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Universities and Civilizations

Worldwide Academic Competition and Geopolitics

Franck Leprévost

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Universities and Civilizations

"Elsewhere" is a more beautiful word than "Tomorrow"
Paul Morand

To my mother Geneviève and my aunt Evelyne
To my son Cédric

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Foreword

When they published the first edition of the Shanghai International University Ranking in 2003, the three researchers from Shanghai Jiao Tong University who are responsible for this initiative probably didn't imagine that they were writing a new page in the world history of higher education. Firstly, they created emulators, since several commercial companies (Times Higher Education – THE, US News and World Report, Quacquarelli Symonds – QS) and government agencies (Russia, Taiwan) had copied them by launching their own international ranking. Secondly, they have had a profound influence on the behavior of many players who were directly or indirectly linked to the world of higher education: students looking for the most prestigious universities to continue their studies, business leaders anxious to recruit graduates from the best universities, and above all, university leaders increasingly obsessed by their institution's position in the various international rankings. And finally, they were used to convince a growing number of heads of state to grant significant financial resources for the development of world-class universities, that would worthily represent the intellectual and scientific level of the countries in question.

Over the past decade, several authors have been working to dissect the methodology of university rankings and to expose methodological flaws. Others have studied the impact of these rankings, looking at the transformation strategies of universities seeking to move up the rankings, as well as the "excellence initiatives" adopted by countries seeking to revitalize their underperforming university systems. However, none, to date, have succeeded in doing what Professor Leprévost undertook with his fascinating book on "universities and civilizations". Not only has he dissected the methodology of the main rankings and carefully analyzed some of the

excellence initiatives, particularly the Russian one, he is also the first to reset the course for academic excellence, induced by university rankings in a more global context. Indeed, one of the most interesting contributions of this new book is the analysis of the relationship between the evolution of university policies and the political, economic and cultural context of the civilizations in which they have evolved.

The author of this very well-documented work, Professor Leprévost, former Vice-Rector of the University of Luxembourg (an institution that has had an impressive track record despite its young age), challenges the reader to examine the recent evolution of major research universities in the context of the clash of great civilizations, carefully studied by Samuel Huntington in his 1996 book *The Clash of Civilizations*. Examining university strategies from the perspective of civilizations is an original approach that allows us to place the impact of international rankings in a relevant geopolitical context, and to more easily understand the diversity of national responses to geopolitical issues. The fundamental question put forward by the author is whether the dynamism of major universities is an adequate indicator of the intellectual vitality of the civilizations from which they originate.

This original analytical approach sheds new light on the rise of Chinese universities, the decline of American public universities that are increasingly deprived of resources by the States that fund them, the decline of Japanese universities reluctant to play the internationalization card, the efforts of French and German universities to rise in the rankings, or the absence of universities in India, Africa (except South Africa) and Latin America. In this context, Professor Leprévost devotes a fascinating chapter to Russia, studying the "5-100" initiative in detail, which is aimed at placing five universities among the top 100 in the world. This chapter sheds interesting light on the record of investment by the Russian government and the characteristics of the university system, inherited from the Soviet era, that hamper the development of Russian universities, such as the separation between research academies and universities, and governance arrangements reflecting a mentality of control from the national authorities.

This book on "universities and civilizations" evokes a world of increased competition and a break with a long history of cooperation, exchange and collaboration between academic institutions and the teacher-researchers who populate them. It challenges the reader with a series of key questions on the evolution of higher education systems and the role of universities in

contemporary societies: are international rankings a revealing indicator of a new geostrategy of knowledge? What is the role of cutting-edge universities? To what extent are excellence initiatives part of the panoply of strategic actions that are deployed by countries to maintain or improve their position among nations? Does the evolution of the ranking of the best universities shed light on the vitality of the civilizations they belong to? To answer these questions, Professor Leprévost reviews the reasons why some countries are investing in their universities, in search of new intellectual and economic leadership: a desire for political power, the definition of higher education as industry, efforts to diversify the economy, and the ambition to increasingly rely on the knowledge economy as an engine of development.

The answers in this book are organized in three main chapters. First, Professor Leprévost identifies leading universities on the basis of their results in the main international rankings. He then examines their geographical position within the framework of the seven great civilizations defined by Samuel Huntington. After a very instructive detour through Russia, he finally looks at the role of leading universities in contemporary societies and the tension between the traditional logic of contributing to the public good, and the distortions introduced by the new conception of education as a private investment.

Professor Leprévost ends his book with an incursion into the world of literature, evoking in turn Paul Valéry, Virginie Despentes, Ian Manook and Michel Houellebecq. This last part is an unprecedented way of illustrating, through a few well-chosen quotations, the evolution of contemporary society and its universities under the weight of demographic trends and technological change, resulting in the increasing automation and robotization of production processes. Allow yourself to be seduced by this original book which, with undeniable writing talent, paints a picture of international rankings and higher education, skillfully mixing geopolitics, the world of universities and literature.

Jamil SALMI
International expert in university transformation; distinguished Professor of Higher Education Policy at Diego Portales University (Santiago de Chile)
Washington DC
August 2020

Preface

Elements of Genesis

"Where are you going?" the boy asked.
"Far out to come in when the wind shifts.
I want to be out before it is light."

Ernest Hemingway (1952, p. 3).

The first ideas for this work were jotted down on paper in 2016 while I was living in St. Petersburg, Russia. The initial project involved writing an article on Russian universities by only looking at the international rankings established by Times Higher Education. Many footnotes were already covering the content; limiting oneself to the Times ranking alone was becoming less common. Attending a workshop at MIT in Boston and a conference in Berkeley led me to rethink things. The thinking became more refined as the article grew (without, however, guaranteeing the transfer of proportions). Some ideas were specific to the Russian context, while others took on a more generic turn. The article became a short memo. Then, the idea of writing a book came up, along with the hesitations and doubts that such a long-term commitment implies. Therefore, while writing the book, we decided to make it short and compact to preserve our breath. The book continued to be enriched with new incisions and footnotes, as old ones migrated and mutated into sketches of new paragraphs and chapters. I was aiming for a maximum of 26,000 words like *The Old Man and the Sea* (Hemingway 1952). The comparison with Hemingway ends there: I went overboard.

After a deviation of nearly 62,000 words, you have to stop yourself. This does not imply just writing the final word (or pause). It also means choosing

the title and subheading. This is not necessarily the easiest thing to do, all the more so, since it is a matter of making the author's wishes converge with those of the publisher. Lastly, "universities and civilizations" sums up the substance of the book quite well. While everyone more or less agrees on the meaning of the first term, using the second more risky, especially in contemporary academia, and if one takes Huntington's point of view on these issues. However, to a large extent, the relevance of "the clash of civilizations" analysed by Huntington remains key today. Therefore, I assume responsibility for these choices, risk and title. Of course, the outlines of such a project should be specified; this is the purpose of the subheading. However, comfort dictates selecting a cautiously neutral subheading. A different choice has been made by weighing this cautious neutrality of the subheading against a less consensual approach. Indeed, the subtitle uses a word which, in recent years, has gradually become taboo in the academic sphere and beyond, like many other words, incidentally. This sulphurous word is "competition". Yet, whether one likes the word or not, it exists. Indeed, there is *de facto* a global competition among universities to attract the best students, the best professors and the best academic leaders. Even if it existed in less visible forms before, the publication of the first Shanghai ranking in 2003 gave this competition a planetary impetus. Moreover, even if some have global objectives, universities contribute to and are part of the countries where they are established. Noting the absence or surprised by the weak positioning of some of their academic institutions in international rankings, several countries have initiated policies to remedy this situation. These actions give a geopolitical and even a strategic dimension to State policy in academic affairs. "Worldwide academic competition and geopolitics" specifies the relationship between universities and civilizations that I try to address in this work, where a sketch of the dynamics in force and of the variations of amplitudes is drawn, thanks to an analysis of world universities rankings over time. May this analysis also serve to shed light on the understanding of State policy in university matters.

