



KNOWLEDGE WITHOUT BORDERS

American Research Universities in a Global Context

By Michael M. Crow and William B. Dabars

In his important new monograph on the American research university, Jonathan Cole, provost emeritus of Columbia University, describes his experience as an advisor to Chinese provincial leaders determined to build an institution to rival Ivy League schools “starting from scratch.” The assignment, writes Cole, was to “create a blueprint for greatness.”¹ China is in the midst of a massive investment in its national infrastructure for higher education and policy makers there understand well the correlation between higher education and competitiveness in the global knowledge economy, as attested by an editorial that appeared in the *China Daily* in October 2009.²

While the editorial takes the commendable position that government planning for the development of a consortium of world-class institutions places undue emphasis on exclusivity and international status at the cost of access for the majority of citizens, the inherent idealization of this set of elite American research universities underscores the imperative to reconsider the model these institutions represent in the twenty-first century. The commitment to build research universities from scratch offers China the opportunity to design universities that transcend historical models, which in the case of the American research university, as we contend in the following, is to some degree limited by its entrenchment in obsolete institutional design, lack of scalability, and residual elitism.

From the perspectives of policy makers as well as average citizens of nations throughout the world, the United States offers what by general consensus is held to be the definitive model for higher education. In reality, however, it makes little sense to speak of a single model, as if American higher education were governed by a centralized national authority or even guided by a unified and cohesive vision. Contemporary American higher education is in many important respects the product of a range of institutional ‘birth parents’ and

◁ Classroom at the Weill Cornell Medical College in Qatar, Doha, Feb. 26, 2008.
Bryan Denton/Corbis

a long trajectory of ad hoc negotiations taken in response to historical exigencies or fraught political circumstances. The evolution of this set of heterogeneous institutions and the dynamics of its current success are not easily replicated by fiat, and efforts by policy makers in developing economies to emulate its broad contours are unlikely to produce the same results or outcomes. The time and place are different and the definition of success in the future remains to be written. And the “blueprint for greatness” will almost certainly require adaptation depending on organizational type and national context.

The focus on American universities represents widespread recognition by ruling elites and average citizens alike that higher education is the single most critical adaptive function in our society, aligning the most certain prospect for personal success with national economic competitiveness as well as our collective best hope in resolving the intractable challenges that confront the world community. Because higher education has been one of the primary sources of the knowledge and innovation that have driven the global economy, the demand for advanced teaching and research, and for the new ideas, products, and processes that it yields, has reached fever pitch and exceeds the supply currently available. While the production of human capital will always remain the primary role of higher education, in recent decades awareness has emerged in both developed and developing economies that scientific discovery and technological innovation are major drivers of national economic growth and competitiveness, and in terms of their contributions to economic development, American research universities have been uniquely successful.³ The consensus that new knowledge contributes to economic competitiveness has pushed higher education to the forefront of policy discussions, corresponding to a ubiquitous new emphasis on science and technology education. In the decades ahead, decisions taken by policy makers regarding higher education will be major determinants of a given country’s economic competitiveness and ability to enhance the well-being of its citizens.

A Competitive Academic Marketplace

The American research university combines teaching with advanced research and a commitment to societal well-being. The status of these preeminent institutions in international assessments reflects the esteem in which they are held worldwide. American institutions consistently occupy seventeen of the top twenty slots in the authoritative ranking of world-class universities conducted by the Institute of Higher Education at Shanghai Jiao Tong University, and fourteen of the top twenty in the *Times Higher Education* World University Rankings (2011–12).⁴ The number of international students seeking enrollment at American colleges and universities attests to the perception that these institutions offer opportunities found nowhere else. According

to the *Chronicle of Higher Education*, projections from the British Council suggest that by the end of the decade, American universities will enroll 118,000 students from India, surpassing the projected enrollment of Chinese students.⁵ To cite but one further example, the National Science Foundation reports that over two-thirds of the engineers who receive PhDs from American universities are not citizens of the United States.⁶ The intent of policy makers to emulate American higher education reflects their realization that this institutional framework represents a uniquely successful model, which not only excels in educating students but also contributes inestimably to economic growth and competitiveness.

