified description of the guild process highlights the most important part of the United States university organization: the power of the guilds to determine the standards of quality for the faculty.

While the external world sees the university shell, it is the quality of the faculty, controlled and managed by the guilds, that determines the quality of the university. Whatever else the university shell can bring to the task of building and sustaining a great university, none of it matters unless the guilds construct a high quality research faculty.

The criteria for each guild are national in the sense that whatever defines quality for history in California also defines it in New York, but each local guild defines the appropriate level of quality for its purposes. For example, a less powerful research university could accept as adequate quality the publication of a good article in a respected journal. In a more powerful research university, adequate quality would require publication of a well-reviewed book by a strong academic press. In the most powerful research university, the standard would be even higher, and the guild there might ask, "Is there another historian in the world better than the candidate before us?" Nonetheless, what constitutes a good historical product remains the same everywhere; what differs is the quantity and quality of the research each local guild expects. (6)

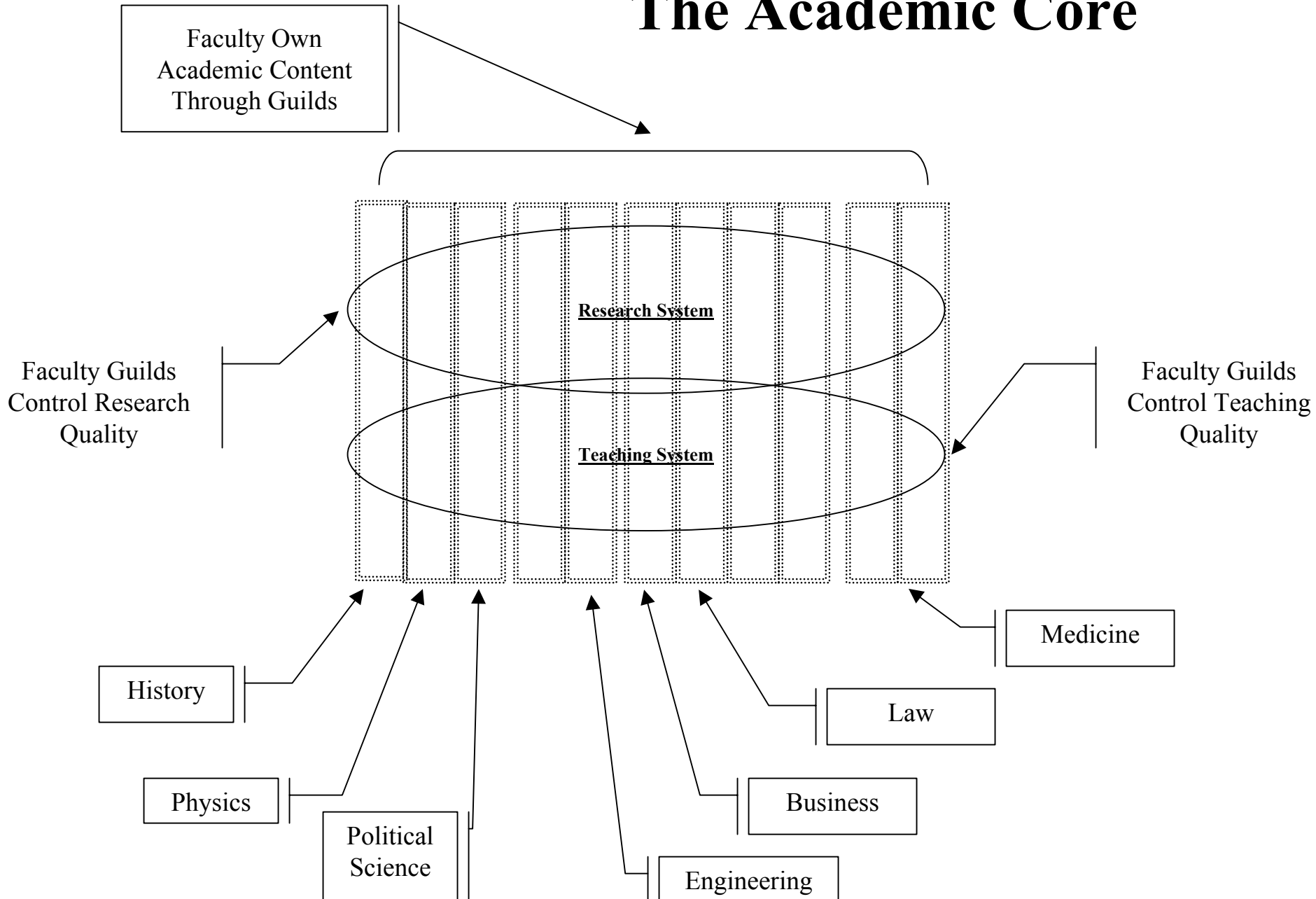
Although the guild system is stable and effective, the system struggles with two significant constraints: a scarcity of talent and a scarcity of money.

