

# The Past, Present, and Future of the Research University

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Research universities are complex institutions with multiple academic and societal roles. They are both national institutions that contribute to culture, technology and society, and international institutions that link to global intellectual and scientific trends. There is widespread recognition of the importance of research universities but many countries do not recognise their complexity and the resources needed for building and sustaining them. Research universities face a number of challenges, mainly the pressures towards privatisation and that of maintaining their autonomy and controlling essential academic decision-making. Central to the success of a research university is adequate and stable funding.

Research universities stand at the centre of the 21st-century global knowledge economy and serve as “flagships” for post-secondary education worldwide. These elite institutions are complex institutions with multiple academic and societal roles. They provide the key link between the nation’s scientific and knowledge system to global science and scholarship. They produce much of the new information and analysis leading to important advances in technology but also contributing, just as significantly, to better understanding the human condition through the social sciences and humanities. Research universities are complex institutions with multiple academic and societal roles. They are at once national institutions that contribute to culture, technology, and society and international institutions that link to global intellectual and scientific trends. They are truly central institutions of the global knowledge society (Salmi 2009). This article provides a historical and global context in which to understand the development of the research university.

As national institutions, research universities serve only a minority of undergraduate students, usually the nation’s best and brightest, and employ the best-qualified academics. They are the central universities for educating students at the doctoral level and produce the bulk of the research output. Smaller countries may have only one research university, while larger nations may have many – although only a small minority of the total post-secondary institutions in the country. In the US, for example, there are perhaps 150 globally relevant research universities out of around 4,800 post-secondary institutions.

These institutions produce the bulk of original research – both basic and applied, in most countries – and receive most funding for research. Their professors are hired because of their qualifications to conduct research and rewarded for their research prowess and productivity. The organisation, reward structures, and indeed the academic culture of these universities focus on research. In the hierarchy of academic values, research stands at the top, although teaching and services remain important. At research universities, research is the central characteristic, but teaching is not ignored and is often related to research foci. Most of the academic community, including the undergraduate students, often has the opportunity to participate in research and is exposed to the research culture.

Research universities, because of their unique mission, require sustained support and working conditions that will sustain their academic mission. Their budgets are larger than at other universities and the cost per student greater. Their financial support, in most countries largely from public sources, must be sustained if the

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institutions are to succeed. A considerable degree of autonomy – to make decisions about degrees, programmes, and other academic matters – must be provided, and academic freedom is central.

In order to understand the contemporary research universities, it is useful to examine their historical underpinnings, contemporary development, and future challenges.

### The 21st-Century Global Context

Research universities are integral parts of the global higher education and societal environment (Altbach, Reisberg and Rumbley 2010; OECD 2009). Key 21st-century realities for tertiary education worldwide include the massification of enrolments, the role of the private sector and the privatisation of public higher education, the ongoing debate concerning the public versus private good in higher education, the rise of Asian countries as academic centres, and quite recently, the global economic crisis and its impact on higher education.

With annual enrolments of at least 30% of the eligible age cohort, massification of enrolment has been the central higher education reality of the past half century. Since 2000, post-secondary enrolments have increased from 100 to well over 150 million (OECD 2008) worldwide, and expansion continues in much of the world. Half of enrolment growth in the coming two decades will occur in just two countries, China and India because they enrol 22% and 10%, respectively, of the age group and thus have considerable scope for expansion (Altbach 2009). Global expansion has been fuelled by demand from an ever-growing segment of the population for access to the degrees that are believed to hold the promise of greater lifetime earning and opportunities and the needs of the knowledge-based global economy. The implications of massification have been immense, however, with major financial implications, infrastructure challenges, questions about quality, and potentially diminished returns in labour markets with more university graduates than the economy can sustain.

The next notable phenomenon, private higher education, is by no means a new event, but its forms and impact are evolving quite rapidly. The private sector has dominated much of east Asia, as Japan, Taiwan, the Philippines, and South Korea have educated 80% of their students in private universities for generations. The non-profit private sector has been strong in the us as well. Globally, Roman Catholic universities and other religious schools have long been key participants, often serving as the flagship quality institutions in their countries. What these institutions all have in common, however, is their commitment to education as a non-profit activity.