While there are approximately five thousand institutions of higher education in the United States, no more than roughly one hundred of these, both public and private, are classified as major research institutions in the categorization established by the Carnegie Foundation for Higher Education. Approximately one hundred additional universities with less extensive research portfolios comprise a second research-grade level.⁷ While research universities are the most complex and comprehensive knowledge enterprises, committed as they are to discovery, creativity, and innovation, they represent only one of any number of institutional types in American higher education, which includes liberal arts colleges, regional colleges, community colleges, professional schools, and technical institutes, as well as for-profit enterprises focused primarily on workforce training.

American higher education is the product of a decentralized approach that from the outset led fortuitously to the establishment of a plurality of institutional types, i.e., a variety of public and private institutions that perpetually engage in what has been termed a highly competitive “academic marketplace.”⁸ The decentralization and relative lack of regulation that has characterized the American approach stands in marked contrast to the centralized national administration of higher education found throughout much of the world. The U.S. Department of Education does not function in the manner of most state ministries in this sector, which exercise the authority to determine policy as well as the allocation of resources for instruction and research. Public and private universities alike in the United States enjoy relative autonomy and are free to shape their institutional identities as well as their respective missions, values, organization, operations, and practices.

A Trajectory Toward Innovation

The American research university assumed its present structure and purposes in the final decades of the nineteenth century when, following the lead of Johns Hopkins University, established in 1876 in Baltimore, Maryland, a small number of institutions added programs of specialized graduate study modeled on the practices of German

scientific research institutes to their residential undergraduate programs. As enumerated in the definitive account of historian Roger L. Geiger, paralleling the transition of the elite Ivy League colleges into universities were a set of state, i.e., public universities, including the University of Michigan and University of California. During this pivotal era in American higher education, a handful of private institutions were also conceived from their inception as research universities, including Stanford University and the University of Chicago.⁹

The establishment of the state universities must be considered within the context of another formative influence on the evolution of the American research university. In July 1862, President Abraham Lincoln signed into law the Morrill Act, which provided funding derived from the sale of federal lands to state governments to build new colleges and universities or transform existing schools to provide instruction in practical fields to the sons and daughters of the working and middle classes. The legislation set a precedent for federal support for higher education, and as a consequence of its mandate, the land-grant institutions shaped the research enterprises of the emerging American research universities through an emphasis on scientific inquiry and technological innovation.¹⁰

Following the Second World War, American research universities assumed a commanding lead in the discovery and dissemination of the new knowledge that has fueled economic growth. The war effort had set the stage for federal government support of science in exchange for academic research focused primarily on national defense, economic prosperity, and public health. Influenced by the success of the scientific contribution to victory, the government expanded its investment in all forms of scientific research. The contribution of this set of institutions to the global community thus arises from their combined production of human capital, which includes a significant portion of international students, and useful knowledge, which not only improves our collective quality of life but also sparks innovation and spurs economic growth. These institutions produce leaders in all spheres of human endeavor as well as perpetual innovation in ideas, products, and processes.

While the research sector is largely distinct from higher education in many nations, the American research university combines undergraduate and graduate instruction with its research enterprise. Germany and France have been cited for establishing exemplary national systems with parallel and differentiated research sectors that compete with universities. The eighty institutes of the Max Planck Society, and the Centre National de la Recherche Scientifique (CNRS), respectively, comprise each nation's foremost research organization.¹¹ American research universities, both public and private, compete openly for federal research dollars and private investment, whereas in some countries funding is allocated to institutions or distributed to various sectors

by formulae. The Higher Education Funding Council for England (HEFCE), for example, determines priorities for expenditure each year and apportions total funds accordingly, while in the United States individual faculty members or research teams compete for research grants. Richard C. Atkinson and William A. Blanpied (former president of the University of California, and former analyst at the National Science Foundation, respectively) have underscored the extent to which this competitive process has engendered quality in American research universities and contend that efforts to replicate the model in other national contexts could falter if participants are culturally averse to such competition.¹² Most public universities receive a portion of their general funding from their respective state legislatures and are distinguished from their private research-grade peers less by their shared commitment to the public good than by their funding model and generally larger enrollments.