The Scarcity of Talent: Faculty and Students

A university's quality comes from the quality of its faculty and students. Buildings and other tangible assets, as well as the professional and other staff, also constitute essential elements for quality, but all of these elements serve the academic needs of the faculty and students. Quality faculty at the level required to compete among the top American research universities exist in limited supply. As a result, the national and international marketplace for research faculty is highly competitive. The university establishes its quality by recruiting, retaining, promoting and rewarding the best research faculty. This marketplace operates in a rather predictable fashion. It begins at the time of an initial hire, typically when an individual has just completed a Ph.D. and enters the academic marketplace. At this stage, research universities hire faculty based primarily on an expectation of future research productivity. They seek graduates of the most prestigious programs and institutions whose dissertations and other work demonstrate research quality and a potential for high productivity. The competition for the very best at this level is fierce, and the most promising candidates will receive many offers.

The second stage takes place during the following six years as the faculty member develops a research profile by publishing the results of her work in national and international journals of high prestige, competing for grants from foundations or national or international agencies. During this period, her guild will constantly review the faculty member's progress. At the end of the six years, faculty in research universities reach a decision point in the guild. The guild must either make a commitment to permanent employment or must dismiss the faculty member, who would then need to seek alternative employment at another university.

Quality Engine: The Academic Core



This tenure commitment is the most important institutional decision for maintaining quality, and the criteria applied determine the quality of the university for long periods since tenure guarantees an individual permanent employment. In the best research universities, the guild considered the faculty member's past research productivity and quality and, in addition, makes a judgment about the faculty member's future research productivity and quality. The standard applied to these judgments varies from institution to institution, but the best institutions a national and international standard for quality and productivity. The question is: "Does this candidate for a tenured position compete at the top level among the best people in the world?" This represents a high standard, to be sure, but the overall quality of the university will depend on its ability to make this decision effectively.

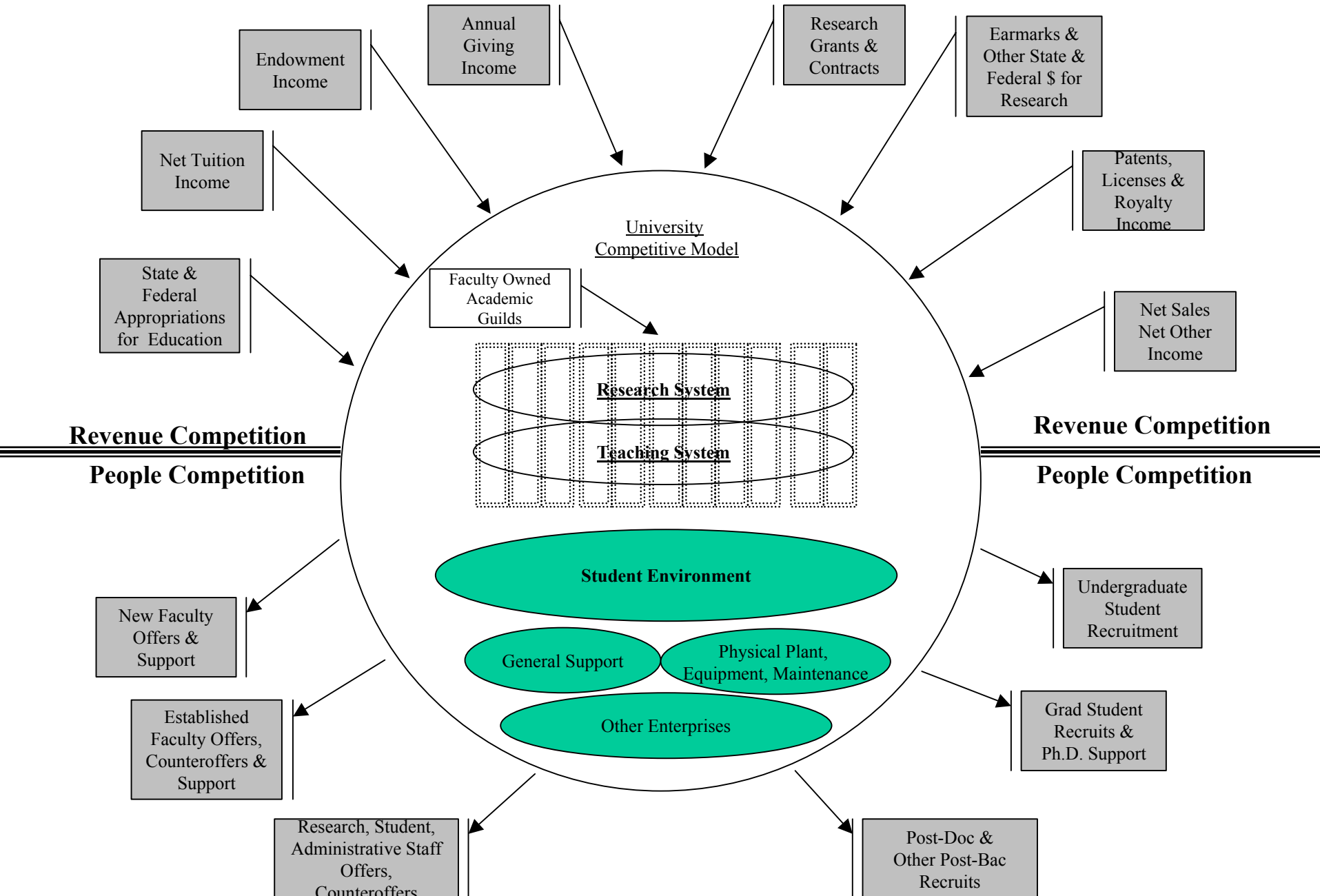
The regular and orderly process that leads to this career progression--from initial hire as an assistant professor, through promotion to associate professor, the award of tenure, and a subsequent promotion to full professor--does not fully define the marketplace for faculty. At every point in this process, the national and sometimes international marketplace for high quality research talent exercises a strong pressure on the university. An excellent faculty member, publishing in competitive journals and acquiring competitive grants, will receive employment offers from other universities that will promise a better position with more money and expanded research support. This marketplace is active, and the best research faculty will find themselves engaged in such discussions at many times during their academic careers. The university and especially the local guild, to which the faculty member belongs, must counter these offers and, at the same time, recruit proven scholars from other universities. This competitive marketplace sets a standard for performance that defines the top levels of faculty research quality.