The (methodical) reader traditionally begins a book by reading the preface. However, the preface, as is the case here, is often the last thing the author writes (before getting down to the "polishing" of the text and the editorial discussions). He explains certain choices, sets out his final thoughts and shares his more or less melancholy questions about what will happen next, as an existential void begins to appear.

Before the Foreword, which Jamil Salmi did me the honor of writing, the book opens with a quotation. This quote by Paul Morand would be more than enough to answer what comes "after". However, it touches on a more substantial personal plan. It reflects, for example, what led me to accept responsibilities outside of France, positions where I could act, build and forge, whereas such opportunities in my native country would (at least at the time) have required too much time, taken on too bland forms, and been subject to too many hazards. Then, from there, to expose myself with curiosity to very varied ways of thinking and realities, expressed in multiple languages in many countries on different continents. This "elsewhere" gives an understanding and a life experience for which I am grateful. Not only because it feeds into this book. To me, "elsewhere" is more beautiful than "tomorrow" but has never meant that "yesterday" was to be banished, let alone to forget the country where I was born, and in which I participate. At the opposite end of the contemporary spectrum – the paradoxical (and often little-known) result of globalization's encounter with Karl Marx – I am not a citizen of the world, just as no one else is. Some people claim that, that's all. By talking about important phenomena in countries that are beacons of civilizations, by talking about the dynamism of some and the weaknesses or inconsistencies of others, by showing what is happening elsewhere, how it is happening and with what impact, this book also revolves around France[1].

What will happen after this book? Maybe this work will be taken up again someday. The first way of revising this book would of course be to update the chapters. The second way, compatible with the first and favored by the "modular" architecture of the book, would be to add new chapters focusing on certain countries that are not fully covered here, or on certain civilizations. In this case, a balance would have to be found between priority and temptation. Indeed, civilizations and their flagship countries (in a sense that will be given below), or their important countries, are neither equally prioritized in general, nor equally tempting to me in particular. In the event of a divergence between the intensities of the two notions – a tempting, but not priority country versus a priority country, but less tempting – I will probably give nature its rights and thus give temptation primacy over priority. A third way would be to take certain footnotes or incisions and promote them as new chapters, or even new books. Topics are indeed abundant. It would be useful to carry out studies – some of them comparative – on university financing models and the related issue of student debt[2]; on the societal impact and global trends of universities focused on the transmission of knowledge, and not on its creation; on thematic

rankings of leading universities, particularly by looking at countries that heavily invest in deep learning technologies, artificial intelligence and data storage capacities; on national university systems[3] (where a number of small countries would probably do well, if not very well); on the evaluation and accreditation of university and research structures (a separate but related topic from the one we are dealing with here); and on the challenge that the reader will discover at the end of this book.

We shall see.

Whatever happens, from the summer of 2019, with its alternating heat waves and torrential downpours, to the coronavirus in the spring of 2020, the fine-tuning of this book has been carried out with enthusiasm and without any melancholy. My marriage to Anna in Normandy had a lot to do with it.

Barneville – LUXEMBOURG
August 2020

Acknowledgements

In 2016, I had the privilege of taking a sabbatical year after 10 years in top management at the University of Luxembourg (UL). This was a perfect time to take a step back (literally and figuratively, although I remained responsible for the UL international rankings) and risks (figuratively only). Specifically, I strongly wished to move out of both the thematic comfort sphere and the civilizational and cultural sphere. Taking a deep breath of fresh air and discovering what I didn't know yet – but had long been tempted by – led me to spend about three months at the European Investment Bank (EIB) and the European Investment Fund (EIF), then almost nine months at the Peter the Great Saint Petersburg State Polytechnic University (Polytech) in Russia.

As I gradually came to understand the operating system of the EIB and the EIF, discussions with my contacts on the projects of these institutions taught me to think more holistically than I had done up to then. These exchanges also fostered the desire to structure disparate reflections on higher education and research in a broad framework. May those who made this stay possible and nurtured these discussions find the expression of my gratitude here, notably Henry von Blumenthal, Guy Clausse, Jacques Darcy, Rémy Jacob, Francisco de Paula Coelho, Fulceri Bruni Roccia, Bruno Rossignol and Marjut Santoni.

I left the world of European finance in the spring of 2016 to join the world of Russian universities. I had the chance to be a Guest Professor and Senior Advisor to the Rector of Polytech, at a time when this institution was strongly developing its national visibility thanks to the 5-100 excellence

program. This stay made it possible to complete certain scientific work that had been neglected. It also provided an *in vivo* experience of Russian academic life. This was made possible through the following people, whom I would like to thank wholeheartedly: Andrei Rudskoy, Rector of Polytech, Dmitry Arseniev, his Vice-Rector in charge of international relations, Vyacheslav Shkodyrev, Tetiana Kovalenko, Elena Selivanova, Nikita Golovin, Yuri Klutchkoi, and the Polytech strategic planning office team.

More generally, I am indebted to the representatives of Russian higher education and research institutions for the countless discussions that have sharpened my understanding of the national academic system and the 5-100 excellence program. In particular, Alexander Shestakov, Rector of South Ural State University (one of the 21 universities in the program), Andrey Radionov, Vice-Rector, and Gleb Radchenko, Dean of the Faculty of Computer Science, helped me to understand the impact and importance of the Russian excellence program for their university located in an industrial region, far from Moscow and Saint Petersburg. Their insights were incomparably useful. I thank them warmly for this.

During the 2018–2019 academic year, the opportunity arose to contribute to the work of the expertise and consultancy mission (*mission expertise et conseil* – MEC) of the DGESIP[1] of the French Ministry of Higher Education, Research and Innovation. This experience has enabled me to get back in touch with the higher education and research landscape of France, and to better perceive its evolutions. I would like to thank Brigitte Plateau and Anne-Sophie Barthez, the successive Directors-General of DGESIP during this period, as well as Danièle Kerneis, Head of the MEC, and all the advisers and experts both from this structure and from the Ministry more broadly, in particular Jean Bouvier d'Yvoire. This dive into France was invigorating. It provided material for a reflection still in the making on the place of academic France in international competition, but which began to be expressed in my conferences in Toulouse (annual congress of directors of services of French universities) in June 2019, and in Paris (joint DGESIP-DGRI[2] conference of the Ministry) in November of the same year. May their organizers be warmly thanked here.

1 DGESIP: *Direction générale de l'enseignement supérieur et de l'insertion professionnelle* – Directorate general for higher education and professional integration.

2 DGRI: *Direction générale de la recherche et de l'innovation* – Research and Innovation Branch.

Thanks to my family for their help. In integrating the graphs and tables, particularly in Chapter 3 and the Appendices, my wife has taken on a dry and technical task, compensated for by the satisfaction of being at the forefront of the trends of the world's academic elite. The sharp and uncompromising gazes of my mother and aunt reduced several adventurous initiatives in syntax, grammar and spelling to nothing.

Successive versions of this work have benefited from discussions with Phil Altbach and the attentive reading of Nicolas Bernard, Jean Bouvier d'Yvoire, Pierre-Armand Michel, Virginie Mucciante, Antoine Petit, Guy Poos, Jamil Salmi, Rolf Tarrach and Hilligje van't Land. They are warmly thanked for the discussions about this text.

The opinions given here are, however, solely binding to the author. Including possible errors.

