GLOBAL PERSPECTIVES ON HIGHER EDUCATION

How World-Class Universities Affect Global Higher Education

Influences and Responses

Ying Cheng, Qi Wang and Nian Cai Liu (Eds.)

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Higher education worldwide is in a period of transition, affected by globalization, the advent of mass access, changing relationships between the university and the state, and the new technologies, among others. *Global Perspectives on Higher Education* provides cogent analysis and comparative perspectives on these and other central issues affecting postsecondary education worldwide.

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YING CHENG, QI WANG AND NIAN CAI LIU

1. HOW WORLD-CLASS UNIVERSITIES AFFECT GLOBAL HIGHER EDUCATION

Influences and Responses

INTRODUCTION

World-class universities (WCU), commonly recognized as global research universities or flagship universities, are cornerstone institutions embedded in any academic system and play an important role in developing a nation's competitiveness in the global knowledge economy. It is widely agreed that these universities are committed to creation and dissemination of knowledge in a range of disciplines and fields; the delivery of elite education at all levels; serving national needs; and furthering the international public good (Altbach, 2009; Liu, 2009; van der Wende, 2009). The development of world-class universities is high on the policy agenda of various stakeholders across the globe (Altbach & Balan, 2007; Huisman, 2008). Such a "world-class" movement has been fuelled and intensified by the proliferation of international league tables (Salmi, 2009; King, 2011). In the past few years, an increasing number of nations, regions and higher education institutions in both developed and developing countries have joined the same race for academic excellence and have adopted a range of development strategies and implemented various reforms. It was in this context that Graduate School of Education at Shanghai Jiao Tong University initiated the biennial International Conference on World-Class Universities in 2005. Previous conferences have gathered university administrators, government officials, leading scholars and policy researchers from around the world to discuss the various issues related to world-class universities.

The Fifth International Conference on World-Class Universities was held in November 2013. The conference theme was "How World-Class Universities Affect Global Higher Education: Influences and Responses," to provide insights and experiences of building world-class universities from different national and regional perspectives.

GLOBAL IMPACT OF WORLD-CLASS UNIVERSITY MOVEMENT: EXCELLENCE INITIATIVES

Seeking world-class university status has been a global phenomenon in the past decade (Mohrman et al., 2008; Altbach, 2011). Not only in the developed countries but also in those economies in transition, governments have conducted comprehensive reforms to restructure their higher education systems through this

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"world-class movement" (Deem et al., 2008; Altbach, 2009). Such efforts to encourage higher education growth have been witnessed in particular in Asian and European countries and regions. Governments and leading universities in these countries and regions have adopted various strategies and approaches in pursuit of academic excellence. Among these strategies, excellence initiatives, that is, strategic funding programmes, are one of the main policy foci adopted by governments. Selected universities in these countries and regions have been provided extra and concentrated funding to develop excellence in teaching and research.

A few East Asian countries and regions are among the first to implement strategic funding programmes in pursuit of excellence. For example, the mainland Chinese government has adopted a national policy advocating the building of globally prominent universities over the past decade, and has launched a group of specific national initiatives and competitive funding programmes, such as the 211 and 985 Projects (see Chapter 8). The 211 Project aims at developing about 100 universities and a number of key disciplines by the early 21st Century. To further strengthen the development of excellence, the 985 Project, launched in 1998, emphasizes the exploration of new mechanisms for higher education governance and developing a path to transform a selected few top universities into world-class status. Both projects have provided the selected universities with abundant resources to enhance teaching and research quality and with autonomy in institutional governance and management. Challenged by the increasing competition from its neighbouring countries, the Japanese government has put in place policies to foster world-class universities through competitive funding schemes since early 2001, such as the 21st Century Centres of Excellence, the Global Centres of Excellence and the World Premier International Research Centre Initiative (see Chapter 7). Although government and ruling party changes might have led to some alterations in these funding programmes, the orientation to pursue excellence in Japanese universities remains. Similar trends and developments are also taking place in South Korea (the Brain Korea 21, World-Class University Initiatives and the BK21 PLUS project, see Chapter 6), Taiwan (Development Plan for World-Class Universities and Research Centres of Excellence, see Chapter 7), as well as in Singapore (World-Class Universities programme) and Malaysia (Accelerated Programme for Excellence).

One of the earliest strategic funding programmes in Europe was the Excellence Initiative implemented by the federal and state governments in Germany in June 2005 (Chapter 4). This programme intended to enhance research in Germany, to support and promote elite institutions, and ultimately to improve its higher education performance. In addition to its "Plan Campus" Programme, the French government decided to launch a structural support programme – the "Investment Programme for the Future" in 2009 (Chapter 2 and 3) – to boost higher education and research which is "a key sector for the future." Realizing its universities' relatively poor performance in global higher education, the Russian government has initiated a series of reform since the 1990s, including the Innovative University Programme, the Federal Universities Project and the National Research

Universities Initiative. These projects focus on strengthening their research capacity (Chapter 5). At the end of 2012, the Russian president Vladimir Putin signed a decree with the target of at least five Russian universities in the top 100 of world university rankings by 2020. Similar excellence initiatives are also observed in Denmark (Centres of Excellence), Finland (Centres of Excellence in Research), Norway (the Centres of Excellence Scheme) and Spain (International Campus of Excellence).

Despite the different organization and managerial approaches, these initiatives all propose clear aims for excellence, provide adequate funding to a select few institutions and research centres, and ensure essential policy support from government. These initiatives tend to provide relatively long term funding, which ensures continuity and improves the effectiveness of such policy implementation. Furthermore, these competitive funding programmes are proposed, agreed on and legislated by government and its associated organizations. The legislation processes turn these education initiatives into regulations and laws, which strengthen the authoritative and compulsory nature of the policies. In addition, these funding programmes have raised an awareness of international competition among institutions (Wang, 2011).