However, the marketplace for teaching talent differs considerably from the marketplace for research talent. The reason for this disappoints those of us who are teachers. High quality teaching talent is much more abundant than high quality research talent. Research universities have no special need to compete in a market for quality teachers. The university hires faculty primarily because of their research abilities, but in fact almost all the faculty hired will also teach well or much better than well. When the university needs to improve its instruction, it usually can find the teaching talent among its existing faculty and need not access an external marketplace. Superior teaching talent, being much more widely available than superior research talent, has no external market and research universities receive relatively little external market pressure to increase teaching compensation. Indeed, incentives to improve teaching must come from within the university because no effective external marketplace for teaching exists. (7)

Like research faculty, students also constitute a competitive marketplace. The large number of students seeking admission to America's colleges and universities creates a market in which universities compete to attract the highest quality student population possible. At the same time, the students compete to enter the universities that have the best students. This competition is two-tiered. At the top tier, the very best students receive many offers of admission, special scholarships, fellowships, and other benefits from universities and colleges that want them to join their student body. Students in the tier below the top compete to enter institutions that have many top-tier students. This competitive behavior reflects the university's commitment to building the highest internal quality possible, and universities compete for the quality students needed to achieve this goal.

Within this context of the research university, the process of instruction--the teaching of students--plays an important role. Quality (or perceived quality) of instruction, the depth and breadth of the curriculum, the variety of extra curricular learning opportunities and the number of special programs all help to attract the best students because the best students demand these things. Just as the best faculty want good libraries, laboratories, and staff support, so too the best students want quality teachers and facilities, a wide variety of academic choices and opportunities, and similar enhancements. (8)

Quality Engines: The Model



The Scarcity of Money

Both of these competitions, for the best students and the best faculty, require one essential element: money. The acquisition of revenue is another highly competitive marketplace for American universities. Money purchases the physical plant, facilities, quality staff, and competitive salaries that support and attract first-rate faculty. Money purchases the scholarships, fellowships, libraries, and student facilities that attract the best students.

Money is of particular concern for the research university, because as an economic activity, research loses money. Research does not directly generate sufficient dollars to pay for its costs. Instead, the university must find the resources to pay for the cost of research that is not covered by grants or contracts. Science in particular is an expensive research exercise, for while the federal government, foundations, and international agencies provide large sums in support of scientific research; the cost of producing this research always exceeds the amount of the external support. This means that the university must make up the difference from its internal or other sources so that it can continue to subsidize the cost of nationally and internationally competitive research.