The role of research universities in producing knowledge-based technological innovation and thus promoting economic development in no small measure accounts for the relevance of this institutional model in developing nations. The economic contribution of research universities is closely tied to the basic and applied research conducted on their campuses, which sometimes permits the commercialization of intellectual property through technology transfer. Through the development of products, processes, and applications across a range of markets, academic research has the potential to generate economic returns to institutions, a process that in turn further invigorates the broader economic impact of universities.¹³

Since 1945, the growth of the American economy has been largely driven by science-based technological innovation. Research cited by a committee of the U.S. National Academies indicates that in the second half of the twentieth century, as much as 85 percent of measured growth in per capita income in the United States derived from technological change.¹⁴ In addition to their critical role in discovery and innovation, universities mediate the relationship between fundamental research and industrial application, spawning entire industries and anchoring innovation clusters. According to some estimates, 80 percent of new industries may be derived from academic research.¹⁵ The centrality of research universities as hubs of regional innovation clusters is most famously epitomized in the relationship between Stanford University and Silicon Valley, and between Harvard University, the Massachusetts Institute of Technology, and Route 128 in the Boston area.¹⁶

Given the importance of scientific discovery and technological innovation to national competitiveness, efforts to increase the quantitative, scientific, and technological literacy of students are entirely appropriate. But curricula expressly tailored in response to the demands of the workforce must be balanced with opportunities for students to develop their capacity for critical thinking, analytical reasoning, creativity,

and leadership—all of which one finds in the disciplines associated with a liberal arts education. It is essential that higher education develops in students the ability to understand the complexity and interrelatedness of our cultural, economic, natural, political, social, and technological systems. We must educate individuals capable of advancing civic participation and creative expression and communicating insights across borders. The potential for an educated citizenry to contribute to the resolution of complex challenges entails more than just calculus. As Jonathan Cole argues in this context, “Almost all truly distinguished universities create a seamless web of cognitive influence among the individual disciplines that affects the quality of the whole. That is one reason I believe you cannot build great universities without representation of the humanities as well as the sciences.”¹⁷

Overcoming Design Limitations

An assessment of limitations in the design of a contemporary American research university might reasonably begin with consideration of the reciprocal interrelationship between society and its institutions, because American higher education, and especially public higher education, is often represented as a ‘social contract’ or ‘social compact.’ John Aubrey Douglass, senior research fellow at the Center for Studies in Higher Education, University of California, Berkeley, articulates the implications of this commitment: “To a degree perhaps unmatched by any other single institution in our society or by any other nation in the world, America’s public universities were conceived, funded, and developed as tools of socioeconomic engineering... These institutions were to benefit the individual not as a goal unto themselves but as a means to shape a more progressive and productive society.”¹⁸

And, indeed, public sector investment in higher education in the United States during the twentieth century produced a level of educational attainment unmatched anywhere in the world, which served as a catalyst for innovation and thus economic growth. Yet with this very success, public investment in higher education has progressively declined. While nations worldwide are investing strategically to educate their citizens, America’s educational infrastructure remains unable to accommodate projected enrollment demands. Accordingly, America’s leading institutions have become increasingly exclusive and define their excellence through admissions practices based on the exclusion of the majority of applicants. In this sense, status is attained through the maintenance of scarcity, and academic elitism may be perceived as a defensive posture and abdication of implicit responsibility.

Following nearly four centuries of advancement in the standard of living and quality of life, the present generation of younger Americans is very likely to witness the commencement of incipient decline across a spectrum of indicators. Projections cited

by the U.S. National Academies suggest declines in educational outcomes, health indicators, and prosperity and the evidence is apparent at every turn.¹⁹ A recent report on high school graduation rates in fifty of the largest U.S. cities, for example, finds that seventeen had graduation rates lower than 50 percent meaning untold numbers of high school students lack the qualifications even to submit applications to top universities and colleges.²⁰ Despite the conventional wisdom that America is a classless society, socioeconomic disadvantage based on family income and the educational attainment of parents remains a barrier to economic mobility and access to higher education. According to research conducted by former Andrew W. Mellon Foundation President William G. Bowen and colleagues, the percentage of first generation college students from families with incomes in the bottom quartile of distribution comprises no more than 3.1 percent of university enrollment nationwide.²¹ Demographic trends suggest that the United States is becoming a nation hopelessly divided between a vibrant and dynamic upper class, a static and challenged middle class, and a disadvantaged class increasingly defined by the working poor and those socially and economically unable to realize the American Dream.