COMMON ISSUES IN BUILDING WORLD-CLASS UNIVERSITIES

Governments' aspirations to develop world-class universities have accelerated the implementation of "concentration and selection" policies in various countries and regions; however, challenges are inevitable. A range of common issues and problems, in terms of funding, research, market forces, autonomy and accountability, the globalization of science, academic freedom and the academic profession, are universally applicable but with different scope and depth in different countries and regions (Altbach, 2009).

From the perspective of financial resources, with the increasing cost of operating a world-class research-oriented university, many governments have managed to support their leading universities with concentrated funding to promote excellence. However, two issues need to be taken into consideration. On the one hand, in the context of the recent economic crisis, many developed countries have been cutting their public expenditure on education while most developing and transition economics still have fairly low overall education spending as a share of GDP (World Bank, 2012). This leads to the concern: to what extent can the funding of world-class universities be sustainable. On the other hand, while the top end of the higher education system has had significant investment through national initiatives, the other members at the bottom of the systems might not obtain adequate support from the government, which might undermine the overall quality of mass higher education (Altbach & Wang, 2012). Policy makers at national level should ask how many world-class universities are desirable and affordable as a public sector investment (Salmi, 2009).

From the perspective of research and innovation, there is still a trade-off between quantity and quality. For example, while research shows rapid growth in

the number of papers published internationally by East Asian universities, especially those receiving extra funding, there has been limited progress in terms of paper quality reflected by citation data and in terms of leading academic research that has a significant international impact (Marginson, 2011b). Concentrated research expenditure might be one of the elements impacting on intellectual quality, but the research culture and institutional autonomy, as well as academic freedom, are also indispensable (Altbach, 2011; Marginson, 2011a).

From the perspective of governance, how to deal with the tension between autonomy and accountability in the context of the neoliberal economic consensus can be seen as a core issue. It is true that these competitive funding programmes mentioned in the previous section to some extent have further enabled the selected universities autonomy and flexibility to spend according to their demands, while performance criteria are tightly attached to assure accountability and quality (World Bank, 2012). However, in those countries and regions with strong national steering and control, it might be possible that research priorities are decided and shaped by the governments (Altbach, 2009; Marginson, 2011a). Also, in relation to diversifying funding resources, the commercialization of research brings significant challenges: market forces and commercial interests can generate potential conflict between traditional academic norms and commercial interests, and between basic research and applied and often profit-oriented research (Altbach, 2009).

From the perspective of talent concentration, world-class universities require highly trained professors, scholars and scientists devoting their full professional attention to teaching and research. One of the challenges, especially in middle- and low-income countries, is to provide reasonable remuneration and employment security to staff, not only academic but also administrative staff, so as to guarantee their time and work commitment and to guarantee facilities and infrastructure to make their creative research possible (Altbach, 2009). In the "publish or perish" environment, few practices have been instituted for professors to balance their teaching and research responsibilities (Deem, Mok & Lucas, 2008).

From the perspective of national languages, the English language is still dominant in the global academe, for both instruction and research (Altbach, 2011). To engage in global competition, world-class universities must function in the international language of science and scholarship. In spite of the increasing internationalization movement around the world, it will be still a while before scholarship is translated into English on a large scale (Marginson, 2011b). Meanwhile, world-class universities also have responsibilities to develop research to serve the demands of local communities, to disseminate research in their local contexts, and to support and develop local languages (Altbach, 2009).

Despite a common goal and a strategic focus on building academic excellence observed across the globe, it is not difficult to identify different emphases, procedures and mechanisms adopted within these approaches. Altbach and Salmi's research (2011) reiterate that a complete analysis of operating a world-class university needs to take into consideration the context within which institutions evolve, as education reform and changes do not happen in a vacuum. Countries and

those overseeing their higher education systems need to carefully assess their needs, resources and long-term interests, and design their strategies based on their national and institutional models. There is no universal model or recipe for making academic excellence (Salmi, 2009). International experience might be helpful to provide experience and lessons; however, a simple policy copying exercise may not transfer effectively from one country or university to another.

CONTRIBUTIONS TO THIS VOLUME

Reflecting the above points, this volume is composed of two sections: "National and Regional Reflections on Excellence Initiatives" and "Opportunities and Challenges of Developing Excellence."

National and Regional Reflections on Excellence Initiatives

This section particularly focuses on and updates the policy trends and changes in developing world-class universities, addresses factors and concerns that governments need to take into account in making relevant education policies, and discusses the impact of national and regional investment in research and teaching excellence.

Michel Rocard, a former prime minister of France, provides us an insightful story on the excellence funding scheme in France – the "Investment Programme for the Future" (PIA). Directly involved in this policy making, Mr Rocard discusses how such a policy of "concentration and selection" have been proposed, implemented and developed. France's relatively poor performance in various university rankings triggered heated debate on whether France can again be capable of world-class research. The PIA, implemented in 2009, was designed to boost research and higher education in France, and sets out clear goals of only awarding support to innovative projects of excellence, in other words, equality and regional balance are not the policy concerns. It is interesting to note that even with a change of government, this excellence policy was not only respected but extended and intensified. Though it is too early to discuss the impact of the PIA, the early results show increasing enthusiasm to develop both fundamental and applied research, and active collaboration both among universities and between universities and industry. Following Mr Rocard's inside story, Ghislaine Filliatreau provides contextual information on the higher education and research system in France and further analyses the impact of the PIA.

Jiani Zhu provides an in-depth analysis on the Excellence Initiative in Germany in her chapter. With its long history, the German, or Humboldtian, model of universities influenced higher education development around the world by the end of the 19th century. However, similar to the situation in France, the performance of German universities has been less impressive in recent years, compared with other developed countries. An "Excellence Initiative" was launched by the federal and state governments in June 2005 to strengthen cutting-edge research, to support and promote elite institutions, and ultimately to improve their international

competitiveness. This programme breaks its egalitarian system by only focusing support on universities with the strongest international research potential. The Excellence Initiative has been implemented in two phases (Phase I: 2005/2012; and Phase II: 2012-2017). Zhu argues that this ground-breaking Excellence Initiative has changed the higher education landscape in Germany by boosting research power, enhancing its international reputation, increasingly attracting talented scholars from abroad, and by creating a culture of competition across German universities. However, this research-oriented funding scheme is mainly criticized for its unequal distribution in terms of geographical locations and for its negligence of teaching. Thus, further implementation of this programme requires discussion on how to sustain strong financial support and how to maximize its positive effect in the long term.