In the pursuit of internal quality, then, the university seeks revenue from gifts, government subsidies, technology sales to business, contracts for services, and other activities. Every dollar not required to support continuing operations is a dollar that the university can invest in improving research or student quality. The effectiveness of the university in acquiring these funds and investing them in research or student quality determines the relative success of the university within its competitive marketplaces. (9)

Rankings and the Competitive Spirit

Since the university always seeks to increase the internal quality of the institution, comparative measures of competitiveness serve an important purpose. Obvious indicators of success are the institution's ability to recruit the most eminent faculty and the best students. However, the recruitment of individual faculty members occurs over many years, and student quality reflects only one dimension of a major research university.

As a result, universities in America are addicted to rankings. This is a cultural phenomenon, as Americans rank everything and have an insatiable enthusiasm to define who or what is *number one* (whatever the topic or activity). This competitive spirit appears among universities as well, as each strives to be among the top institutions of their kind. Unfortunately, unlike football or basketball, universities do not keep score in an easily verifiable way. Baseball teams keep score and collect statistics on all aspects of the game. The goal of the exercise is to know what needs improvement in order to compete more effectively and win. As the competitive environment for universities grows ever more intense, these institutions also look for measures of competitive success so that they can improve their performance.

Because America's colleges and universities are so varied and diverse, no single measure or group of measures can serve them all. However, a selected set of measures can serve to identify the elements of competitive success for particular groups of universities. Because of their intense focus within the competitive research marketplace, research universities in particular can find reasonably useful comparative indicators. The effort to collect the data in comparable form, and to organize and present it in a useful way, is a challenge in itself, but the result proves useful in identifying the most successful, elite research universities. (10)

The Top American Research Universities: The Measures

For our study of research universities, we identified nine measures that touch on five important elements of the successful research university:

1. Research
2. Private Support
3. Faculty Quality
4. Advanced Training
5. Undergraduates.

Data for many indicators that we might like to have in our collection do not exist in any comparable form, and universities, in spite of their enthusiasm for research, tend to resist any effective efforts to measure their productivity and quality. Nonetheless, sufficient data exist to permit a reasonable understanding of major research institutions' relative success in competing with each other.

We first identified the major research universities. For the purposes of our study, we took those institutions reporting at least \$20 million (US\$) per year in federally funded research expenditures. This indicator serves to identify institutions that invest a substantial amount of their own resources in research development and who have a research enterprise that is capable of competing successfully at the highest level of federal competition. As mentioned above, the 154 universities who compete at this level spend 91% of the total amount of federal research expenditures among the 600 universities that report to the federal government on this indicator. In short, these are major participants in the marketplace.

Within this group, we look at all of the universities together, but we also separate them into two groups:

1. Universities managed by private, not-for-profit corporations
2. Universities owned and managed by public agencies in the states

Private and public universities have somewhat different financial and operational structures, even although they compete in the same markets. With this understanding of the universe of *Top American Research Universities*, we looked at these data elements within the five groups.

In the **Research** category, we report Total Research Expenditures and Federal Research Expenditures. These two numbers differ in that the total includes research support from state governments, corporations, foundations and other not-for-profit entities, and internal institutional funds. Included also are various special programs for agriculture. For most academics, the federal number is the clearest indicator of research competitiveness. The various programs the federal government sponsors distribute these funds primarily through peer-reviewed competition. The non-federal funds included in the total category may come specifically for some institutions without competition; they may also reflect a particular corporate relationship with individual institutions, or they may derive from special political arrangements within individual states. Nonetheless, the total research number provides an indicator of competitive success in all areas of research, and for that reason, we include it.

Private support, an essential component of institutional revenue, subsidizes the internal quality of the university in both research and undergraduate education. Every American research university raises substantial funds from the private sector in the form of gifts from individuals and from foundations and corporations. The primary characteristic of this funding is that it does not require the delivery of a specific product. Research grants and contracts, for example, require the

delivery of a research product and provide a portion of the costs of delivering the product. A gift, however, does not require any specific result, and universities can use the funds (within the areas designated by donors) to support other research and teaching projects. Gifts fall into two general categories: endowments that form permanent funds from which annual earnings support the university's programs; and annual giving all contributions actually received during the institution's fiscal year in the form of cash, securities, company products, and other property from alumni, non-alumni individuals, corporations, foundations, religious organizations, and other groups. We report the size of each institution's endowment, and the size of their annual giving.