If we assume a commitment to societal well-being is implicit in the mission of American research universities, we are left to ponder why some of the most vaunted institutions in the world seem to fall short of their potential to broadly advance the public good. We would argue that this limitation is a consequence of entrenchment in an obsolete model, which largely assumed its present contours in the nineteenth century and has not evolved sufficiently since. It is a model that favors the pursuit of increasingly specialized knowledge over explicit commitment to the application of knowledge. If research universities are to create knowledge that responds to the ‘grand challenges’ of our epoch—public health, social justice, poverty alleviation, access to clean water, sustainable development, climate change—these institutions must integrate their quest to advance discovery and innovation with an explicit mandate to assume responsibility for the societies they serve. All of these challenges are global in scale and their resolution will require a coordinated and international response from research universities, business and industry, and governments throughout the world.

Historical models, such as the American research university, will inevitably require varying degrees of adaptation, especially if they are to serve regional interests and address the challenges that confront developing nations. For research universities emerging worldwide, a commitment to local, national, and regional priorities will leverage the collective stock of knowledge and focus the pursuit of new knowledge and innovation. Adherence to fliopietistic conventions derived from another era hinders both adaptability and the capacity for rapid response to

real-time demands, and will impede the potential of new institutions to develop appropriate organizational platforms, learning technologies, and transdisciplinary curricula. The perpetuation of discipline-based departments corresponds to an academic culture that prizes individualism over teamwork and the discovery of specialized knowledge over problem-based collaboration. Arbitrary disciplinary boundaries will not facilitate appropriate responses to emergent, non-linear, and unpredictable new complexities. Only an amalgamation of transdisciplinary, transinstitutional, and transnational frameworks has the potential to advance broader social and economic outcomes.

The Emergence of Global Institutions

As comprehensive knowledge enterprises, research universities are key institutional actors in national systems of innovation, a concept that embraces economic, political, and social institutions relevant to discovery and innovation, spanning academia, business and industry, and government.²² The imperative for transdisciplinary organization of teaching and research is obvious, but we must foster transinstitutional as well as transnational collaboration involving universities, industries, and governments, which both facilitates scholarly and scientific exchange and aggregates knowledge, thus preventing unnecessary replication of effort. The differentiation of knowledge enterprises facilitates their integration into coordinated and synergistic networks, thus expanding our potential to offer multiple solutions and exert greater impact across broader swathes of knowledge. Transnational endeavor to lend direction and purpose to the humanistic insight, social understanding, scientific discoveries, and technological adaptations that are the product of academic culture represent our best hope as we choose between alternative trajectories in the coming decades.

Inasmuch as knowledge and innovation flourish when embedded in and inter-related through transinstitutional and transnational networks, each nation must proactively look beyond its borders to advance connectivity. In this context, the emergence of “mega-research universities”—a set of large American research universities with an expansive global presence and research expenditures that for each presently total more than \$750 million per year—promises to engage institutions worldwide even as it affects their competitive posture. Following the lead of such institutions as Johns Hopkins University, the University of California, Los Angeles, and the University of Washington, mega-universities are generating ambitious portfolios of intellectual property and engaging business, industry, and governments around the world. For some of these institutions, the establishment of full-scale operations abroad—one need only think of Cornell University, for example, setting up a medical school in Qatar and the University of Chicago a business school

in Singapore—instantiates this trend. The emergence of these global institutions is only the most recent stage in the millennium-long trajectory of institutional evolution that characterizes the history of the university. Research universities have historically played a leading role in facilitating mutually productive international exchange as well as the formation of strategic alliances between the public and private sectors. Scholarship, scientific research, technological innovation, and creative endeavor all implicitly address a global audience and thus international engagement must become an explicit design criterion. In order to accelerate their engagement as transnational knowledge enterprises, research universities must develop new models focused not only on discovery but also access to a broad demographic and greater engagement in order to maximize societal impact. Despite the imperative for new and differentiated institutional models, however, academia must never retreat from its core values.

The Imperative to Adapt

The increasing interconnectedness and integration of societies and economies worldwide makes us more and more interdependent. The nations of the world are confronted by an extraordinary array of challenges, from endemic regional conflicts to international terrorism to worldwide health crises to the depletion of natural resources. Perturbations from economic crises continue to threaten an interrelated global economy that until quite recently had seemed to offer only boundless promise, while each news cycle delivers horrendous accounts of violence, poverty, inequity, and injustice. Institutions, organizations, and private sector enterprises, many construed as multinational, operate within a web of dynamic systems on so many scales that few among us even glimpse their shifting interrelationships. And while the diffusion of information and ideas has become instantaneous, opportunities for misunderstanding and conflict proliferate exponentially as byproducts of knowledge are disseminated worldwide in milliseconds.