"To have another language is to possess a second soul," said Charlemagne. During a stay in Ukraine, I asked Tetiana Kuchynska, then-Head of the international relations office at the Kiev Polytechnic Institute, if she knew someone who could teach the basics of Russian to a total beginner with a brain slowed down by the weight of years. Nadiia Kravchenko, a young master's student at KPI, allowed me to take the first steps in this new language in Kiev, the cradle of Orthodox civilization and the Rus' people. Later, in Saint Petersburg, Irina Baranova, Professor and Head of the center for learning Russian as a foreign language at Polytech, patiently pursued my initiation in to the meanders of this beautiful Slavic language for nine months. A Chekhovian trilogy for a priceless gift. Tetiana entrusted me to Nadiia. Nadiia prepared me for Irina. The three of them opened the door for me to the Russian language and thus to the Russian soul. How can I thank them?

I'm at a loss for words.

1

The Origin of a Triptych

I wake to sleep, and take my waking slow.
I feel my fate in what I cannot fear.
I learn by going where I have to go.

We think by feeling. What is there to know?
I hear my being dance from ear to ear.
I wake to sleep, and take my waking slow.

Of those so close beside me, which are you?
God bless the Ground! I shall walk softly there,
And learn by going where I have to go.

Light takes the Tree; but who can tell us how?
The lowly worm climbs up a winding stair;
I wake to sleep, and take my waking slow.

Great Nature has another thing to do
To you and me; so take the lively air,
And, lovely, learn by going where to go.

This shaking keeps me steady. I should know.
What falls away is always. And is near.
I wake to sleep, and take my waking slow.
I learn by going where I have to go.

Theodore Roethke – "The Waking"
(Roethke 1966, p. 104)

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1.1. The sun is shining in Berkeley

The sun is shining in Berkeley this September 2016. The presidents, vice presidents, and representatives of some of the world's top universities, however, are not taking advantage of California's fine weather. Gathered at the World Universities Summit, they are debating the challenges of higher education and high-level research in a pleasantly air-conditioned room with the curtains firmly drawn.

At around 5 p.m., a new round-table discussion ends in the tradition of all events organized by Times Higher Education. Argumentative, consensual and without great surprise. The chairman opens the question-and-answer session. They follow one another. Argumentative, consensual and without great surprise.

Until...

A finger rises in the audience. Its owner, an American professor, speaks. His address recalled that American universities had benefited greatly from public funding during the Cold War. Referring to a book published in 1997 (Chomsky *et al*. 1997), with chapters by nine academics, he pointed out that this funding, however, had a tendency to melt like snow in the sun, as East-West political relations had warmed up. As tensions between the United States and Russia or between the United States and China return – and are likely to continue in some form or another regardless of who becomes president[1] of the United States – will history repeat itself? Will America's public universities[2] (whose direct federal resources have been in steady decline for decades) experience a new golden age and their researchers be given new levels of funding? The answer was as expected: cautious, consensus-seeking, and expressing virtuous hope for a renewal of government funding for American universities, independent of any international tension.

It is natural, however, to extend this question and the idea behind it: more generally, do the international tensions in the world have, or will they have, a global impact on universities, especially those who are global leaders[3], some of which were gathered at the Berkeley Congress? Is there a geopolitical reading of the various excellence initiatives that a number of countries have launched in recent years? Beyond the nations themselves, can we go so far as to shed light, in terms of civilizations, on the global

landscape of higher education and cutting-edge research? In other words, does the evolution of the ranking of the best universities say something about the vitality of the civilizations to which they belong? Are international rankings becoming a revealing thermometer of a geostrategy of knowledge?

These questions are, of course, so broad that it would be illusory to attempt to give a definitive answer, especially in this section, which is intended as an introductory overview.

1.2. Fukuyama versus Huntington: the revenge of civilizations in the 21st Century

Nevertheless, let us try to give an initial justification for their relevance. The question from the American professor at Berkeley first of all refers to a situation that emerged from the Cold War. This implicitly ended[4] with the fall of the USSR in 1991, thus putting an end to the "short" 20th Century that began in 1914 with the First World War.

This end was seen as a deliverance that went far beyond what was perceived as the cessation of East-West tensions. For many observers, capitalist and liberal ideology had won, and communist ideology had lost. This victory of one ideology over the other was to mark, in their view, the end of the great conflicts and open an infinite period of near-planetary peace: "the end of history", to quote Francis Fukuyama's famous prophecy[5] about the fall of the Berlin Wall in 1989.

However, as early as the summer of 1993, Samuel Huntington published an article in the *Foreign Affairs* journal entitled "The Clash of Civilizations?" (Huntington 1993). In view of the controversy generated by this article on all continents[6], the Harvard professor decided to develop his analysis of the world in a more substantial work. He would do so again three years later with his now famous 500-page book: *The Clash of Civilizations and the Remaking of the World Order* (Huntington 1996). The reasonable doubt he had in 1993 is no longer relevant in 1996: the question mark at the top of his article disappeared from the title of his book.

The very rich substance of Huntington's work goes far beyond[7] the scope of this chapter in describing the genesis of a thought. Let us content ourselves by summarizing the main message here: history is not finished with us; new conflicts of great magnitude will arise; these conflicts will no

longer be based on ideologies, but on differences of civilizations and therefore on differences of cultures. Huntington gives the following definition of civilization in the second chapter of Part I of his book:

> A civilization is thus the highest cultural grouping of people and the broadest level of cultural identity people have short of that which distinguishes humans from other species. It is defined both by common objective elements, such as language, history, religion, customs, institutions, and by subjective self-identification of people. People have levels of identity: a resident of Rome may define himself with varying degrees of intensity as a Roman, an Italian, a Catholic, a Christian, a European, a Westerner. The civilization to which he belongs is the broadest level of identification with which he strongly identifies. Civilizations are the biggest "we" within which we feel culturally at home as distinguished from all the other "thems" out there. (Huntington 1996, p. 43)

In the third chapter of Part I (Huntington 1996, pp. 56–78), he develops his argument to contest the very existence of a "universal civilization", and justifies the fact that the "bigger us" opposing all the other "them" are the civilizations he designates and defines, and that they are strict parts of all humanity. In other words, the whole of humanity certainly distinguishes man from other animal species, but does not constitute a civilization. It merely encompasses civilizations, which is already a broad agenda. Let us jump to Huntington's conclusion of this chapter:

> It would, as Braudel observes, almost "be childish" to think that modernization or "the triumph of civilization in the singular" would lead to the end of the plurality of historical cultures embodied for centuries in the world's great civilizations. Modernization, instead, strengthens those cultures and reduces the relative power of the West. In fundamental ways, the world is becoming more modern and less Western. (Huntington 1996, p. 78)

Returning to 1989 and 1991, the successive falls of the Berlin Wall, and then of the Soviet empire, did not mean the end of the conflicts. For humanity, they mark the transition from a bipolar world to a multipolar, multi-civilizational and multicultural world. More specifically, the

cartography proposed by Huntington structures the world around the following civilizations and flagship countries:

– Western civilization, whose leading country is the United States;

– Chinese civilization, whose leading country is China;

– Hindu civilization, whose leading country is India;

– Japanese civilization, whose leading country is Japan;

– Orthodox civilization, whose leading country is Russia;

– Latin America, without a leading country;

– Muslim civilization, without a leading country;

– and (if possible) the African civilization, without a leading country (Huntington 1997, pp. 51–56, including "if possible").