A newer phenomenon is the for-profit private sector. The growing needs of a massified system have led in many countries to expanded private sectors. With regard to the for-profit sector, the rise of institutions has focused on teaching to meet the demands of the student market for specific fields of study, filling a niche that many public universities could not (Altbach 1999). Since research universities, except in the us and Japan, are almost exclusively public institutions, the rise of the private sector presents some challenges, mostly in terms of regulations and quality assurance, although private institutions seldom aspire to be research-intensive. The challenge of ensuring that private

higher education broadly serves the public interest is a key public issue in tertiary education in the 21st century (Teixeira 2009).

It remains unclear how the economic crisis that started in 2008 will affect higher education in general and the research-university sector, in particular. There are examples in several countries of severe cutbacks in the funding of higher education generally. The 2010 budget cutbacks in the United Kingdom (UK) and the continuing state-imposed cuts in most of the us states are such examples. Outside of Japan, most Asian countries have not cut higher education budgets, and both China and India have, in fact, responded to the crisis by adding funds to their tertiary education spending, particularly for research and development. Despite economic strains, continental western Europe has not trimmed higher education budgets significantly, either.

The result of these spending decisions in the face of the economic crisis is unclear. It is possible that the balance of research-university strength will be weakened, at least temporarily, in the higher education sectors in the major Anglo-Saxon countries, where public research universities prevail, while there is continuing strength in Asia and to some extent in continental western Europe. The slow shift in the balance of academic strength from North America and Europe to east Asia may, in fact, be assisted by these current economic trends and philosophic spending decisions made by governments in regard to their higher education sectors.

The relentless logic of the global knowledge economy and the realities of cross-border academic mobility also influence the direction of higher education generally and of the research university (Marginson and van der Wende 2009a). The need for advanced education for a growing segment of the population and the salience of research for economic development have increased the profile of research universities. Both faculty and students are increasingly recruited internationally, and mobility is now an established fact of contemporary higher education, especially affecting research universities.

### Historical Background

Almost all of the world's universities stem from the medieval European universities of the 12th century (Haskins 1923). Only the Islamic Al-Azhar University in Cairo stems from a different academic tradition, and even its non-religious faculties are western-based (Makdisi 1981). The original universities in Italy and France expanded to the rest of Europe and then to the rest of the world, as a result of colonialism or the spread of western ideas. Universities were involved in teaching, professional training, and the preservation of history and culture.

From time to time, ideas spread from the universities to society were influential. The Protestant Reformation, for example, was championed by a theology professor, Martin Luther, and spread from campus to society. Major influential thinkers – Comenius, Jan Hus, and Erasmus, among them – were professors, and their ideas had wide influence. But neither modern science nor contemporary arts were generally part of the curriculum. Neither the Renaissance and nor later the beginnings of the industrial revolution in England and then in France have their roots directly in universities. Indeed, Napoleon found the French universities of his day sufficiently irrelevant, so he abolished them.

Research has not always been a key function of academic institutions (Ben-David and Zloczower 1962). In fact, the contemporary research university dates back only to the beginning of the 19th century – specifically to Humboldt’s reformed University of Berlin (Fallon 1980). Before that, universities were largely devoted to teaching and the preparation of professionals in fields such as law, medicine, and theology. While the Humboldtian idea brilliantly focused on research, it stressed research for national development and applied work as much if not more than basic research. From this research model, the disciplinary structures emerged – with the development of such fields as chemistry, physics, and others, and also the social sciences such as economics and sociology.

Humboldt’s university was a state institution – financed by the Prussian government. The academic staff was made up of state civil servants and had high social prestige and security of tenure. The structure of the academic profession was hierarchical and based on the chair system. The Humboldtian ideas of *Lernfreiheit* (freedom to learn) and *Lehrfreiheit* (freedom to teach) enshrined a great deal of autonomy and academic freedom in the university.

The Prussian government was supportive of this new university model because it promised to assist in national development and help Prussia – and, then, Germany – achieve international power and influence. It is significant that the two countries that most enthusiastically adapted the Humboldtian model were the us and Japan – both of which, particularly in the 19th and 20th centuries, were committed to national development and saw higher education as a contributor.

The American variant of the German research university is particularly relevant (Geiger 2004a). In the latter 19th century, following the Land Grant acts, American universities began to emphasise research and especially focused on harnessing science for agriculture and its emerging industry. The American research university varied from the German model in several important respects: it emphasised research to society as a key value; the organisation of the academic profession was more democratic – using discipline-based departments rather than the hierarchy of the chair system; and its governance and administrative arrangement was more participative (by the faculty) and more managerial (by deans and presidents who were appointed by trustees or governing boards rather than elected by peers).