As a measure of **Faculty Quality**, we identify a number of competitive distinctions in the form of National Academy memberships and faculty fellowships and awards. These distinctions help to identify institutions whose faculty have high levels of peer recognition in many fields within the arts, sciences, social sciences, humanities and professions. While these prestigious awards do not capture all forms of faculty productivity, they serve as a good indicator of the general level of faculty distinction.

Advanced training appears in the number of doctorates awarded and the number of postdoctorates supported. The number of earned doctorates indicates a strong graduate program and serves as an indirect indicator both of the vitality of the research enterprise and the quality of the faculty. Postdoctoral opportunities accompany all highly competitive research programs particularly in the physical sciences and biological sciences, and they serve as another indicator of the strength of the institution's research enterprise.

Finally, for **undergraduates**, we report the median Scholastic Aptitude Test score for the incoming freshman class. The SAT is a good indicator of general undergraduate student quality, and while the use of standardized test scores is controversial in some quarters in American higher education, the competition for student talent focuses heavily on this score. As a result, whatever the merits of the test, the median score of the entering class offers a reliable measure of the competitiveness of the institution in the student marketplace.

These nine measures, then, provide a perspective on the competitiveness of American research universities:

1. Total Research
2. Federal Research
3. Endowment
4. Annual Giving
5. National Academy Memberships
6. Faculty Awards
7. Doctorates Awarded
8. Post Doctoral Fellowships
9. Undergraduate Median SAT scores

Research University Groups

Unlike sports teams, research universities do not change their performance dramatically within a year or two; rather, this change occurs over periods of five to ten years. University quality depends heavily on faculty quality, and the rate of faculty change in turn drives institutional change. Moreover, the difference among universities with similar performance is not great; and thus, fine distinctions of ranking have relatively little meaning. What matters is how well an institution does relative to others in the various dimensions these indicators capture. Universities that rank within the top 25 nationally compete effectively, and if they rank within the top 25 of their private or public group, they also compete well among their colleagues in these two groups.

Our study displays the universities in groups based upon the number of times that they rank in the top 25 for each of the measures. The top group includes institutions that rank in the top 25 on all nine measures, the next group ranks in the top 25 on eight measures, and so on. This method of displaying the rankings recognizes that the very best American research universities perform at top levels of competitive quality in everything they do. Other outstanding universities will compete very well on some of the indicators but not on others.

The message of this analysis is very simple. Universities that aspire to compete with the best institutions must compete well in every dimension. By inspecting these data carefully (and by reviewing other supporting data we maintain online), universities can identify those aspects of their institution requiring improvement to enhance their relative performance.

Principles of University Improvement

Ranking and clustering methodologies of this kind serve no useful purpose unless they also lead to improvement. In our study of American research universities, we have learned some things about improving and changing universities. Some academics find these principles uncomfortable, for their view of academic life imagines a genteel life-style of academic contemplation not a competitive marketplace for academic quality and productivity. For universities that choose to improve relative to their peers and relative to the national and international community of scholarship and research, the following principles prove helpful.

1. Measuring performance leads to improvement.
Absent measurement, politics replace performance as the institutional criteria.
2. Comparative measurement against the best defines the range of improvement.
Measuring against the ordinary leads to acceptance of the ordinary.
3. Faculty performance drives university performance.
Measurement of faculty performance against the best leads to improvement.
4. Improvement in faculty performance depends on rewarding measurable high quality and productivity.
Absent rewards for measurable performance, politics replace performance.
5. University improvement comes from hiring, promoting, retaining, and rewarding the best faculty.
6. University improvement requires that the institution invest money in measurable performance. Universities that invest in improvement without measuring performance waste money.
7. Universities that match their goals with their measurement of performance and then with their investment of money improve quickly.

Universities and higher education serve as the engines of economic progress; they create the human and intellectual capital that underlies material well being; and they serve society in an endless number of ways. They are more important to national success than industry, commerce, or government because the prosperity of those enterprises depends on what the universities can produce. Universities deserve and require as much attention to quality and productivity, effectiveness, and competitiveness as any corporation, business, or other enterprise. A nation's university system can only be as good as its best institutions, and its best institutions have an obligation to organize themselves to compete at the highest international level on behalf of their society. With an attention to measurable indicators of quality and productivity, any university can create the incentives that will guarantee its improvement. (11)