Isak Froumin and Alexander Povalko's chapter reviews three projects adopted to promote academic excellence in Russia. Again, aware of the relatively poor performance of its universities in higher education globally, the Russian government has initiated a series reforms in its well-differentiated higher education system since the 1990s. One of the core challenges to develop research universities is the past separation of research and the university education, a feature of the Soviet system. To strengthen its research capacity and to ultimately improve the competitiveness of Russian universities internationally, the government has consistently invested in the higher education sector through various funding programmes: the particular support for the two leading "national treasure" universities, Moscow State and Saint Petersburg State University, the establishment of several "federal universities," and support for the National Research University programme, along with a number of Targeted Federal programmes. As a critical analysis on these programmes shows, in spite of research quality enhancement, serious examinations and discussions on the lack of the effectiveness of these funding initiatives are needed. The authors argue that important issues for further policy actions for excellence include the setting of reasonable goals and approaches to achieve them, providing flexible financing, improving openness and transparency in institutional development, emphasizing national partnership, governance reform, and sustainable funding.

Geo-Suk Suh and Sang-June Park review the ongoing journey to develop world-class universities in South Korea. The Korean government identified several weaknesses in its higher education system in response to the demands of the global knowledge economy. Compared with other developed countries and with international standards, higher education institutions in Korea seemed to have a lower level of academic competence. To enhance the nation's global competitiveness, the government initiated the Brain Korea 21 (BK21) and World-Class University Projects higher education reform projects. Both projects bring have been fruitful, including increasing qualified human capital, developing graduate schools, promoting partnerships and collaboration between education, research and university-industry, and improving the internationalization activities of Korean universities. To consolidate the previous two projects' successes and responding to their issues and challenges, the Korean government has implemented

the BK21 PLUS project (2013-2019) to train talent, strengthen research competitiveness, reinforce industry-education co-operation, as well as enhance education quality, in particular. The authors point to two factors to achieve progress and success: the provision of sustainable financial support and the assurance of regional balance.

Following the Korean example, Akiyoshi Yonezawa and Angela Yung Chi Hou put the cases of Japan and Taiwan together to analyse the common challenges they face. Taiwan and Japan share common features – well-developed economies, ageing societies and the threat of losing high quality human resources, declining public funding, and an imbalance between the quality and quantity of education. With increasing international competition, both realize that to develop highly skilled human resources and advanced science and technology is a policy priority. They have therefore adopted "selection and concentration" policies, such as the "Centres of Excellence" and "World Premier Initiatives" in Japan, and "Development Plan for World-Class Universities and Research Centres of Excellence" and "Teaching Excellence Initiative" in Taiwan. These endeavours have elevated their leading universities to world-class status. Echoing the previous chapters, both authors argue that, as excellence building is a long-term struggle, one crucial question is how to ensure adequate and sustainable funding support to higher education, which is essential to maintaining national competitiveness in a global knowledge economy.

Qi Wang and Ying Cheng's chapter discusses the policies and practices in developing world-class universities in mainland China, particularly the 985 Project – a centralized, outcome-oriented funding programme. The authors claim that the 985 Project and its financial support have a great impact on the development of the selected universities in terms of research and education quality, and knowledge innovation. These selected universities' elite status in the Chinese higher education system has been strengthened. However, a gap still remains between universities in mainland China and other world-class universities in the world in terms of research quality; and the research and academic culture has not fundamentally changed. It is argued that, as the funding allocation is organized and decided by the government with little transparency in the selection and evaluation process, strategies need to be, and have been, adopted to stimulate and inspire a competitive mechanism in the third phase of the 985 Project.

Opportunities and Challenges of Developing Excellence

The second section of this volume comprises of the context of global pursuit of world-class universities, both in developed and developing countries and regions. It intends to provide critical discussion on the role of world-class universities in promoting national and regional economic growth and social development. It focuses on the key issues and challenges facing governments around the world, including decreasing public funding, tensions between building excellence and developing diversity, balancing global competition and local development, and the relationship between research funding investment and productivity.

Related to funding and resources, William Tierney begins the discussion by raising the question how leading public research universities in the US can maintain their excellence in the post-financial crisis context. Tierney argues, based on the current definition of and discussion on world-class universities, that public research universities are going to face two-fold challenges, particularly related to the neither efficient nor effective public regulatory system. First, significantly declining funding may prevent public universities from developing and competing against their private counterparts, despite institutions increasingly diversifying their financial resources. Second, as disruptive technology and social media are transforming higher education and the way universities used to operate (such as by online learning), whether public universities can respond to these changes in time remains questionable. Any institution that is "immune" to changes will confront significant problems. Tierney also points out that disruptive technology may impact or even alter the current criteria for excellence.

One challenge to building world-class universities is how to develop a differentiated world-class system and counterbalance the trends towards isomorphism. The diversification of higher education system takes place in various forms of collaboration, including alliances, coalitions and mergers. Marijk van der Wende discusses how these activities may affect the missions of universities and to what extent it is possible to measure the diversity of the higher education system. Reviewing different forms of collaboration, this chapter analyses the related questions and dilemmas of mergers and university missions, including the tension between institutional size and missions for teaching and research, the balance between teaching and research, and the balance between government steering and institutional autonomy. To achieve a combination of excellence and diversity at system level, appropriate measures of system-level diversity and performance need to be developed.