Slowly, the American research university became the predominant global model by the middle of the 20th century (Geiger 1993, 2004a). Through a combination of significant expenditure on research – some of it provided by the defence department and related to cold war military technology – strong support from the states, effective academic governance, the creation of a differentiated academic system in most states that identified research universities at the top, and a vibrant non-profit academic sector, American research universities became the international “gold standard”.

### Language of Science and Scholarship

Because universities are international institutions, with their openness to faculty and student flows and borderless knowledge creation and dissemination, the language of science and

scholarship is of central importance. The earliest European universities used a common language for teaching and publishing – Latin. Even at that time, the universities saw themselves as international institutions, serving students from throughout Europe and often hiring professors from a variety of countries. Knowledge circulated through the medium of Latin. One of the key tasks of those early years was translating books from Arabic and Greek into Latin and introducing this knowledge to Europe. Later, national languages began to dominate universities in their home countries as the result of the Protestant Reformation, and the universities became national rather than international institutions.

French was then a central language of scholarship during the Enlightenment and the Napoleonic period. German became a key scientific language with the rise of the research university in the 19th century, and many of the new scientific journals were published in German. English slowly increased its influence as the major language of scientific communication following the second world war with the rise of the American research university and the expansion of university systems in English-speaking countries as the UK, Canada, Australia, New Zealand, and in formerly British colonies including India and Pakistan in south Asia, Nigeria, Ghana, Zimbabwe and Kenya in Africa, and also South Africa. In Asia, Hong Kong and Singapore emerged as academic powerhouses that used English in their universities.

By the beginning of the 21st century, English has emerged as the nearly universal medium of scientific communication (Lillis and Curry 2010). In addition, universities in non-English-speaking countries are to varying degrees using English as a language of instruction in some fields. In many Arabic-speaking countries, for example, English is used as the language of instruction in the scientific areas and in some professional fields such as business administration – likewise, in South Korea and China. In Malaysia, which emphasised the use of Bahasa Malaysia as the language of instruction, English has returned as a major teaching language. On the European continent, English is used for teaching in fields deemed most globally relevant and mobile – such as, business and engineering.

Most influential academic journals and scientific websites are in English, and universities in many parts of the world encourage or even demand that their professors publish in English-medium journals as evidence of quality scholarship. There are many arguments concerning the advisability of this emphasis on the use of English for communication and academic advancement. Yet, the fact is English is now the global language of science and scholarship and is likely to remain dominant for the foreseeable future. Some analysts (Lillis and Curry 2010) have pointed out that academics worldwide are forced to use the methodologies and paradigms of the main English-medium journals, which reflect the values of the editors and boards in the us, the UK, and the other metropolitan countries. It is notably more difficult for authors whose first language is not English to have their work accepted in these influential publications, and the top-ranking journals are increasingly selective, accepting only 5 to 10 % of submissions, as universities worldwide demand that their scholars and scientists publish in these journals.

English is the language of academic globalisation. There are many arguments concerning the advisability of this emphasis on the use of English for communication and academic advancement. Yet, English is now the global language of science and scholarship and is likely to remain dominant for the foreseeable future. In some ways, it is also the language of academic neocolonialism in the sense that scholars everywhere are under pressure to conform to the norms and values of the metropolitan academic systems that use English. The influence of English on research, teaching, and scholarship in the 21st century is one of the realities of research universities worldwide.

### The 'Spirit' of the Research University

A research university is not only an institution; it is also an idea (Ben-David 1977; Shils 1997a). Creating and sustaining an institution based on a concept is not easy. At the heart of the research university is its faculty. Academic staff must have a commitment to the idea of disinterested research – knowledge for its own sake – as well as to the more practical elements of research and its use in contemporary society. The spirit of the research university also includes a commitment to academic freedom – part of von Humboldt's original vision and also a necessity if the best inquiry is to take place.

A research university is elite and meritocratic in such areas as hiring and admissions policies, promotion standards, and degree requirements for staff and students, although terms like "elite" or "meritocratic" are not necessarily popular in a democratic age when access has been the key rallying cry of higher education for decades. Yet, for research universities to be successful, they must proudly proclaim these characteristics. Research universities cannot be democratic; they recognise the primacy of merit, and their decisions are based on a relentless pursuit of excellence. At the same time, they are elite institutions in the sense that they aspire to be the best – as often reflected in a top ranking – in teaching, research, and participation in the global knowledge network.