Notes

1. The literature on higher education in the United States is of course extensive. A good starting place is Arthur M. Cohen, *The Shaping of American Higher Education: Emergence and Growth of the Contemporary System* (San Francisco: Jossey Bass, 1998). Some of the quantitative aspects of the growth of US colleges and universities, as well as data on other forms of schooling, appears in the latest *Digest of Educational Statistics, 2000: Compendium January 2001* published by the National Center for Educational Statistics (Washington, D.C.: U.S. Department of Education, 2000) [<http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2001034>]. The NCES also published the very useful work by John G. Wirt, *The Condition of Education, 2000*, especially "Section 5. The Context of Post Secondary Education," (Washington, D.C.: NCES, June 2000) [http://nces.ed.gov/pubs2000/2000062_5.pdf]. On the subject of the revenue sources for US higher education institutions, a useful summary appears in the *Digest* mentioned above in "Table 327: Current-fund revenue of degree-granting institutions, by source: 1980-81 to 1995-96." On the changes in and levels of tuition and fees paid by students and their families see the *Digest*, "Table 313: Average undergraduate tuition and fees and room and board rates paid by full-time-equivalent students in degree-granting institutions, by type and control of institution: 1964-65 to 1999-2000." For a summary view of the endowments of almost 500 colleges and universities, see the annual report published by *The Chronicle of Higher Education* (available on their web page to subscribers for the years 1995-1999 at <http://www.chronicle.com/stats/endowment.htm>). Particularly revealing of the intense interest in and commitment to higher education in the United States are the many guidebooks and rankings designed to assist parents and students in choosing a college or university from among the many available. For examples, see the *Kiplinger's Magazine* guides to private and public institutions, Kristin Davis, "Private Colleges Worth the Price" (September 1999) [<http://www.kiplinger.com/magazine/archives/1999/September/college.htm>] and Davis, "State Universities to Cheer About" (September 1998) [<http://www.kiplinger.com/magazine/archives/1998/September/college.htm>]. The most successful, if not universally admired, effort to rank colleges and universities is from **U.S. News and World Report 2001 College Rankings** [<http://www.usnews.com/usnews/edu/college/corank.htm>] and a useful summary of this survey's methodological difficulties is by Denise S. Gater, "U.S. News & World Report's Methodology and Rankings of Colleges and Universities," *The Center Reports* (2000) [<http://thecenter.ufl.edu/usnews.html>]. There are many other similar guides available that focus on different characteristics of universities. For students of higher education a number of good resources are available at the Carnegie Foundation for the Advancement of Teaching website [<http://www.carnegiefoundation.org/Classification/index.htm#Research>]. A very useful categorization of American higher education institutions by market segment is in Patricia J. Gumpert, "In Search of Strategic Perspective: A Tool for Mapping the Market in Postsecondary Education," *Change* (Nov/Dec 1997, 23-36).

2. Not surprisingly, many observers find much wrong with US colleges and universities. The critiques run from the reasonable such as the general survey of higher education by Peter David in "The Knowledge Factory," *The Economist* [http://www.economist.com/editorial/freeforall/5-10-97/index_survey.html] or the Boyer Commission of Educating Undergraduates in the Research University's report *Reinventing Undergraduate Education: A Blueprint for America's Research Universities--Boyer Commission* [<http://notes.cc.sunysb.edu/Pres/boyer.nsf>] to muckraking exposes such as Allan Bloom, *The Closing of the American Mind. How Higher Education has Failed Democracy and Impoverished the Souls of Today's Students* (New York: Simon and Schuster, 1987) or Lynne V. Cheney, *Tyrannical Machines. A Report on Educational Practices Gone Wrong and Our Best Hopes for Setting Them Right* (Washington, DC: National Endowment for the Humanities, 1990) and Charles J. Sykes, *Profscam. Professors and the Demise of Higher Education* (Washington, DC: Regnery Gateway, 1988). Innumerable national commissions also address many of these issues and a useful perspective on the university response to such reports is in Clifford Adelman, "War and Peace among the Words: Rhetoric, Style, and Propaganda in

Response to National Reports," *Journal of Higher Education*, Vol. 58, No. 4. (Jul. - Aug., 1987), pp. 371-403.

3. Many groups and individual scholars have reviewed the state of the undergraduate curriculum and the environment for learning in US colleges and universities. For a sample of these studies see George D. Kuh, "How Are We Doing? Tracking the Quality of the Undergraduate Experience, 1960s to the Present," *The Review of Higher Education* 22.2 (1999) 99-120, and *Transforming Undergraduate Education in Science, Mathematics, Engineering, and Technology*. Committee on Undergraduate Science Education, National Research Council (Washington, D.C.: National Academy Press, 1999) [<http://www.nap.edu/books/0309062942/html/index.html>]. It is always helpful to look closely at the requirements for an undergraduate degree at representative US colleges and universities. See for example, *Chicago: The College Curriculum* [<http://www-college.uchicago.edu/College/Academic/Curriculum/curric.html>] *Michigan: Literature, Science, and the Arts* [<http://www.lsa.umich.edu/saa/publications/bulletin/>] *Pomona College: The Curriculum* [<http://www.pomona.edu/Academics/Overview/Curriculum.html>], and *St. John's College, Maryland* [<http://www.sjca.edu/college.html>].