To what extent a developing country needs to have world-class universities has been debated in the recent years. Andrés Bernasconi employs Chile as a case study to illustrate this question. As a middle-income but relatively small country, Chile has a relatively long history of higher education. Its universities, mainly teaching-oriented, are among the best in Latin America in terms of output, efficacy and efficiency, and have played a key role in the socio-economic development of the country. However, if using research-based indicators of global university rankings to evaluate them, Chilean universities still fall behind and do not fit the category of a "world-class" research university. The comparative analysis between the two leading universities in Chile and the State University of Campinas in Brazil shows that Chilean universities fall behind in terms of graduate enrolment, faculty recruitment (talent), financial support (resources) and competent university management (governance). Bernasconi argues that the quest for two or three world-class universities would be feasible in Chile, if additional financial support from diverse resources is provided, scientific research and the relevance of knowledge transfer to serve the demands of the local community are emphasized, and education at both undergraduate and graduate levels are expanded. In addition,

while institutional autonomy is important, interaction with government in terms of the strategic planning and steering of higher education development is necessary.

Echoing the Chilean case, Gerard Postiglione provides an insightful analysis on the University of Hong Kong to reflect how the university plays a key role in helping Hong Kong, a small-sized economy, to anchor globalization and ensure its long-term competitiveness as a major global city. The University utilizes its long history and its Western academic heritage to position itself as the leading international university of China, attracting top students and leading scholars from all over the world. As Postiglione argues, the University's success depends on a healthy environment of institutional arrangements, international brain circulation, as well as partnership and interaction between academia, industry and government. While its location enables it to enjoy open access to international knowledge networks, the University also plays an important role in China's development in the global economy. All these factors constitute the context within which the University develops its world-class status.

Comparing the data from 21 universities in Asia, Australia, Europe and North America, Kathryn Mohrman's ongoing research discusses the impact of national investment in universities in terms of research funding and publication performances, both quantity and quality. The findings show that universities in different nations have increased their investment in research at a higher rate than the overall growth in university budget. Many of the case universities have increased the number of publications indexed by the ISI Web of Knowledge, which in turn has improved their positions in global university rankings. However, using the Leiden impact factor in further analysis, it is not difficult to find increasing research expenditure may not necessarily be associated with research quality enhancement. Hence, increasing research expenditure alone is not the only answer to improve universities' competitiveness.

This book not only represents a contribution to ongoing discussions on the topic of building world-class universities, but also a continuation of the previous four volumes on this topic – "World-Class Universities and Ranking: Aiming beyond Status" (Sadlak & Liu, 2007), "The World-Class University as Part of a New Higher Education Paradigm: From Institutional Qualities to Systemic Excellence" (Sadlak & Liu, 2009), "Paths to a World-Class University" (Liu, Wang & Cheng, 2011), and "Building World-Class Universities: Different Approaches to a Shared Goal" (Wang, Cheng & Liu, 2012).

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SECTION 1

NATIONAL AND REGIONAL REFLECTIONS ON EXCELLENCE INITIATIVES

MICHEL ROCARD

2. A NEW PUSH IN FRENCH EXCELLENCE

Could France Again Be Capable of World-Class Research?

It is an honour for me to have been invited by your University. I feel it even more deeply as I am not a researcher or a PhD in sciences or an "academic" in anything of the sort. This is even somewhat of an irony, since I get to be asked by you to inform you of what is happening in France on the various fronts of higher education, research, knowledge, its creation, transmission and dissemination.

You had indeed noticed that, in this area, something is happening in France, which does look like a crisis.

Actually, you had to be puzzled at seeing, in your annual rankings of higher education and research institutions, that, as years go by, there are only very few French institutions among the top one hundred; less than a dozen in the second hundred, and only few again in the last three hundred in your list. Could the country of Descartes, Condorcet, Carnot, Lavoisier, Pasteur, along with so many others be walking out on knowledge?

What, for you, was a cause for astonishment was for us French the brutal and tragic realization of a disaster that only a few in the know suspected, and that has begun to show, in recent years, in serious manner: abnormally high failure rates of students in graduate courses; steep deterioration of our external balance of patents and licences; the collapse of our language in the world's intellectual flowering; etc.

Yet, you heard things were changing, and with a vengeance, too. You also heard I was involved in this change. That is precisely why you have invited me.

To do this, I need to remind you of some context. A few minutes will be lost, but it is certainly worth the time.

First, on the face of this planet, Europe is an oddity. Around the world and throughout history, when peoples became sedentary, they sought security. Leaders were eager to ensure it while receiving their legitimacy for succeeding.

Everywhere the narrative is the same: our people are good, warm, brotherly, therefore good policing will suffice to deal with the few offenders. The real threat of violence comes from the OTHER, who does not have the same skin colour, speaks differently and prays to other gods.

We must push our boundaries as far as possible and send our armies there to defend them. Empires extended to the limits of the so far explored world and travelled as they could afford in those days. This is obviously the case of China of course, with the Great Wall to prove it; it is also true of India, and of the Japanese, who travelled across all its islands. This can also be said of the Aztec empire to the

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south of North America and of the Inca Empire, northwest of South America. It is equally clear of Upper Egypt, Cyrus in Persia, Alexander of Macedon; the Roman Empire as well as the Russian empire in Siberia are both cases in point. This can be applied as well to the Zulu and Benin or Mali empires, although Africa's history is not yet written.

Europe stands as an exception to this pattern. Fifteen distinct linguistic communities proved populated enough to resist each other and prevent the birth, or rather rebirth after the Roman one, of a single empire of such dimensions. One exception was Charlemagne's in the 9th century, but his empire broke up in less than a hundred years. Since then, we have been slaughtering each other, because borders are unstable, and we keep dreaming of unity without ever achieving it. Even the current European Union is a political paralytic.

Within this European oddity, France is another oddity. We are the only country that does not result from a single language community. When, in 1914, we had to mobilize our people to go to war against the Germans, to our dismay 80 percent of young mobilized conscripts did not speak French but Breton, Occitan, Alsatian, amongst other dialects. France is a military creation, the result of a continuity of royal dynasties from the *Val de Loire*, the Loire Valley. To achieve this, our forty successive kings did all they could to erase – kill, actually – five cultures, a word defined as the coincidence of a language and a religion: Brittany; the Occitan, Alsatian, Corsican and Basque Countries, as well as Flanders, can partly be described as such. The republics that followed forcibly imposed the monopoly of our current language.