Students, too, are a central element of the spirit of the university. Not only are they, ideally, meritocratically selected from among the brightest young people in society, and perhaps worldwide, students need to have a commitment to the university's goals and to its academic ethos. A high level of performance is expected.

The research university is committed to the "life of the mind" in all of the complexities of that term. Although it is a central institution in the knowledge economy, it is also an institution that must have time for reflection and critique, and a consideration of culture, religion, society, and values. The spirit is open to ideas and willing to challenge established orthodoxies.

At the same time, a research university is firmly linked to the society. It is not an "ivory tower," as it is frequently derided. Von Humboldt purposefully tied the university closely to the needs of state and society. An early president of the University of Wisconsin-Madison, a distinguished US research university, claimed "the border of the university is the border of the state" (Veysey 1965: 108-09). This symbolises the ideal of serving the needs of society as well as the creation and dissemination of knowledge.

Another central element of the spirit of the research university – alongside its staff and students – is the principle of academic

freedom (Shils 1997b; Altbach 2007). Without academic freedom, a research university cannot fulfil its mission nor can it be "world class". The traditional Humboldtian ideal of academic freedom is the freedom of academic staff and students to pursue teaching and research and publication and expression without restriction. In most part of the world, the ideal of academic freedom has expanded to include expression on any topic or theme even beyond the confines of specific scientific or scholarly expertise. The key element of academic freedom is the concept of open inquiry as a core value of the university.

A research university, especially one that aspires to the highest world standards, is a special institution based on a unique set of ideas and principles. Without a clear and continuing commitment to its own, it will not succeed.

### Governance and Leadership: The Missing Link

Governance, as distinct from management, concerns how academic decisions are made. Post-secondary institutions of all kinds are both managed and led. Moreover, they are, at their best, communities of scholars. Universities are, of course, increasingly large bureaucracies with complex management needs (Shattock 2010); yet, they differ significantly from other large organisations in several key ways. First, to be successful they must include those who teach and do research (the academic community) in the decision-making (the governance) of the institution (Rosovsky 1990). In addition, students, while not necessarily involved directly in governance, must also be included as key stakeholders in the academic community. Research universities especially need the full involvement of the academic staff in the key decision-making arrangements of the institution. Research universities typically have a greater degree of professorial power and stronger guarantees of academic autonomy than other academic institutions.

Academic leadership is of increasing importance in an era of complex and highly visible academic organisations. The role of the university president, vice chancellor, or rector is managerial and academic. Some have argued that presidents should be top scholars while others favour successful managers, sometimes from outside of academe, as university leaders (Goodall 2009). In research universities, presidents must have academic credibility and display a deep knowledge of and respect for the academic mission of the institution. At the same time, they must be able to represent the university in society and make the case for the centrality and importance of the institution. Modern academic leadership is an increasingly complex and multifaceted task, and finding talented leaders is difficult.

The substantive academic prerogatives – control over who is admitted, who is hired and fired from the professoriate, the curriculum, and who is awarded degrees – are at the core of professorial control. The best contemporary universities have shared governance, with the academic community in control of essential academic decisions; and administrators and managers responsible for resources, facilities, and other administrative matters. Academic governance models vary across research universities. Representative bodies of the academic community, sometimes including students, are typical. The traditional European pattern of control by the senior professors, who also elected the rector from

among their ranks for short terms of office, is perhaps no longer practical, in light of the myriad skills (noted above) demanded of an effective university leader. Regardless, the key point is that the academic community must have a significant role in shaping and supervising the key academic elements of the research university.

### **A Special Kind of Professor**

Research universities require a special type of professor. They need to be well educated as to perform their teaching and research responsibilities at the highest levels. Their commitment to the culture of research requires a strong resolution as well. Research-university academic staff typically hold the doctorate or its equivalent, usually having studied at the top universities in their home countries or abroad – in many countries not the norm for the academic profession.

The research-university professor, like the institution itself, is both competitive and collaborative – imbued with a desire to contribute to science and scholarship both to advance the field and to build a career and reputation. At the same time, these academics often work in teams, especially in the sciences, and understand the importance of collaboration.