1.3. The role of universities in the race for global intellectual leadership

As a first approach, let us embrace Samuel Huntington's reading of the world. However, before looking at the role that universities could play in this reading grid, let us also make the nuance that Régis Debray (Debray 2017, especially pp. 20–27) makes between civilization and culture, which are too often mistaken for one another[8], our own. Let us give him the floor:

> Just as a mother tongue radiates in regional dialects, a civilization de-compartmentalizes the culture from which it comes […]. A culture builds places, a civilization builds roads. It assumes and requires a foreign policy. A civilization acts, it is offensive. A culture reacts, it is defensive. There is no civilization that does not take root in a culture, but a culture does not become a civilization without a fleet and an ambition, a great dream and a mobile force. […] 'Imperial civilizations' is a redundancy. Just as an empire is multi-ethnic, a civilization, in the prime of life, needs all the talents available and must control several cultures as enclaves, outposts or relays […]. (Debray 2017, pp. 23–24)

Let us spend a little more time on Debray's analysis[9], that "an economy alone has never made a civilization" (Op. cit., p. 26) and that "it is an

economist's myopia to measure the vitality of a civilization by the yardstick of its industry or its currency" (op. cit., p. 27). Relying on the redundancy of the expression "imperial civilizations", Debray ultimately asserts that:

> In short, supremacy is established when *the imprint survives the grip, and the grip survives the empire*. […] A civilization has won when the empire from which it proceeds no longer needs to be imperialist to make its mark. (Debray 2017, p. 27)

Debray's nuance between civilization and culture[10], and the irreducibility of the latter to a (*myopic*) purely economic vision of the world, reinforce the relevance of the question that is at the origin of the present reflection. Universities play a pivotal role in the matters of civilization, given their importance in an analysis in terms of culture and the development of armament capacity. They are a place where the transmission of universal and cultural knowledge transpires; they can be used to defend a given culture, or to promote it; they can be the instruments of "power" that can certainly remain "soft", but can also become "hard" and contribute to a cultural hegemony that Gramsci would not have denied. According to Huntington:

> The balance of power between civilizations is shifting: the West is declining in relative influence; Asian civilizations are expanding their economic, military, and political strength; Islam is exploding demographically with destabilizing consequences for Muslim countries and their neighbors; and non-Western civilizations generally are reaffirming the value of their own cultures. (Huntington 1996, p. 20)

Are some of the changes Huntington observes also measurable, at least in part, with respect to the world's top universities? Is the evolution of these university rankings an indicator of the intellectual vitality of these civilizations?

While shedding light on the global landscape of higher education and research in terms of civilizations may, at least in part, be justified by the above arguments, we choose to confine this light to the leading universities, in other words, to those that contribute to a significant production[11] of knowledge *in addition* to the transmission of that knowledge. We are, of

course, fully aware that the reality of the global higher education landscape is much more complex. Indeed, other institutions, by far the most numerous – more than 90% – transmit knowledge without producing it.

However, the latter are intent on responding to a challenge whose great complexity is already increasing day by day: mass education.

The number of students on earth is projected to double by 2025, compared to 2012 (see (Bjarnason *et al*. 2009) and (Goddard 2012); see (Maslen 2012) for a summary of the latter), to reach 262 million. Almost all of this growth will be outside Western civilization, with more than half coming from China and India (Altbach 2009).

In addition, there are calls[12] within countries or groups of countries to achieve high minimum quotas (generally above 40%) within an age group, with a higher education degree or with an equivalent level of education.

Lastly, if the countries where this growth is taking place fail to provide adequate university infrastructure at the necessary pace, it is estimated that by 2025, about 8 million students (three times as many as in 2012, and twice as many as in 2017) will go abroad[13] for their education (see (Bhandari 2009) cited in (Goddard 2012)).

These figures speak for themselves: demographic pressure[14]makes these institutions crucial and indispensable in this generation of educated and self-reliant citizens, and therefore[15], in the development of a stable and productive middle class, at least that is their purpose. The main challenge for higher education institutions is, of course, the quality of education, pedagogical innovations in this field, and their capacity to change the lives of learners[16].

This task is extremely difficult and also largely ignored by current ranking systems[17]. It is therefore with a touch of bad conscience[18], and at the cost of numerous cross-references to the (numbered) notes grouped together in the *Notes, Insertions and Tangents section* of this study (a description of the content of each of the sections of this study is given below), that we have left more than 90% of universities out of this reflection, in order to concentrate on the small portion of those with significant research activity, and among them, the even smaller portion of universities in the international rankings. For convenience, we refer to the latter indiscriminately as “leading edge” or “elite” universities. Let there be no mistake: the author thinks, says

and constantly repeats that the strategy of universities should not be based on international rankings. He is not a blissful admirer of the results of these rankings. However, it is clear that these international rankings have largely penetrated the landscape of higher education and research since 2003, and the first so-called Shanghai ranking, followed by about thirty others, including those of QS-THE (before these two organizations split and gave birth to two separate rankings) and more recently, the Leiden ranking[19]. We therefore try to take advantage of the phenomena that these rankings may reflect, regardless of how the experts feel about them[20].

With the three limits set – acceptance of Samuel Huntington's vision of the world in terms of civilizations and leading countries, Régis Debray's refinements and nuances on the fact that a civilization is more than a culture and cannot simply be reduced to an economy, and a focus on the best universities in the world as rendered by international rankings – our approach is articulated in the form of a triptych, each part of which deals, in essence, with a question in a nutshell.

1.4. Why? Where? How?

The first part of the triptych is, of course, about identification, but above all, about the role of leading universities. The first aspect of identification is "easy": international rankings have become a major tool for the graduation of leading universities. These international rankings form the thermometer that we consult. The main question of this first part of the triptych is, however, different. Indeed, the role of leading universities is not often addressed. While the answers may vary considerably from one place to another or from one period to another[21], some common features can nevertheless be identified. What are these motivations? What are these common features and their weight in academic initiatives to create world champions from leading countries? Finally, what are the missions of these leading universities? These questions will be addressed in the "why?" section. The last of these questions are considered again, but under a different aspect in the concluding chapter of the book.

The second part asks "where?". In other words, where are the best universities in the world? We propose a civilizational reading of the development of leading universities and their positioning in the context of a geostrategy of higher education and research. Our approach is different from

and complementary to the book (Hazelkorn 2015) and the collective work (Hazelkorn 2017) led by Hazelkorn, where there is a notable emphasis on case studies. We propose a unified vision in light of the world rankings of universities. We address the question of "where?" in a context that may be broader than that of a single country or, when dealing with a single country, taking it as the spearhead of a broader civilization. Our focus, at this stage, is on civilizations and their flagship countries and seeks to draw global trends. This question of "where?" is based on a careful examination of the results of international rankings for both the flagship countries of civilizations and the civilizations themselves. This section therefore focuses on a review of the methodology used by the THE, QS, Leiden and Shanghai rankings, and the results of the Top 20, Top 200 and Top 1000 of these rankings, both for flagship countries and for civilizations, over a period of about 10–15 years, depending on the rankings.

Ideally, this work should be complemented by a targeted study of universities in each of the "seven or eight major civilizations of the world" and, within them, their flagship countries, if there are any[22].

The third part, completing the triptych, should ask the question "how?", within a conceptual framework of civilization and leading countries. This is a complex task and we are only initiating it in this part of our study.

Let us describe the complexity. In contrast to the three blocs that organized the world during the Cold War (*free* world, communist bloc, and non-aligned states), seven or eight civilizations constitute Huntington's contemporary groupings of States (Huntington 1997, chapters 1 and 2). The organization of this geography has not remained without opposition. Among the protests expressed, not against this view of the world as civilizations, but against what civilizations digest and the boundaries to which they claim to adhere to according to Huntington (the first paragraph in the Appendix gives this assignment to the corresponding civilizations of the countries included in the various rankings), the strongest have come from Europe. Since Europe is also the historical cradle of universities, it is only fair to summarize the criticisms that have been expressed from the old continent.