I believe I need not carry on about the details of the context: you have already figured it all out. A nation that has been willed top-down and battered together by its army can last out only by relying on the extreme centralization of its administration. Everything is decided on in Paris, even local public facilities. Any local or regional autonomy is suspected – legitimately so for too long – of irredentist or centrifugal tendencies. Local authorities have to endure the tightest supervision by the most centralized government in the entire Western world.

Furthermore, knowledge has been proved dangerous. Such a brutal, push and shove history is food for intellectual excitement. A great many French people have reflected, written, invented, discovered and produced music and paintings over the last millennium, and this was often deemed subversive. The Enlightenment was the mother of the Revolution. Napoleon assumed control of the State over secondary education and dissolved universities. Only faculties managed to rise from the ashes. Today, after being painstakingly rebuilt over a century, our universities remain weak, faltering and dependent on the State, which keeps a watchful eye on it all.

Finally, but it is of great importance for today's topic, our people got rid of archaic situations and privileges of yore, more brutally and more comprehensively than any other in Europe. The great Revolution provided the chance of achieving our national crystallization. The people became sovereign, and out of caution gained from history, vested sovereignty at the very top, in Parliament, while prohibiting delegation of it to any other, especially not local authorities, counties or

cities, and even less to academic institutions. Therefore, creating a university is a state decision, and it will choose to do it only provided it is in charge.

Meanwhile, the people also expressed, against the return of abolished privileges, its commitment to equality. The word is even part of the Republic's motto. Regarding our subject, exhaustively, this has resulted for example in legitimizing any territory or "*département*" (county) to request from the state the establishment of a university, when none already exists. Thereby, we have 81 of them today, all too small obviously, and since they are at the government's service, they are endowed funds annually under the nation's budget, but without heritage or resources of their own. Hence, they are very poor indeed. This does not facilitate access to the capabilities of modern instruments of discovery and of knowledge creation.

The same requirement of equality has led to other consequences.

One of them is that the State has the moral obligation, not a statutory one for all that fortunately, to make sure, willy-nilly, that the subsidies it pays to universities, whether large or small, provincial or Parisian, amount to the same per student expense in all of them. The means to fight against the lack of research funding can therefore hardly be found in that direction.

Here is another consequence of this political and constitutional commitment to equality: the promotion of personnel cannot be left to departmental heads' discretion, based on assessment of their merits and their results. It is deemed impossible for the dialogue between the director and one of his subordinate researchers or teachers to take place without being tainted with personal affection. Such assessment can only be suspected of being subjective – therefore arbitrary.

This is of course unacceptable. Seniority is then the sole possible basis for evaluation on completely objective criteria. Trade-unions have always acted as vigilant guardians of this tenet, even more staunchly than about the former principle. As they are very powerful while governments are weak, they obtained many a minister's resignation. We can no longer get rid of the mediocre.

Now for another consequence of this tropism. Though French birth rates had weakened so much for a century as to transform France into an immigrant country (the only one in Europe), our nation heeded the powerful and lasting wake-up call during and after World War II. This has been called the baby boom. It was deemed an obvious fact – not worth stepping back and thinking about it – for France to accept turning its secondary education into a mass endeavour; its numbers increased tenfold in less than twenty years, without being able to apportion the necessary funds.

Same thing, or just about, in higher education. Upon entering college, it was deemed wise, and was actually done in France, a long time ago and to a small extent mind you, to organize the careful selection of incoming students – and you, who are listening to me here, have all always been doing it in your countries. Selection, you said?! When all the country's youths go to primary and then up to high school? You can't be serious! This would be in violation of all republican principles, the establishment of institutional inequality, confirmation that the high and middle classes do not identify with the people. Can't be done … By mutual

agreement between the right and the left and under two republics in a row, the university has been barred from conducting any serious selection at entry and forced to accommodate all the youths leaving secondary education. We went from 100,000 to two million students. Naturally the corresponding financial means have not been forthcoming. Among other results, here is one: 50 percent of students fail at the end of the first year, and vanish without a degree from university onto the labour market; this has been happening ever since and is still almost always the case. Another result: the overall financial poverty that results from all this leads to having to make do and barely squeak by, to the discomfort and decay so typical of the teaching proper, but certainly precludes even more definitely any significant effort in favour of research because, though research is necessary to maintain a vibrant intellectual life and foster progress, it can be dispensed with when it comes to coping with the daily functioning of schooling.

I was told you wish to understand it all. If that is the case, bear with me, I still need to provide one more fact and two comments.

That fact, actually, you have always known it, but I need to mention it again and account for it. Faced with such a multi-secular university disaster, economic forces, scientific or literary elites, and even – perhaps especially – the State, have sought ways to limit the damage and secure the elite's training and transmission of higher learning. To achieve this, from the last kings to the Revolution, the Emperor, the Republics, and private industry as well, all have conspired to establish our so unique *Écoles supérieures* (Higher Institutes, if you will), with tightly restricted access and highly talented. More than twenty of them claim the title of *Grande École*. Many are public, some private. All are highly selective, small, with highly qualified staff. Yet, their size and purpose greatly limit their access to research. Henceforth, to keep up top-quality research, the State had to create and expand large specialist institutions. There are some for medicine, for the sea, for agriculture, for the atom, for a little of everything. Money has been pouring there. All are powerful, efficient, talented, skilled, and basically quite isolated. All are highly autonomous, all of them cut off from the University. They dread having to depend on a university or even on the minister of education. They have hardly got used to establishing collaborations with each other and are basically reluctant to work together. Nevertheless, they are for a great part to be credited for what remains of successful research in France.

This is the context.

And here is my first concluding remark.

Let me say a few words to greet the talent, dedication and enduring courage of all those teachers, researchers, principals, directors, deans and rectors who have managed to keep such a system afloat throughout the previous century.