These academics contribute by far the largest amount of scholarly and scientific research articles and books. Their publication rates are way above the average for the academic profession (Haas 1996). Indeed, it is likely that perhaps 90% of the articles that appear in the top-ranked academic journals are written by professors in the research universities.

In a world where many teachers in universities work part time and do not enjoy much job security, research university professors are full time, for the most part with reasonable security of tenure, and are paid adequate if not lavish salaries that can support themselves and their families. In other words, research university professors are, in comparison to their peers, privileged academics. In order for a research university to be successful, the academics must enjoy conditions of employment that will permit them to do their best work.

Research university professors typically have modest teaching responsibilities; they are provided with the time to undertake and publish research. In most developed-country research universities, teaching responsibilities seldom are more than two courses per semester and, in some institutions and in some disciplines, less than that. Where teaching assignments are higher, as is the case in many developing countries, research commitment and productivity tend to be lower.

These academics tend to be international in their consciousness and often in their work. They increasingly collaborate with colleagues in different countries and are sometimes internationally mobile, taking jobs where working conditions, salaries, and facilities are best. This contributes to a “brain drain” from developing countries, although in recent years internationally minded academics function in more than one country, sometimes holding academic appointments in more than one country. At the same time, research university professors operate in a national environment although they are, of course, employed by national institutions, and they are expected to fulfil local and national responsibilities. Janus-faced, they must look in several directions at once.

These academics tend to be “cosmopolitan” rather than “local” in their interests and activities (Gouldner 1957). Their professional ties tend to be more with colleagues in their discipline around the world than with colleagues at their university. They participate directly in the global-knowledge network by attending scientific conferences, working jointly with colleagues abroad, and participating actively in cross-border scientific communication. Typically, they are less loyal to their universities and willing to move, sometimes abroad, if better working conditions, salaries, or higher prestige is offered. And because of their scientific visibility, they often have greater opportunities for such mobility. Sociologist Burton Clark once noted that academics inhabit “small worlds, different worlds” (Clark 1987).

Academics working at research universities are a small but extraordinarily key part of the total academic profession. Despite their small numbers, they produce most of the important research. In many countries, they educate most of the academic profession. Thus, their orientations and perspectives have considerable influence on the academic profession as a whole. They are, indeed, a rare and special breed.

### **The California ‘Master Plan’ for Higher Education**

The American research university model is widely considered the “gold standard” and is emulated globally. The quintessential American public research universities are those of the University of California system. The California “Master Plan” of 1960 constitutes an effective way of organising a differentiated public higher education system to cater to both research excellence as well as access and massification. Clark Kerr, chancellor of the University of California, Berkeley campus and then president of the University of California System between 1952 and 1967, was central to both the creation of the Master Plan and the development of the University of California system and its flagship Berkeley campus (Kerr 2001; Pelfrey 2004).

The California Master Plan established the three-tiered California public higher education system, with three systems clearly differentiated by function but linked through system articulation. This arrangement has successfully operated for more than half century. At the pinnacle of the system are the 10 campuses of the University of California. These universities, led by the Berkeley campus, admit the top eighth of high school students in the state and have a research mission. The next level consists of the 23-campus California State University system, which enrolls around 4,33,000 students. These institutions offer bachelor’s and master’s degrees, but not doctorates, and the academic staff are not expected to maintain a research intensity on par with the academics in the University of California system. The community-college system has 112 campuses with 3 million students – the largest such system in the US; these are all colleges with teaching and service at their core and little to no research capacity or expectations. Funding patterns, missions, and governance all differ among the three tiers of the California system, and state regulation has maintained the different missions of the public colleges and universities. The Master Plan imposed differentiation across California public higher education and remains a defining and effective innovation that has served the state well over more than half a century. By distributing resources with an ideal of efficiency at its core, the Master Plan also

institutionalised a commitment to excellence in its best research universities, such as the University of California, Berkeley.

Clark Kerr, the architect of the Master Plan, had a vision of the key characteristics for the system's research universities, and these elements are central to the University of California, Berkeley, one of the world's best universities. First, the internal governance of the university is mainly in the hands of the professors; key decisions concerning academic policy and direction, even if initiated by administrators, receive inputs from the academics. This concept of shared governance is central to the idea of the university. The Berkeley campus is rigorously meritocratic in everything that it does – appointment and promotion of faculty, student admissions, and other aspects. Research and teaching are intertwined, but research has the upper hand. Academic freedom is a central value of the academic community. The university has, from the beginning, been engaged with society, particularly with the state of California. The service mission of the university has always been of central importance.