Western civilization has two components. One is Anglo-Saxon (mainly USA, UK, Canada, New Zealand and Australia) and has English as its linguistic unit. The other component, European[23], is more linguistically

fragmented[24]. For example, for Jean-Pierre Chevènement, Huntington's proposal of a dilution of European nations into a Western bloc is questionable: "Huntington's scheme has a heuristic value: it allows us to orient ourselves, but loosely" (Chevènement 2016, p. 136). It might therefore be necessary to distinguish between Anglo-Saxon civilization and European civilization, considering the memory[25] that some nations retain, and to see France, for example, as the flagship of European civilization. However, this does not always seem to be the case. Europe increasingly seems to revolve[26] around Berlin rather than Paris.

So, is Europe a civilization apart, fundamentally different from the North American Anglo-Saxon civilization? Or has it been taken into the United States' orbit as a "junior partner", in other words, as a minor and residual component of Western civilization? Like Jean-Pierre Chevènement, Régis Debray is also critical of the reading proposed by Samuel Huntington. However, he leaves little doubt about the direction of his aforementioned work. The legendary mediologist states:

> In 1919, there was a European civilization with American culture as a variant. There is, in 2017, an American civilization, whose European cultures seem, with all their diversity, at best, adjustment variables, at worst, indigenous reserves.
>
> On a chessboard, this is called castling. On a battlefield, a defeat. (Debray 2017, p. 48)

Taking note of this castling and defeat, the United States of America, is indeed the leading country of Western civilization, including Europe. This is the view taken in this book[27] although, we allow ourselves a brief review of continental academic Europe in the concluding chapter of this book, as well as in a substantial footnote. In order of priority, it would be advisable to begin by studying the "how?" across Western civilization and the USA[28].

It is probably through Chinese civilization, and its flagship country, China, that the landscape of higher education and research should continue to be studied as a counterpoint to what is happening within Western civilization. Anticipating our conclusions, let us say that the academic center of gravity is rapidly shifting towards China and the civilization it nurtures[29]. It would then be a matter of further study into the Indian civilization and its

flagship country, India. The case of Japanese civilization is simpler, in that it coincides with Japan and does not go beyond it[30]. It would then be time to deal with the case of the Muslim civilization, Latin American civilization, the possible African civilization (remember that the term "possibly" belongs to Huntington), three (or two) civilizations without a clearly identified flagship country. Lastly, this overview would be incomplete if we omitted the Orthodox civilization and its flagship country, Russia.

The previous paragraph describes the complexity of dealing with the question "how?", for all civilizations and their flagship countries. Rather than doing nothing, given the magnitude of the task, we have chosen to do what we can. We are starting this vast program today with Russia[31], the flagship country of Orthodox civilization.

Two reasons guide our choice of analysis of the "how?" for the Russian version: the calendar[32], temporal by definition, and the immersion, spatial[33] in this case.

Firstly, Russia launched the ambitious 5-100 project in 2012, aimed at propelling five Russian universities into the top 100 in the world by 2020. By the time we write the final lines of this book, this will be on the horizon.

Secondly, our analysis is based on an in vivo experience of almost nine months during the year 2016, in one of the first universities selected by the 5-100/2020 project, and on the expertise and consulting activities that several of these Russian universities have requested since then.

In the fourth chapter of the present work, we satisfy the diktat of the Russian emergency, by dealing with the third part of the triptych – the "how?" – in the context of the flagship country of Orthodox civilization, Russia. We analyze the chances of success and the obstacles encountered by Russian institutions in their conquest of international academic summits. Lastly, we propose options for strategic choices to be made at the governmental level.

Let us now continue the description of the contents of the other parts of this book.

Practically every page of this study is filled with numbered notes. They are grouped together in the "Notes, Insertions and Tangents" section of this book. The title reflects the fact that these notes often contain much more than details. Some give a historical or literary perspective (or both); several initiate possible avenues of development (some of which are mentioned in the foreword); and others address subjects that may seem more distant from the heart of the book's subject but which, in our minds, are nevertheless linked to it in one form or another. A mathematician would say that they are related to, and positively correlated with, our concerns at the moment.

The "Appendices" section contains a certain amount of information, tables and graphs on which the different chapters are based. A "Reference" brings together the main sources used in this book.

We try to bring together the main points of emphasis of the previous chapters in Chapter 5, under the heading "Conclusion: Analysis and Perspectives". Here, we identify the main trends of our study regarding the winners of the race for global intellectual leadership, as measured by the rankings. We even risk drawing trajectories that seem probable to us. Since the universities were born in Europe, we take advantage of this section to outline the situation of continental European universities within Western civilization. They confirm – without necessarily comforting – a prophecy by Paul Valéry from a hundred years ago, recalled in this same chapter. Beyond divisions and competitions, elite universities have important responsibilities, especially in tackling difficult problems. If the question of "why?" initiates the triptych, we mutate it in this chapter into "for what?". We are indeed questioning the very mission of universities, wherever and whoever they are, and the responsibility of elite universities in particular, in the unprecedented context of population explosion, advances in robotic automation, and migrations of both technology and people.

This work does not have all the answers. It gives an angle, and identifies the dynamics of positions among the world's elite in higher education and research. We believe in the sustainability of these dynamics. We hope that this book will provide some hindsight when it comes to influencing public policy and university reforms. This hindsight is necessary so that the short time for action does not obstruct the long time for strategic thinking in this competitive sector that is crucial to the sovereignty of nations, at a time when important forces are at work and when civilizational balances that were thought to be stable are faltering.

Throughout this book, we aim to contribute to the task that Albert Camus spoke of in his speech at the reception of the Nobel Prize in 1957:

> Every generation, no doubt, believes it is destined to remake the world. Mine, however, knows it will not. Its task may be greater. It is to keep the world from falling apart. (Camus 1957, pp. 18–19)

At least, we try to do so by naming things as we see them, with all the lucidity and intellectual honesty we are capable of.

This study does not solely rely on lectures, graphs and scholarly analysis. It also draws[34] on stories, novels, plays, films, songs and pictorial works. It was not conceived in a theoretical, abstract and dry manner in the reassuring environment of an immovable office. Nomadism, quarrelling[35] and leaving the sphere of comfort are the main determining factors.

Let us begin this journey.

2

Why?

With one reform, the country of Qi could reach the level of Lu;
with one reform, Lu could reach the Way.

The Analects by Confucius (Confucius 2014, Chapter 6)

2.1. The purpose of universities

Why? At the heart of this chapter, this *existential* question constitutes the first part of the triptych, whose origin was given in the previous chapter. In the following chapters, we will address the other parts of the triptych, namely the questions "where?" and "how?". These different questions are part of the general context of the design – or even the purpose – of a geostrategy of higher education and planetary research. This design assumes prerequisites: these are what we are discussing here. More specifically, we are asking two questions[1] upstream of the academic river of leading universities:

1) What is the societal role of such institutions in extremely diverse environments?

2) What are the reasons for some nations wanting to establish such high-performing universities?

We shall see that the angle adopted to deal with the first question is largely "generic". It is therefore, to some extent, "above" a specific national context (*a fortiori* above the Russian context which, with the Berkeley conference, is at the origin of this work. The Russian context is dealt with in

Universities and Civilizations: Worldwide Academic Competition and Geopolitics,
First Edition. Franck Leprévost.

detail in Chapter 4). However, even this generic character takes shape by contextualization at the national level.