Second concluding remark: it is rather an anecdote that should make you smile: in the middle of it, all governments, it was the least they could do, have sometimes sought to reform the system. The last but one government even had lofty ambitions: granting universities their autonomy would certainly enable them to grow, he thought. Well, the French breed of higher education professors must, among all languages, religious practices, skin colours, levels of knowledge and

income combined, be the only one in the world able to go on strike to fight against their own empowerment and autonomy!

The State is the only guarantee … but, try as it might, this is not what it is primarily meant for and so it makes a mess of it. This is a disaster. My beautiful country makes you wonder sometimes, it is all so distressing.

A surprising change came from politicians. Political power everywhere is in charge of managing what exists. Except when revolutions break out, it is most of the time and just about everywhere unable to bring any change at all, in France more than anywhere else. Yet, the severity of the collapse had become more blatant, not only in the Academic Ranking of World Universities (also called the Shanghai rankings). It became a political concern.

Then a series of decisions were made, all as astonishing as unexpected.

In 2007 France elected an atypical President, and then granted him a parliamentary majority. Nicolas Sarkozy is determinedly and brazenly conservative. On some issues, he even feels barely hidden sympathies for the extreme right, which is a foil for the Socialist parliamentary opposition, and also a concern for a small part on his own side. He is an activist, a brave one; he makes fast and hard decisions and is at times proven right, at others wrong. The majority-opposition relationships in Parliament were tense and appalling. There was little ground for cooperation.

This President has hardly any or no economic culture. It was a blessing actually: thanks to this he has no taboos, as shall be seen. He was well-aware, he said it himself, of the collapse of higher education and research. But he had to admit he could do nothing about it. Structures are rigid and there is no money anyway.

Since 1974, the last budget in surplus, France has posted back to back deficits and increased debt. The 2006-2008 financial crisis suddenly made matters worse and the debt is staggering today.

For almost fifteen years, we have experienced nearly zero growth, massive unemployment and the dangerous global financial mess. In this context, the central body of a very mixed party – called the UMP, then at the helm in France – rallied to monetarist visions, in the wake of the United States, Britain, Japan, the Netherlands, today's Germany for a great part, and the IMF; but this body is more intelligent and circumspect than the rest, and is of all evidence eventually switching to a different doctrine.

Still, according to that doctrine, the state can do nothing about growth and does not have to get involved. Growth can only be achieved via private investment, which itself depends on trust. Get your budgets balanced, keep your word, pay your debts, be serious: confidence will return and growth along with it.

The debt must drop, it can't increase, no two ways about it. This, in economic matters, is the unifying intellectual corpus of the French right.

President Sarkozy agrees with this narrative (though no zealot about it) and was alarmed at the growing scientific and technical French collapse. He saw it as a threat. One day in 2009 he said he would float a comprehensive "National Loan for the Future" with a view to resolving this disturbing situation. This announcement triggered general amazement, concern among many in the administrative,

intellectual and political circles, well beyond the UMP. Even within the UMP, anger flared. "We are already too indebted, this is very dangerous. The IMF, Brussels and Germany are bound to rant against it. We'll lose our French triple-A credit ratings." The majority split over it, hostility hardened. Parliamentary success became uncertain. Sensing it, the President sought broader political support for the operation.

By promoting research and higher education, the project plays in favour of personnel, a great number of who vote on the left. They might as well support the President's project, or at least not oppose it. But it had to achieve great visibility.

The President of course put in charge of the operation one of the most respected and talented men in his camp, former Prime Minister Alain Juppe. But he decided – and this was his second oddest idea after the strangeness of the loan concept – to also call upon a leftist as co-director of the operation. I am a former Prime Minister, fairly respected and not really busy at the time. He called me.

Without consulting or asking permission from anyone, I agreed immediately. Strangely enough, though they could well have – because working, even internally, under orders from the enemy is treason – Socialist Party members did not make any comments or remarks, much less a reprimand. Maybe out of some kind of respect, or perhaps to avoid image damaging public conflict, or then again and especially, because of the extreme importance of the subject matter … Here I was, free and without pressure or coercion.

The President of the Republic set up a 20-member strong commission, picked among the most respected scientists in France, in all subjects, including even some heads of institutions. The commission was formally installed by the President of the Republic himself in his Residence. Alain Juppe and I were appointed co-chairs. The ceremony ended, as did time for solemnities and the room was slowly clearing.

Alain Juppe and I stayed alone; we were sitting at a corner table in the empty room. What next?

A few intermittent parliamentary jousting over twenty years is not enough to tie bonds of friendship or trust. We hardly knew each other. Neither of us could help smiling about the situation.

All he knew about me was that I am a staunch socialist, but a moderate, heterodox one, and reconciled with the market economy. All I knew about him was that, though he is right-wing, he is not one of the financial right. He even scorns it somewhat and sometimes quite overtly so. In fact, and basically, he is a Gaullist – meaning that the State, its importance, efficiency and respectability lie at the heart of his political vision. No absolute antagonism stood between us. Nor was there any technical preparation for this unscheduled meeting. It had to happen, but later, in a more solemn and better prepared atmosphere. But then, here we were … almost by accident, and no collaborators to hold our hands.

Two veteran political foxes, respected for their past, both boasting very diverse experiences, therefore powerful, both free from the heavy political apparatuses we both have belonged to for a lifetime, which we have even temporarily led, were left here to observe each other with complicity.

No hierarchy, either political or administrative, or corporatist was there to control us or clip our wings. Neither of us, besides, belongs to the relevant professional groups – teachers, researchers, experts, scientists or heads of institutions.

We had received one instruction: "Stir up and boost research and higher education in France. The loan will take care of the funding, just tell us how much you need and deliver, anyway you choose. I just want results."

No comments or instructions on possible limitations on the scope of our assignment, or about procedures and resources either. The sectorial ministers concerned will be kept informed – later.

Neither of us was inexperienced. In half an hour, just talking, keeping no written record of it, a pact was passed. I whipped into the list just three measures of equal importance and of the same mind, but actually taken later.