4. For an understanding of the research drive of US universities and its relationship to national success the article by Vannevar Bush, "As We May Think," originally published in the July 1945 issue of *The Atlantic Monthly* and reproduced at this website with *The Atlantic's* permission [<http://www.isg.sfu.ca/~duchier/misc/vbush/vbush.shtml>] provides a clear articulation of the American transition from science and technology for war to science and technology for national progress. A more contemporary view is in a report from the National Academy of Sciences in 1997, *Science and Engineering Research in a Changing World* (Washington, D.C.: National Academy of Sciences, 1997) [<http://www.nas.edu/21st/research/>]. An interesting reflection of the common belief in the efficacy of science appears in news articles such as the following item filed by Lila Guterman, "U.S. Is Urged to Invest in Science Education or Risk Losing Its Global Edge," *The Chronicle of Higher Education* (February 19, 2001). For a reflection of the same belief about the value of university-based research see David Walker, "Britain Aims to Raise Its Global Standing in Science With \$979-Million in Grants," *The Chronicle of Higher Education* (February 21, 2001). Similar concerns for the development of the humanities are reviewed in a publication of the American Council of Learned Societies by Thomas Bender, Stanley Chodorow, and Pauline Yu, *The Transformation of Humanistic Studies in the Twenty-first Century: Opportunities and Perils* (Washington, D.C.: American Council of Learned Societies, Occasional Paper No. 40 (n.d. accessed 6/98) [<http://www.acls.org/op40.htm>]. For a study of research university performance see John V. Lombardi, et. al., *The Top American Research Universities* (Gainesville: *TheCenter*, 2000) [<http://thecenter.ufl.edu/research2000.html>].

5. On university organization see the interesting review of university governance that runs from the Middle Ages to the present in E.D. Duryea, and Philip Altbach, eds., *University and College Governing Boards from the Middle Ages to the Twentieth Century* (Garland Publishing, 1997). An early and insightful review of university operations is in Barry M. Richman and Richard N. Farmer, *Leadership, Goals, and Power in Higher Education. A Contingency and Open-Systems Approach to Effective Management* (San Francisco: Josey-Bass Publishers, 1974). A good review and a thoughtful perspective on the organization and management of not-for-profit enterprises is in Helmut K. Anheier, "Managing Non-Profit Organisations: Towards A New Approach," *Centre for Civil Society Working Paper Series* (January 2000) available online at [<http://www.lse.ac.uk/Depts/ccs/cswp1.pdf>]. Another working paper that offers a useful perspective on the competitive behavior of not-for-profit organizations is Tomas J. Philipson and Richard A. Posner, "Antitrust and the Not-For-Profit Sector," *NBER Working Paper* No. W8126 (Issued in February 2001) [<http://papers.nber.org/papers/W8126>]. For an irreverent if often accurate view of managing the shell organization of the university see Peter T. Flawn, *A Primer for University Presidents: Managing the Modern University*, (Austin: University of Texas Press, 1990). The enthusiasm for management panaceas for US universities is reviewed in Robert Birnbaum, "The Life Cycle of Academic Management Fads," *Journal Of Higher Education*, (71:1,

2000). On the scale and purpose of the university, Clark Kerr's *The Uses of the University*, (1963; 4th ed., Cambridge: Harvard University Press, 1995) remains a classic of some interest.

6. The operation of the faculty guild appears in many publications. Of particular interest is the description of the national standards for all faculty guilds published originally in 1940 and updated later American Association of University Professors. *1940 Statement of Principles on Academic Freedom and Tenure With 1970 Interpretive Comments* (Washington, D.C.: AAUP, 1940,1970) [<http://www.aaup.org/1940stat.htm>]. Individual university manuals provide amplification and explanation of how these guild rules apply locally as in University of Michigan, *Criteria for Appointment and Promotion of Instructional Staff* [<http://www.umich.edu/~provost/handbook/5/5.1.html>].