The second question seems, of course, *a priori* different in terms of its generality. Indeed, each country has its own agenda and reasons for launching such an approach. It should also be noted that, given the more or less interventionist nature of the countries concerned, not only can governments and their leaders initiate the dynamic, but so can universities themselves and their own decision-making bodies. In any case, however, what will be observed is that the range of possible reasons is, on the whole, sufficiently limited, and that equally generic trends can be identified: "some" rather than "one".

On top of these two questions, we must ask another. The irony is that it derogates from the title of this chapter, and anticipates the following ones. It is not another "why?", but a "how?". It is a pragmatic "how?", often considered largely implicit, which helps us to know "where?". Let us clarify much of what underlies this book, while noting that the next chapter, which is devoted entirely to it, will further describe the methodologies and some of the main outcomes.

2.2. International rankings and world academic elite

How is it decreed that a university has joined the world's elite? In other words, how can one objectively identify which universities are part of this elite? How is it decided that one institution is part of the elite and another is excluded? Excellence is not self-proclaimed, but measured[2]. Among the indicators, international rankings play a role, the impact of which continues to grow from year to year. Indeed:

– students (and their parents, who often fund them and are concerned about their future) see universities as stepping stones to careers and salaries, and of course want to choose reputable universities;

– professors and researchers look to them for their career development[3];

– university management teams look at them because it provides them with a decision-making aid, or a negotiating lever when it comes to deciding on collaborations with other universities;

– governments use them, for example, to set objectives for their universities in the context of excellence programs, or to decide on the allocation of scholarships for students to study abroad, only giving them if the students go to ranked universities;

– etc.

Regardless of all the above, the international rankings do not change the fact that a university must first and foremost have a coherent strategy, and that a university can play an absolutely crucial role while not appearing in the international rankings[4]. Moreover, the obsession with international rankings is accompanied by potentially damaging collateral effects, as recalled for example in the Russian context[5] by Taradina and Yudkevich (2017). In a more global context, we observe a new phenomenon (with possible excesses): the more or less implicit correlation between the income of the presidents of certain universities and the results of their institutions in national or international rankings[6].

The rankings use more or less objective criteria and indicators, with more or less full traceability. The quality of the information is more or less good, they are relatively biased towards a certain language, system, ideology or dogma[7], etc. Moreover, they inherently have the original defect of summing up the variety of contributions of the complex, protean and multidimensional activity of universities in one figure[8] – a position in a ranking. It is mathematically self-evident that projecting something that has several dimensions into a single one implies a loss of information.

In any case, and despite all this and many other criticisms, international rankings will probably continue to accompany the life of universities for many years to come. Even if a certain ranking were to lose its significance, it is very unlikely that the international rankings as such will disappear.

They are here to stay, that's the way it is. One has to deal with it.

The range of rankings itself has also grown significantly. However, only a handful of them have truly become renowned. These are essentially the QS ranking (QS n.d.), the THE ranking (THE n.d.), the so-called Leiden Ranking (CWTS Leiden Ranking n.d.), and lastly the so-called Shanghai Ranking (ARWU n.d.). It is to these four ranking organizations that the world-class universities are mainly referred to, and that we will also refer to in the next chapter.

This being said, regardless of the ranking we consider, the 20,000[9] or so listed universities on the planet are distributed in an essentially binary manner:

– on the one hand, a vast majority of institutions transmit knowledge without producing it;

– on the other hand, a small number of institutions produce and transmit knowledge.

Broadly speaking, only 1,500 to 2,000 have a significant research activity[10]. Universities capable of producing knowledge, and not information, thus represent at maximum 10% of all listed universities in the world, whereas about 1,000 universities appear in the global rankings at present. In addition to these global rankings, the rankings by scientific topics[11] should be added. However, with a few exceptions and in the right order, these rankings essentially include the same universities as those appearing in the global rankings. The rankings provide a hierarchy between institutions. The ambition of a certain number of universities, sometimes supported by national excellence programs, is to be among the top 0.5% or the top 1% (in other words, still in absolute terms of the Top 100 or the Top 200) of all universities on Earth, in light of these rankings. This hierarchy is based on essentially quantitative criteria: the number of publications per teacher-researcher, their h-index, the success rate of students and the employability of graduates, institutional and competitive research revenues, etc.

However, these quantified elements, regardless of how instructive or fragmented[12] they may be, do not answer the other crucial, yet often ignored, question, which is often left in the background of other motivations when politicians decide on such programs of academic excellence.

2.3. What is the role of a leading university?

A leading university[13] has at least four functions that distinguish it from a traditional university:

– it provides a biotope that is favorable for the emergence of knowledge;

– it deals with difficult, high-risk scientific problems;

– it attracts companies capable of cooperating with its laboratories on some of its problems;

– it prepares its students for a world that does not yet exist.

In addition, it influences the societal debates of nations, it provides scientific insights into sensitive issues requiring political action, and its members inform or even initiate discussions within the country (and beyond). In other words, a world-class university builds and shapes intellectual leadership that transcends borders and has a global impact[14].

All these missions are firmly forward-looking. However, they implicitly assume that students are aware that the world they live in has a history, that it is known to them, and that they are living their lives in a historical path that precedes them. These "prerequisites" relate to history, literature, culture and ultimately the civilization of a country. They should be self-evident, since they are largely part of what schools should transmit from kindergarten to university, in order to equip children, and then adolescents, to become part of this heritage as adults. However, this is less and less true in many countries, particularly Western countries, where, as a result of successive reforms, the mission given to schools and secondary schools is no longer the transmission of knowledge and *a fortiori* of a culture, but the fight against inequalities, which is at the price of the content of knowledge and the way in which it is transmitted[15]. It is therefore likely that leading universities will have to make an effort to make their students aware of these types of knowledge which they were deprived of in their secondary education in high schools, prior to their entry into university, and no longer consider them as an integral part of the student's background when they enter university. However, not all universities are "naturally" equipped to do this.

Indeed, universities are essentially divided into two groups: those that focus on the fields of "Science & Technology", and those that deviate. This separation ultimately corresponds to a fairly "natural" separation of things between the universal and the contingent.

On the one hand, nature provides problems and phenomena that exist independently of humanity, in other words, humans as social and political beings: biology, chemistry, mathematics, physics essentially.

On the other hand, humans raise questions that do not exist beyond the scope of our own existence: art, linguistics, economic sciences, legal sciences, political sciences, sociology, psychology, theology[16], etc., which will be grouped here under the generic term of human sciences[17].

Lastly, technological fields, such as engineering or computer science, are, however, of a hybrid structure and, in certain aspects, of ruthless Darwinism[18].

In any case, various motivations can lead a university to restrict itself to the fields of "Science & Technology" alone. An electron being the same from the Balkans to the Urals, in Tierra del Fuego or in the China Sea, it is easier to measure academic excellence in these fields, as it can only be international. A consensus of the scientific community is inevitably reached (sometimes delayed) on the universal relevance of the work. Progress in these fields is essentially incremental in nature[19]. Additionally, nations wishing to improve their international competitiveness and to densify their industrial, socio-economic or military capabilities often favor these fields to the detriment of the human sciences, whose impact is more difficult to measure, and where the notion of progress is more flexible, or even irrelevant, as is the case for art, for example.

However, there is also another reason for this keen interest in "Science & Technology": the electron is stubbornly opposed to ideology. A clarification to be well understood: scientific discoveries can certainly lead to ideologically motivated political action, sometimes with far-reaching consequences. For example, the atomic bomb was made because we understood how the atom[20] works. Its use is a political decision. However, physics, as a field of science, is by its very nature kept at a distance from political[21] or religious ideologies.

There may therefore also be a certain "comfort" for universities and researchers to focus on "Science & Technology". This comfort may be related to a survival instinct when universities are located in countries where deviating from ideology – to which the humanities are more exposed than the fields of "Science & Technology" – can lead to prison, torture or death.