Until recently, the University of California has received relatively generous funding from the State of California, with each campus funded independently from others, according to institutional mission and size. Now, with recent budget cuts, the state contribution to the Berkeley operating budget is approximately a quarter of what is needed, although it does pay the salaries of almost all of the faculty members. The rest of the university's income comes from student tuition and fees, research grants and income, the sale of intellectual property, and other sources. This level of state support is now typical of some of the top-ranked public universities and is indicative of a decline of state support for public higher education in the United States. California is, of course, not alone in facing severe, and probably long-lasting, financial and other problems (Lyll and Sell 2006), and the impact of the current financial crisis has been hard on its entire higher education system.

Like most research universities, the University of California, Berkeley is simultaneously international, national, and local. It has a wide international reach, recruiting staff and students from around the world. The university's academic departments and centres are concerned with international issues in all disciplines. Berkeley's national influence includes engaging in research supported by national agencies and hosting laboratories sponsored by the federal government. Less well known are the university's efforts to provide service to the statewide and local communities through special educational programmes including non-degree courses, community outreach, and similar efforts.

Clark Kerr was aware of the challenges of his model of the university. In an epilogue to his classic book, *The Uses of the University* (2001) he pointed to, among other things, what he called "state penury" in the context of expansion of both enrolments and research, the impact of information technology, the rise of the for-profit private sector, demographic changes, variations in the economic benefits of academic degrees, and others (Kerr 2001).

### The Present Circumstances of the Research University

To paraphrase Charles Dickens, these are the best of times and the worst of times for research universities. There is widespread recognition of the importance of the research university for

almost every country. Global rankings, which largely measure research productivity, are in part responsible for the emphasis of research universities (Altbach 2011). The salience of international academic connections and the role of research in the global knowledge economy are understood as central to sustainable economic growth and stability. However, many countries do not recognise the complexity of and the resources needed for building and sustaining research universities (Salmi 2009).

The early 21st century is now a period of emerging research universities in countries where they have not existed before and the strengthening of current institutions. It is also a time of the internationalisation of the research university.

- It is possible to outline some of the characteristics of successful research universities.
- Virtually all-successful research universities are a part of a differentiated academic system where they stand at the top of an academic hierarchy and receive appropriate support for their mission.
- Research universities, except in the US and Japan, are overwhelmingly public institutions. The private sector can seldom support a research university, although some private universities are emerging among some of the Catholic universities in Latin America and in Turkey.
- Research universities are most successful where there is little or no competition from non-university research institutes or where there are strong ties between the universities and such institutes. The "academy of science" system in countries such as Russia and China; the Centre National de Recherche Scientifique in France; and some other models of distinct research institutes generally lack such connections to universities. There are efforts in some countries to better integrate research institutes and the top universities, in some cases merging them, and this will, undoubtedly, strengthen the universities.
- Research universities are expensive institutions. They require more funding than other universities – to attract the best staff and students and to provide the infrastructure necessary for top research and teaching. The "cost per student" is inevitably higher than the average across an entire higher education system. Adequate salaries for faculty, well-equipped libraries and laboratories, and scholarship assistance for bright but needy students are examples of the expenditures required.
- Research universities must have adequate and sustained budgets; they cannot succeed on the basis of inadequate funding or severe budgetary fluctuation over time. Research universities require steady funding, particularly as they get established but also generally.
- At the same time, research universities have the potential for significant income generation. Students are often willing to pay higher tuition and fees at these institutions because of the prestige attached to a degree from them as well as the high quality of academic programmes and access to the best professors. Current debates in the UK and in some US states, concerning charging higher education at research universities than at other post-secondary institutions, reflect both the need for more revenues and the likely success of differential tuition fees. Research universities also generate intellectual property and other discoveries and innovations that have value in the marketplace. In addition,

in some countries, research universities, in part because of their prestige, can generate philanthropic gifts for helping to build an endowment for the university.

- Research universities require physical facilities commensurate with their missions, and this means expensive libraries and laboratories. Sophisticated information technology is also required. All of this is not inexpensive. The infrastructures of research universities are both complex and expensive. Not only do they need to be built but also must be maintained and periodically upgraded.