Against this backdrop of massively accelerating complexity, the global infrastructure for even the most rudimentary levels of higher education is incommensurate in scale to demand. But solutions to the challenges that confront humanity are most likely to come from this one source, which produces broadly educated graduates possessed of the knowledge to drive forward humanistic understanding, scientific discovery, and technological innovation, thereby spurring on both the personal success of individuals and international economic development. Although universities throughout the world have long been transformational catalysts for innovation and societal advancement, what remains to be determined is whether they can adapt rapidly enough to resolve the problems of the global community in the decades ahead.

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- 2 *China Daily*, “Chinese Ivy League” (October 21, 2009) .
- 3 The literature on the economic impact of science-based technological innovation is vast. A useful introduction is to be found in Nathan Rosenberg and Richard R. Nelson, “American Universities and Technical Advance in Industry,” *Research Policy* 23, no. 3 (1994): 323–348. For an overview that introduces discussion of research universities in various national contexts, see Richard C. Atkinson and William A. Blanpied, “Research Universities: Core of the U.S. Science and Technology System,” *Technology in Society* 30 (2008): 30–48.
- 4 Institute of Higher Education, Shanghai Jiao Tong University, Academic Ranking of World Universities: <http://www.shanghairanking.com/ARWU2011.html>.
- 5 *Chronicle of Higher Education*, “By 2020, India Will Be Top Country Sending Students to the U.S.” (March 13, 2012).
- 6 National Science Foundation, Division of Science Resources Statistics, Survey of Earned Doctorates: <http://www.nsf.gov/statistics/nsf09311/pdf/tab3.pdf>, cited in Committee on Prospering in the Global Economy of the Twenty-First Century (U.S.), *Rising Above the Gathering Storm Revisited: Rapidly Approaching Category 5* (Washington, DC: National Academies Press, 2010).
- 7 The Carnegie Foundation for the Advancement of Teaching designates institutions formerly termed “research-extensive” as either RU/VH (“research university/very high research activity”) or RU/H (high research activity). For a discussion of the methodology, involving both aggregate and per capita levels of research expenditures, see <http://classifications.carnegiefoundation.org/methodology/basic.php>.
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- 9 Roger L. Geiger, *To Advance Knowledge: The Growth of American Research Universities, 1900–1940* (Oxford: Oxford University Press, 1986), 2–3.
- 10 Rosenberg and Nelson, “American Universities and Technical Advance in Industry,” 323–348.
- 11 Atkinson and Blanpied, 41–43.
- 12 Atkinson and Blanpied, 41–42.
- 13 A useful overview of the economic impact of academic research worldwide is to be found in the collection of articles edited by Shahid Yusuf and Kaoru Nabeshima, *How Universities Promote Economic Growth* (Washington, DC: International Bank for Reconstruction and Development, 2007).
- 14 Committee on Prospering in the Global Economy of the Twenty-First Century (U.S.), *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future* (Washington, DC: National Academies Press, 2007), 1.
- 15 Richard C. Atkinson and Patricia A. Pelfrey, “Science and the Entrepreneurial University,” *Issues in Science and Technology* 26, no. 4, Summer 2010: 39.

- 16 Anna Lee Saxenian, *Regional Advantage: Culture and Competition in Silicon Valley and Route 128* (Cambridge, MA: Harvard University Press, 1994).
- 17 Cole, *The Great American University*, 5.
- 18 John Aubrey Douglass, *The Conditions for Admission: Access, Equity, and the Social Contract of Public Universities* (Stanford: Stanford University Press, 2007), 7–8.
- 19 *Rising Above the Gathering Storm Revisited*, 65–66.
- 20 Christopher B. Swanson, “Closing the Graduation Gap: Educational and Economic Conditions in America’s Largest Cities.” Bethesda, MD: Editorial Projects in Education, 2009.
- 21 William G. Bowen, Martin A. Kurzweil, and Eugene M. Tobin. *Equity and Excellence in American Higher Education* (Charlottesville: University of Virginia Press, 2006), 98–99, figure 5.2.
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