7. The markets for faculty receive much interest. See in particular the excellent discussion of the pervasiveness of the research criteria for determining faculty worth in James S. Fairweather, "Myths and Realities of Academic Labor Markets," *The Economics of Education Review* (14:2, 1995, 179-192). The National Academy worries about these issues also as is apparent in their *Trends in the Early Careers of Life Scientists* (Washington, D.C.: National Research Council, National Academies Press, 1998) [<http://www.nap.edu/books/0309061806/html/index.html>], which deals with the career patterns of science based faculty. The most telling indicator of the oversupply of teaching talent is the ability of US universities to use part-time and adjunct faculty to teach significant portions of the undergraduate curriculum. See for example Pamela Bach. "Part-Time Faculty Are Here to Stay," *Planning for Higher Education* (27:3, 32-40, Spring 1999) [<http://www.scup.org/balch.htm>] and the discussions of this issue by the profession's major labor organizations in *Part-Time and Non-Tenure-Track Faculty* [<http://www.aaup.org/ptlink.htm>] and *AFT: Statement on Part-Time Faculty Employment* [http://www.aft.org/higher_ed/part_time/parttime.html]. Absent an external market, universities interested in creating incentives for teachers must use an internal market to motivate performance. See for example, Dorene D. Ross, et al., "Teaching as a Priority: A Promising Program at the University of Florida," *College Teaching* (43:4, 1995, 134-138).

8. Competition for students is intense and a clear understanding of this phenomenon appears in the Gordon Winston's work. See for examples Gordon C. Winston, "The Positional Arms Race in Higher Education," *Williams Project on the Economics of Higher Education* (Discussion Paper No. 54, April 2000) [<http://www.williams.edu:803/Mellon/DPs/DP-54.pdf>] and his "College Costs: Subsidies, Intuition, and Policy," *The Williams Project on the Economics of Higher Education* (DP-45, November 1997) [<http://www.williams.edu/Mellon/DPs/DP-45.pdf>]. The standardized nature of undergraduate education in US institutions is clear from the research demonstrating the low return to a student from the high cost of some institutions compared to others. See Eric Eide, Dominic J. Brewer and Ronald G. Ehrenberg, "Does It Pay to Attend an Elite Private College? Evidence on the Effects of Undergraduate College Quality on Graduate School Attendance," *Economics of Education Review*, (17:4, 1998, 371-376) and James Monk, "The Returns to Individual and College Characteristics: Evidence from the National Longitudinal Survey of Youth," *Economics of Education Review*, (19:3, 2000, 279-289). On the impact of a college education see Ernest T. Pascarella and Patrick T. Terenzini, *How College Affects Students: Findings and Insights from Twenty Years of Research* (San Francisco: Jossey-Bass, 1991).

9. Much effort focuses on understanding the costs of research. See American Association for the Advancement of Science, *Guide to R&D Data -Historical Trends in Federal R&D* (1955-) (Washington, D.C., 2000) [<http://www.aaas.org/spp/dspp/rd/guihist.htm>] and the Rand Corporation study "Paying for University Research Facilities and Administration," by Charles A. Goldman, T. Williams et al. (2000) [<http://www.rand.org/publications/MR/MR1135.1/>].

10. The competitiveness of US research universities is clear in the essays in Irwin Feller, "The Determinants of Research Competitiveness Among Universities," in Albert H. Teich, ed., *Competitiveness in Academic Research* (Washington, D.C.: Committee on Science, Engineering,

and Public Policy, American Association for the Advancement of Science, 1996, p. 35-72). In addition to the ranking guides mention in note 1 above and the Winston articles in note 8, another view of student competition is in Lucie Lapovsky, "Phantom Dollars: Findings from 1996 NACUBO Tuition Discounting Survey," *NACUBO Business Officer*, March 1997 [http://www.nacubo.org/website/members/bomag/pd_397.html].

11. The materials on measuring research universities, in addition to the published report *The Top American Research Universities* (Gainesville: *TheCenter*, 2000) mentioned in note 4 above, also include a wide range of other data available on *TheCenter's* web site at [<http://thecenter.ufl.edu>]. An example of an institutional performance improvement report is in John V. Lombardi and Elizabeth D. Capaldi, *A Decade of Performance at the University of Florida, 1990-1999* (Gainesville: University of Florida Foundation, 1999) [<http://jvlone.com/10yrPerformance.html>]. A series of performance reports and an improvement methodology underlies the results reported above. For examples see *Measuring University Performance: The Series* by John V. Lombardi and Elizabeth D. Capaldi, [<http://www.ir.ufl.edu/mups.htm>] with issues on topics as follows (1995) *State Support; Teaching; Classrooms; Research*; (1996) *Excess Hours ; Transfer Students; Research Benefits; Student Quality; Financial Aid; Costs*; (1997) *The Bank; The Ph.D*; and the additional reports by Diane D. Craig (1998) *Universal Tracking; Undergraduates ; Graduate Growth*; (1999) *Improvement; Efficiency*