While such risks in this respect are fortunately non-existent in Russia in contemporary times, to clarify matters concerning the nation that is the focus of Chapter 4, the situation is different in other countries.

Conversely, it may be perceived as wise to distil "change through example" in homeopathic doses by creating universities that are centered on "Science & Technology", and whose mode of recruitment, operation and initial successes can help to further the political regimes in place, as well as

revise certain prevailing doctrines[22]. This kind of hope, however, must be approached with realism and caution[23]. It is risky to take one's Western desires (for this is most often the case) for universal realities. Let us keep in mind the watchword of Japan at the beginning of the Meiji era: "Western technology, Japanese soul."

Ignoring the human sciences, however, does not just amount to a global impoverishment of thinking, but even of excellence in the hard sciences. Indeed, recent years have seen the growth of an interdisciplinary approach to global contemporary problems. Energy, health, the ageing of the population in the West, migration flows, world hunger, the increase in the human population, security, climate, etc. are too complex to be dealt with by a single scientific discipline. Rather, it is the holistic merging of different disciplines and the dialogue between them that makes it possible to tackle them. This is a difficult task because one has to learn the scientific language of the Other in order to converse; scientific multilingualism is still in its infancy. These disciplines, however, which are called upon to cooperate, go beyond[24] the hard sciences, and also need the human sciences. For example, the treatment and scientific approach to neurodegenerative diseases such as Parkinson's not only requires biology, computer science, physics, chemistry and mathematics, but also (without being exhaustive) gerontology, environmental sciences, law, and sociology.

This is one of the reasons why many world-class universities have a prism that goes beyond "Science & Technology" alone. And even the "X University of Science & Technology", where X is designated as a person or a place, increasingly includes cross-sectional components from the human sciences in both teaching and research, and at a very high level for leading universities.

Fortunately, therefore, it seems that the human sciences, in other words, the soft sciences, are gaining ground in the world's best universities without the hard sciences losing out.

2.4. What are the reasons for the intellectual arms race?

The role that we have assigned to leading-edge universities earlier in this chapter and the four functions that follow are essentially intrinsic. We have described the aspirations these institutions wish to adhere to – or should

adhere to. These roles and motivations are largely independent of the host country and present a somewhat idealized vision of things. However, universities are not above ground and reality is rarely ideal. At the beginning of the 21st Century, this reality is driven by the growing tension between mobility and sedentariness, between globalization and national interests[25], and between geography and history.

While leading academics are among the winners of globalization, the institutions that host them are located in specific countries with little or no mobility.

Let us clarify and nuance our proposal in three points, before going to the heart of the question emphasized in this chapter.

– *The academics, winners of globalization*: top researchers produce results that are of interest to their entire scientific community. We recalled earlier that science is largely global, so much so that the scientific community interested in particular topics is spread across the world. These researchers are therefore invited to present their work at numerous conferences around the world. In addition, the best universities in the world are, of course, inclined to attract these researchers on a permanent basis. It is therefore increasingly common for a top academic (including academic leaders) to not only have their careers in different universities, but in different countries and even continents[26].

– *New territories and spheres of influence*: some universities have decided to open campuses abroad. For example, New York University (NYU) has opened campuses in Florence (Italy), Abu Dhabi (United Arab Emirates) and Shanghai (China); the University of Groningen (Holland[27]) has opened a campus in Yantai (China), which it is struggling to close[28] by the way; the University of Nottingham (United Kingdom) has opened a campus in Ningbo (China) and another near Kuala Lumpur (Malaysia). MIT proceeds differently. It also supports the creation of campuses abroad (Singapore, Masdar near Abu Dhabi; it has also "guided" Skoltech in Russia), however, the external campuses it supports are not an integral part of its core. There are, of course, other examples. We can see that the modalities differ and correspond to different strategies. In addition to cultural acclimatization and understanding of the host countries, the difficulties of these varying models lie in the research potential that these entities are able to develop. Indeed, professors from the "parent institutions"

join these campuses for generally short periods of time to give intensive courses. Then, they return to their laboratories at the "parent institution" to continue their research. Few of them take the plunge to settle permanently on these campuses abroad. Cultural or scientific environment barriers often make it more difficult to recruit permanent staff who are capable of developing research activities at the level of those of the parent institutions. These campuses abroad (here we are mainly talking about the opening of university branches abroad, and less about the case of MIT, which accompanies the creation of campuses without this being one of its branches) are therefore there for the purpose of knowledge transmission (with substantial teaching fees, in the majority of cases; bringing funds back to the parent institution is often the main justification for their existence, even if other reasons may co-exist), but hardly for the purpose of creating local knowledge, at least in practice. However, several international ranking organizations (as we shall see in Chapter 3) do, for example, perform ratios on the number of scientific articles published per full-time equivalent teacher-researcher. External campuses contribute to the denominator but not substantially to the numerator, so they tend to have a negative impact on the scientific productivity of the institution as a whole. For these reasons, it seems unlikely to us that the model of establishing campuses abroad will become widespread among elite universities[29].

– *Sedentary universities*: for a variety of fairly clear reasons, the vast majority of universities are strongly anchored in a territory and have their activities there. That is where their campuses are, where university life takes place, and where students and teachers interact. The majority of leading universities certainly encourage the arrival of international students, and even see it as a strategic objective. However, in the end, few of them see the creation of campuses abroad as the answer to this challenge. Even those that do open campuses abroad have a mode of governance, such that the actual autonomy of the campus is modest compared to the influence of the parent institution, again for a variety of reasons. Moreover, wherever these campuses are located, whether on "original" land or on "host" land in the case of campuses abroad, academic institutions remain dependent on their geographical and political environment. In the case of campuses abroad, this phenomenon is accompanied by an elasticity between the influences of the country of departure and those of the country of arrival, without these influences disappearing. In all cases, the role of the country where the center of gravity of activities is located is predominant for obvious reasons.

It should be noted in passing that the first and third aspects – mobile academics and sedentary universities – are giving rise to an increasingly pervasive effect within elite universities: loyalty of academics to the discipline supersedes loyalty to the institution. Universities keep them as long as they can offer competitive working and living conditions. Considering, *a priori*, the loyalty of an academic to a university, or even to a group of universities in a given country, as permanent, is an increasingly naive approach. From this perspective, the DNA of the leading homo academicus is mutating. Elite universities in general are equipping themselves[30] to respond to this mutation.

These clarifications and nuances having been made, it is not surprising that universities are very dependent on the political environments and ambitions of the countries in which their academic center of gravity is located. They are therefore much more sedentary than their high-level employees. They may well have their own goals, and their own intrinsic ambitions. However, the countries in which the leading universities are located (already well placed, or whose rise in international rankings is a national ambition) also have their own agendas. These universities therefore place their action in a specific national context[31].

What, then, can be the supra-institutional agendas of the countries that look favorably on the emergence or maintenance of leading universities on their soil? In other words, we now turn to the following question.