The requirements of the research university are complex. They are physical and human but also contain ideas and orientations relating to academic work.

### Current and Future Challenges

Research universities face many of the same challenges as higher education generally, although with somewhat different characteristics. The issues discussed here, of course, affect countries and institutions in different ways but will to some extent be felt everywhere. There is much that can be learned from national and comparative experiences in dealing with these and other issues.

### Funding

Central to the success of a research university is adequate and stable funding. Higher education everywhere faces funding problems. Research universities have some advantages in competing for scarce higher education funding because they are quite visible, are seen as important to a nation's economy, and are most measurable in the ubiquitous rankings. At the same time, they are as individual institutions quite expensive; it costs more to educate a student at a research university than at most other post-secondary institutions.

Research universities will be increasingly challenged to raise their own funds from potential donors, through the sale of intellectual products and consulting, and increasingly from student tuition and fees. Research universities have the potential to charge higher tuition than other post-secondary institutions. The American private research universities already do so. Most public research universities worldwide are not permitted to charge higher fees, however, due to historical compacts or legislative restrictions even in light of the higher costs of education and the willingness of students to pay more to obtain a better and more prestigious degree from a research university. As noted earlier, a debate about these issues is taking place in the UK and in some American states. It is clear that research universities do cost more and that they need to be able to raise funds without relying entirely on the largess of government.

The global economic crisis of the early 21st century has had an impact on the research universities. As noted earlier, its effects vary across the globe, but the overall result may potentially be a boost to east Asia's universities since their countries have weathered the economic storm better than their western counterparts.

### Autonomy

In an era of accountability, research universities will be challenged to maintain their autonomy and to control their essential academic decision making. Research universities are in the uncomfortable position of being, for the most part, state institutions

subject to bureaucratic rules and parts of complex bureaucratic academic systems. And though research universities require autonomy in charting their own paths to excellence, developing academic programmes and foci, and in managing their affairs – doing so in the face of accountability pressures to prove value added and relevance to their myriad stakeholders is encroaching on historic autonomy norms for many research universities.

### The Best and the Brightest

National research universities will be increasingly challenged to attract top talent, both professors and students, in an increasingly competitive global academic marketplace. Universities compete not only with other universities but also with a growing and often well-paid knowledge sector outside the campus and find that academic salaries often do not match remuneration outside the universities. Top faculty are lured abroad from developing and middle-income countries, as well. In recent years, the best students have also been attracted to top universities abroad by scholarships, excellent academic conditions, and the prestige of studying abroad. While it is difficult to retain professors, universities that can offer at least modestly competitive salaries and good working conditions can be reasonably successful in keeping good talent. But it is a constant struggle in every country, simply because universities pay salaries that are competitive to those outside the campus.

### Privatisation and the Private Sector

Research universities, as has been noted, are public institutions in almost all countries. The pressures towards the privatisation of the public universities exist nearly everywhere, and this trend is for the most part damaging to the research universities, since these institutions are mainly engaged in the public good activities – such as basic research and the instruction of students in a variety of disciplines. If research universities are forced to look to the market to pay their professors and cover their expenses, this policy has the genuine potential to damage the quality and focus of their research and detract from their core missions (Geiger 2004b). Although private for-profit higher education is the fastest-growing part of post-secondary education worldwide, so far it has not played a significant role with regard to research universities. Few countries have private research universities.

### Globalisation

Globalisation is both a benefit and a curse to research universities (Marginson and van der Wende 2009b; Knight 2008). They are at the centre of global knowledge communication and networks. They funnel new ideas and knowledge into the higher education system and the country as well, and they permit the academic community to participate in international science and scholarship. It is possible, in the age of the internet, for individuals anywhere to take advantage of global knowledge, but the resources and academic community of research universities make international participation easier and more effective. In many countries, research universities may be the only institutions adequately linked to global networks. Thus, research universities provide a two-way street for scientific participation.

At the same time, for many universities, globalisation constitutes a threat. The global academic marketplace for professors and students means that the best students and staff can be lured away. Over-reliance on international “core” journals for promotion and research criteria may place professors in peripheral research universities at a disadvantage. Globalisation tends to favour the “centres” over other universities – it does not necessarily contribute to the democratisation of science and scholarship. Thus, globalisation is a two-edged sword in higher education.