– We will steer clear of territorial planning. Reducing inequalities, regional though they actually are, is neither our business nor our goal.
– We won't help existing institutions as such (with subsidies, grants or loans), 81 universities, 20 *Grandes Écoles*, twenty research centres: this would only result in dusting and spraying.
– Our support will be awarded only to innovative projects and on condition that the necessary strengths are gathered behind to bolster it. That innovation was huge.
– We'll back excellence only, as well as anything that comes close to or is capable of it.
– To take our pick among projects of excellence, financial awards will be granted – by an international jury.
– We will not help the regional infrastructures. The timeless rivalry between rail and road, areas threatened with desertification and overcrowded ones is serious and ever present. But it is insoluble without getting ourselves deep into political conflicts, and consensus is what we need. And above all it does not foster innovation. Now, we want to promote innovation, first and foremost. That issue has nothing to do with it.
– As much as to fundamental research, if not more, we will give priority to the industrial translation of research findings. Therein lies France's major weakness. Unlike Germany, for example, SMEs in France are almost excluded from access to innovation, because they have no network ties with researchers and their institutions.
– We will reintroduce nuclear power, one of France's best assets, which is unfortunately weakened by environmentalists' electoral and political terrorism. But the emergence of 4th generation fast-neutron reactors is a pressing economic emergency.

  They are yet to be developed, though.
– We will behave responsibly with Public Finance. The private Office of the President of the Republic – never himself, mind you – had come up with incentives to increase the loan to €100b. Such levels of debt were plain madness: this would be the recipe for immediate downgrading by two degrees

of France's credit ratings; it would cause a dangerous rise in interest rates on our own debt and would contribute to the likelihood of default by France, by the end of the decade. In addition, applications are far fewer than one would expect. Hopes have been clipped and many applications have not even been sent in. Though dreams and frustrations about them are rampant, well-designed projects, validated, assessed and just waiting for funding, are not so numerous – even after the wake-up call message sent by the floating of a "national loan." We will restrict ourselves to an increase close to 10 percent of the outstanding debt. For the markets, it is, as they say, "the thickness of the stroke," hence little detectable. For the French University and Research departments, it amounts to €35b, no less, over a few years, a huge sum that sector has never enjoyed for decades. Though sizeable, the loan is macro-economically modest, and it was a mistake for the press to dub it the "Great Loan," largely to its detriment, besides. The financial markets, for their part, will not even blink at such sudden yet moderate increase of the French debt.

– Finally, to further limit expenditures, and thereby gain more than one percent interest rate, we will not ask for the loan to be specifically identified when it is issued to the general public. It will be buried within the Treasury's overall issues, negotiated between banks. It will leave no registered trail in French financial history.

Our committee, all in all, was pretty amazing. It represented many sectors and institutions where the need for massive additional funding was urgent.

Everyone was perfectly civil; nobody questioned the limitation of the total amount.

Nor did anybody challenge the fact that requiring such a level of excellence, combined with the consolidation of specialized teams, might seriously call into question the very autonomy and sustainability of many institutions as such. Some existing entities would have to be split. This in itself was quite of miracle, probably owing to everyone's painful awareness of our general state of decay.

Over several months, our commission launched a systematic investigation of pending cases, as well as of outstanding or maturing ones in French research, namely:

– Fruitful ideas yet stalled due to lack of resources to pursue them.
– Projects completed intellectually but not having even led to prototyping, out of lack of resources.
– Projects carried through, including prototyping, but not yet at industrial level, etc.

This was Alibaba's cave. We unearthed many unexpected nuggets, frequently at the forefront of global knowledge. Though it is industrially weak, France is still a smart country.

Unanimously, our commission decided to allocate this new resource, according to seven axes.

1st axis: Almost half of the total, €16.5b, was to go towards higher education, research and innovation.

This priority axis was the most revolutionary action for the future: triggering the emergence of a small number of global-sized and reputation institutions, by consolidating existing entities. Some old establishments might have to be scrapped. When will *Polytechnique* (one of the highest-ranking *Grande École* for sciences) students get rid of their military uniform? Whatever. And would you believe it? It washed so well with the committee that represented it that it put up with it without even flinching.

2nd axis: Encourage the development of innovative SMEs: €2b.

3rd axis: Speed up the development of life sciences. €2b.

4th axis: Develop low-carbon energy and energy efficiency in the management of resources, €3.5b.

5th axis: Designing Tomorrow's City: €4.5b.

6th axis: Invent the future of mobility (air, land, sea and space): €3b.

7th axis: Invest in the digital society: €4b.

This was a stupendous device, an intimidating one besides, as it was completely innovative. No existing French administrative, financial or scientific institution, whether public or private, was able to support it on its own. We had to invent everything, including structures and procedures. The government at the time was able to create a new flexible, lightweight structure from scratch, attached to the Prime Minister, pompously called the French "General Commissariat for Investment" (GCI), not even an agency actually, or a "mission" and, to head it, appointed a prominent personality.

René Ricol is a financier, chartered accountant and consultant combined. He comes from the private sector; he hates the hassle of cumbersome government. He is immensely resourceful, adamantly tenacious, and his great sense of leadership is combined with a warm and friendly personality.

The magnitude of the adventure, a crucial stake for the country, the total freedom enjoyed by all had already stirred up the Committee's enthusiasm, and then enabled the Commissioner to gather around him the best French talent from the administration, research, industry and finance.

This stunning General Commissariat for Investment was to carry out an incredible performance:

- Invent new procedures, labels of excellence for example and campuses of excellence, too.
- Invent wherever necessary new structures or institutions: laboratories of excellence (joined clusters under certain conditions), boarding schools of excellence and especially technology transfer companies.
- Make one of our Committee's most unexpected suggestions in France feasible and acceptable, besides managing it through to completion: support to Universities will no longer be in the form of grants but of capital endowments, not to be consumed but producing interests. This is the beginning of funding in the American or German ways. Harvard is allegedly sitting on, say, US$30b assets. French universities: zero. We will have to start small, it will take half a century to grow. But we do have half a century: this is work for the long haul,

all the more so as, thereby, Universities conquer the right to increase capital of their own: thanks to donations, bequests, research contracts, patents sales, etc.
– Find funding from existing structures, whether from public or private banks, local government or research funding institutions, specific additional funding for well-defined projects, but that will give the whole operation a three- to four-fold leverage, which is huge.
– Select large public instruments to bolster or operate each action: The *Caisse des Dépots et Consignations* (the French equivalent to the Official Receiver), an SMEs Bank (known as OSEO), the Agency for Energy Management, the Research Agency, etc. Organize together with them the selection (by international juries' awards in most cases) of project workers, organize and monitor the precise contract between operator and contractor.
– Negotiate and, since it can't be dispensed with for many operations, get approval from European Community authorities in Brussels.

Oh, and I almost forgot the most important of all. Administratively speaking, the Commissariat has no authority. It suggests and puts forward proposals. The Prime Minister is the decision-maker regarding everything, and he does it faithfully, with no hesitation or reservation. Parliament is abundantly informed, and the whole scheme is confirmed in Finance Acts.

This state of facts and rule resulted in the Prime Minister bringing some marginal changes in amounts or procedures. The campuses of excellence became IDEX (institutes). A little less funding went to Tomorrow's City, a little more to life sciences. The spirit and the dynamics never changed.

Then we had an earthquake. France is a pluralist democracy, unstable and capable of drastic changes. The presidential elections were held. In 2012, there was so much resentment and conflict that power changed hands. My side, the Socialists, took over.

None of what I have just explained to you is public knowledge yet, even though a few elected representatives, some university officials and a few business leaders are engaged in the process. In the eyes of Socialists, a Sarkozy signed project is automatically disqualified. In addition, France strives at decentralizing. For the past thirty years, twenty-one regions in metropolitan France out of the 22 there are in all are run by a Socialist majority. The Regions Presidents Committee is a rising and powerful force. It felt greatly tempting to say, "Hang on! Surely, all that money has got to be allotted back to the regions." It is an essential support of the new government.

Alain Juppé and myself, having acted as co-chairs of the initial Committee, became heads of the inevitably ensuing monitoring committee, comprising in particular strong parliamentary representation, and were therefore in charge of presenting the case to the new government. Prime Minister Jean-Marc Ayrault is a friend of mine, of very long standing. He discovered the project, analyzed it, found it was worthwhile, hence approved it and decided in favour of keeping it up. He also was assigned to select who would replace the Commissioner General, René Ricol, and appointed probably the best possible successor, Louis Gallois, one of the creators and long-standing boss of Airbus, one of the great successes of

Franco-German cooperation. Gallois, an admirer of the process approved of it, made sure it was continued and even intensified it.

The new policymakers in office not only respected and adopted the scheme: they extended and intensified it.

A general law on research, meeting other objectives than the national loan, was drafted so as to ensure full compatibility.

An additional tranche, an extra third namely €12b, was committed – a considerable amount. This is when the environmental and energy transition, in particular, made a place for itself, with €2.3b. The Defense industry, a powerful and very innovative sector, left behind in the first phase, and threatened by the deep fiscal crisis faced by France, obtained its preservation to the tune of €1.5b. And above all, the University was allocated an extra €3b, which essentially were kept in the form of non-expendable endowments, and will, a cautionary economic measure, be payable only as of 2015. The Socialist government had just confirmed and strengthened the most profound change and the most ideologically controversial one proposed by our Committee.

The process stirred general enthusiasm and rallied energies. Time passed. The first results are beginning to show.

Among the system's intellectual inventions, there is a new institutional, hitherto unknown concept, the "Institute for Technological Research." In France, before this came about, anyone speaking of University research used to automatically imply "fundamental" research. Universities have incorporated these IRTs. Several have already been launched:

– One in Grenoble for nanotechnologies. It had already been germinating in the unusually intense cooperation between universities and companies in that region.
– Another in Toulouse for aeronautics. Actually, it was already running, informally. But its IRT status attaches numerous medium-sized enterprises, left behind so far.
– The most surprising perhaps, because born not so much out of a compelling local story as of suddenly contagious enthusiasm: the Jules Verne Institute in Nantes for materials and composites.

New institutions are blooming throughout the country and across all domains. I can't go on forever. I'll just conclude with one last example, but not the least: it is the most massive and most significant one, because the most confrontational at first.

South West of Paris, near a plateau close to the city of Saclay, lay several hundred square kilometres of still largely farm land. A lot of space, and close to Paris into the bargain. For thirty years, separately, institutions wanting more space have been setting up their offices there, spread and got their students to move and live in a natural environment. A few *Grandes Ecoles*, three universities, the nearby Versailles one and two from Paris, have set up two branches there, and major research institutes: for atomic energy and agriculture.

Twenty two entities have been built side by side there, though they do not work much in synergy with each other, among them are the *Ecole Polytechnique* and the Commissariat for Atomic Energy.

Then came the process of the national loan for the future. 22 entities got together and put forward a few highly ambitious projects.

The international jury rejected the application. Mayhem broke loose! The argument was "there is no governance at the helm of your projects, you only want to share your money just the way you used to do, to fund projects of insufficient scale; this was not the idea to begin with." This triggered a crisis. Some unit presidents resigned. A younger generation took power. The merger was agreed on; and the jury validated it.

In November 2014, the Paris Saclay University is to be launched under a single integrated authority – resulting in 18 percent of French forces in hard sciences working there. This is twice the size of Berkeley's. 22 entities are to merge into it.

Finally, hundreds of companies, large and medium ones, are already associated with that innovation process.

The rest of the story remains to be written. You will naturally be the first to know. Especially in conclusion, I would very much like to thank you all, the global knowledge community, because many among you have participated on a voluntarily basis, or just about, to these international juries who warranted the process effectiveness and legitimacy.

This is only the beginning. The renewal of the operation is currently under consideration.

Thank you for your attention.

Michel Rocard
Former Prime Minister (1988-1991), France