### The Research University and the Academic System

The inevitable conflict, and often confusion, concerning the role of the research university in the array of higher education providers in a country often creates problems. Research universities are part of a complex higher education system; yet, they have a special role and demand a higher level of resources in the system. It is sometimes difficult to make the argument for special, and privileged, treatment, but the fact is that research universities play a unique societal and educational role.

### Basic vs Applied Research

Research universities conduct research in many fields and disciplines. They are the main sources of basic research, joined in a few countries by private corporations (such as pharmaceutical companies, for instance) and scientific academies, and thus have key responsibility for the scientific advancement. Basic research is a quintessential public-good function; no one earns a direct profit from basic science. Moreover, fundamental research, particularly in the hard sciences and biomedical fields, is often expensive. The funding of basic science has become problematical in many countries. In the social sciences and humanities, where research is less expensive, questions have nonetheless been raised about its usefulness.

At the same time, there has been more stress on applied research, university-industry linkages, and in general on income-producing research products. Conflicts between the traditional academic goals of the university and the desire to earn income from research, often from corporate enterprises, has created conflicts of interest and occasionally inappropriate relationships (Slaughter and Rhoades 2004). Shaping an appropriate balance so that basic research will not be downgraded in the rush for financial stability will be a difficult task.

### The Curriculum

Although seldom discussed, the curriculum for both undergraduate and graduate (postgraduate) studies is contested territory in many countries. A reconsideration of the nature of the undergraduate curriculum is underway. Should undergraduate studies be highly specialised and vocationally oriented, or should liberal and general studies be a central element? Should critical thinking skills be included? Should the length of study be three years, as is now part of the Bologna initiative in Europe, or the more traditional four years? At the graduate level, should doctoral study include American-style coursework or mainly research, as has been the European tradition? How can doctoral education be funded? How can “time to degree” and a high dropout rate in

many fields be ameliorated (Nerad and Heggelund 2008; Walker et al. 2008)? The “professional master’s” degree, now a popular option in many countries and somewhat standardised in Europe by the Bologna initiatives, will also require further analysis and planning in the coming period. Without question, an effective curriculum is central to the success of any university. Curricular initiative in research universities will have an impact throughout the higher education system.

### The Future of the Research University

Because research universities are central institutions in any knowledge- and technology-intensive society and because they are seen as the key to a world-class higher education system, their future is reasonably bright (Altbach and Balan 2007). The fact is that modern societies cannot do without them.

Those who argue that the contemporary university will be fundamentally transformed by distance education and technology, mass enrolments, increasing vocationalisation, privatisation, or the current financial crisis have a point. The early 21st century is a period of both crisis and transformation for higher education globally. And it is entirely possible that some sectors of higher education will change fundamentally.

One sector of higher education is, however, unlikely to be dramatically altered – that is, the research universities. These institutions have the power of tradition behind them, and the fact is that they are quite good at what they accomplish. They will without doubt be changed in some ways, but the research university in 2050 is unlikely to be fundamentally different than such institutions today.

Establishing research universities in countries where they do not exist or upgrading existing universities to serve as research universities is a worldwide phenomenon (Mohrman, Ma and Baker 2008). This is not at all surprising. Countries and academic systems believe that in order to fully participate in the global knowledge economy and benefit from science and scholarship, they must have at least one research university that is able to function at a “world-class” level (Deem, Mok and Lucas 2007). Thus, the community of research universities is rapidly expanding from the traditional academic centres in North America and Europe to developing and emerging economies worldwide (Liu, Wang and Cheng 2011). Whether this provides the most-efficient means for development in countries at differing stages of economic growth is an important consideration often lost in the race to build a great university in every country. In small and fragile states, for instance, economies of scale may point towards greater efficiencies through excellent regional institutions, perhaps. Regardless, the recognition of the importance of research universities is nearly universal.

There are no secrets concerning creating or sustaining research universities. Not surprisingly, many countries seeking to establish such institutions look to successful research universities in the academic centres. As a result, an informal global research model has emerged – emulating the American research university. Appropriately, the global model inevitably takes on national characteristics to reflect the particular academic and societal realities of local circumstances. The variations that can be seen

among successful new research universities reflect an informal global model and also national and local variations. Regardless of the problems and challenges facing higher education in the coming period, the research university will remain a central element of every higher education system and a requirement of most economies.

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