Why do some nations want to establish such high-performing universities? Four main reasons can be identified: the desire for power, higher education as industry, the exploitation of natural resources and preparation for the next phase when these resources have dried up or are no longer as strategic, and finally, investment in knowledge, in particular when natural resources are lacking. These reasons are not mutually exclusive, as we shall see. Moreover, there are also other reasons: for example, the notion of national prestige cannot be excluded from the motivations taken into consideration. However, it is unlikely that prestige alone is a sufficient driving force to launch a policy, whereas the four reasons indicated below may be autonomous. Let us expand on these four reasons:

1) *Longing for power*: “India cannot aspire to be a world power without having a single world-class university.” These strong words (Baty 2015) were delivered in November 2015 at a conference before the rectors of

India's 114 "central institutions" by the country's then President, Pranab Mukherjee. The message is therefore that being a global world power means being an intellectual one. This reason is largely legitimized by India, as we have just seen, but also by Brazil, Russia and China (with various successes which we will return to in the following chapters, particularly in Chapter 4 for the specific case of Russia). A similar perception can be seen in some G7 members. It is not unreasonable to think that academic power is consubstantial with power *itself*, and is implicitly accepted by the USA, Canada, the United Kingdom and Japan. France is also becoming aware that the two go hand in hand, although it is lagging behind Germany[32]. Italy, however, does not seem to perceive things clearly in the same way: it does not seem, at least in practice, to establish a correlation between economic power and academic power. This being said, and even if they differ in many respects, it is relevant for us to group the BRICs[33] and most of the G7 together as largely sharing the same vision of integrating universities into a geostrategy of power. The BRICs carry human and military weight. The G7 bears military and economical weight. Europe (which we will discuss briefly in the concluding chapter, and which is also part of the substantial footnote at the end of the book) does not see itself as a unified academic power, even if European Erasmus or research programs such as the current Horizon 2020 are among Europe's finest achievements. These programs irrigate the universities of the member countries, but do not constitute a factor of unity of destiny.

2) *Higher education as an industry*: the cases of Australia, the USA and the UK are particularly enlightening. These three countries have adopted approaches that ultimately tend to come together in a beautiful Anglo-Saxon unity. The most emblematic case is probably that of Australia, which is the subject of the book (Goddard 2012). Since the launch, in 1985, of a policy allowing foreign students to join Australian universities in return for "full-cost" payment for their training, the higher education sector has become the third largest source of income in Australian foreign trade after coal and steel. By 2012, the date of publication of the above-mentioned book, there were more than 2.5 million overseas alumni, 750,000 overseas students enrolled (onshore and offshore), more than AUD 18 billion in export earnings and 120,000 jobs related to the industry. A common feature of all three countries is that they have defined themselves as both multicultural and globalizing[34]. For a variety of reasons, the internationalization of universities has been part of this dual movement, and may even have contributed to its acceleration.

3) *Exploitation of natural resources and preparation for the aftermath*: these considerations can be perceived in countries such as Kazakhstan, Saudi Arabia and other countries of the Persian Gulf. These countries are rich in natural resources, which have been strategic at the global level for decades and up to the present day. Gas, oil, precious metals or rare earths are among these. These resources are certainly abundant. However, they are not infinite. Furthermore, most countries are also seeking alternative energy sources to oil, gas or nuclear power[35]. The challenge is therefore to make the most of them while the resources are there, and to be prepared to ensure the country's prosperity when they are lacking or if they become irrelevant in the light of new scientific discoveries[36].

4) *Building on knowledge in the absence of a viable alternative*: three countries in Europe and three countries in Asia illustrate this approach very well: Luxembourg, the Netherlands, Switzerland, Korea, Hong Kong[37] and Singapore. What these countries have in common is that they are small, do not play a major political or military role in the world except as adjustment variables for powerful countries (this is the case for Korea and Hong Kong), and do not have a subsoil rich in hydrocarbons (this is a little less true for the Netherlands than for the others, however), rare earths or precious metals. However, these countries have been able to develop first-class universities (some examples are discussed in Altbach *et al*. (2018)). The number, mode of financing and models of universities in these countries differ. Political expectations may also vary. That being said, common features emerge among the hopes and objectives placed on the creation or promotion of universities in these countries. The most important of these is that the ideas they will generate will contribute to the diversification of the sources of prosperity of the countries concerned, create new jobs in innovative sectors, and create a successful industrial base or foster the emergence and strengthening of a high-level tertiary sector. Moreover, most of these small countries attract a foreign population with a very high socio-cultural level and who need efficient universities to send their children to.

Let us nevertheless bring a few caveats to this analysis with the help of a few examples (without claiming any exclusivity):

– After a certain age, everyone experiences the distance between saying and doing. Thus, the political intent expressed by the Indian president has not (yet?) led to tangible results. Similar announcements have already taken place in the past in this country, with very modest results. We must therefore

wait and see whether action will follow words. We return to this great country in Chapter 3 and in the concluding chapter.

– A number of countries have observed the success of Australia's shift to higher education as an industry. This conceptual shift[38] – from "public good" to "private investment in yourself" – then formed followers because it made people envious. The "job descriptions" of university presidents' posts in a great many countries often include the expectation (or even the requirement) to turn the university that awaits them into a cash machine via international student fees. However, the business model alone is not enough to guarantee success. One has to look beyond this to analyze the conditions necessary to attract international students who will pay the full cost. Australia is a politically stable country without major security problems. It also has specific advantages that cannot reasonably be denied when students make a choice: Melbourne, Sydney or Brisbane are among the most beautiful cities in the world; surfing, sunshine and golden beaches await you on the coast, while the (extremely vast) inland areas offer you kangaroos and the fascinating and adventurous life of Crocodile Dundee[39]. These natural advantages are not transferable everywhere. In other words, what is true for Melbourne is not necessarily true for cities in politically unstable countries, that do not have a strong academic tradition and where the beauty of the place does not immediately jump out to the uninitiated eye.

– Abundance of goods is not harmful. Disaster management does not help. Venezuela, for example, has more proven hydrocarbon reserves than Saudi Arabia. Despite this, its collapsing economy does not allow it to conceive even a small presence on the world's academic scene.

– Other countries with abundant natural resources (especially in Central Asia) are comparatively[40] well managed. However, they suffer from academic systems and university policy that are orthogonal to the emergence of world-class universities. Nonetheless, some of these countries, such as Uzbekistan[41], have become aware of these blockages and are beginning to reflect on system reforms. This awareness – however small – is a step in the right direction. Small steps must first be taken to develop a system in the best of cases, but without yet putting conditions in place to create one or more international academic champions.

These observations show that the number of reasons due to which countries promote the emergence of world-class universities is ultimately rather limited, as we have seen. Countries can be jointly guided by several of

these four reasons. No flagship country of civilizations falls under reason 4, with the possible partial exception of Japan, given its particular geography. The USA falls under reasons 1, 2 and 3. China and Russia fall under reasons 1 and 3 and much less under reason 2, at least for the time being. India falls under reason 1, but its actions do not match its words.

These disparities can be explained through the academic traditions developed over the centuries, and by the more or less directional and interventionist character of the countries' governments. These elements also weigh the responsibility of States in the emergence of world academic champions. Sometimes – provided that a number of conditions are met – the inherent dynamics of universities, in other words, the courage, intelligence and interpersonal skills of their leaders, make it possible to develop or maintain world-class institutions in countries with a low level of interventionism, as is the case in the United States. These aspects would merit detailed and focused development beyond the scope of this essay.

However, it is now time to take the global academic temperature, see where the fever is rising and make a diagnosis. But it is first necessary that one has an understanding of how a thermometer works.

3

Where?

Là-bas
Tout est neuf et tout est sauvage
Libre continent sans grillage
Ici, nos rêves sont étroits
C'est pour ça que j'irai là-bas

Excerpt from the song "*Là-bas*" by Jean-Jacques Goldman (Goldman 1987)

Translation:
Over there
Everything's new and wild
Free continent that's not fenced in
Here our dreams are cramped
That's why I'm going over there

Among the 30 or so international university rankings (leaving aside the 150 national rankings), four seem to have gained a dominant position at the global level. These "Big Four" are the rankings established by:

– Times Higher Education (which we will often abbreviate to THE);

– Quacquarelli Symonds (which we will systematically abbreviate to QS);

– CWTS (which we will also refer to as the "Leiden Ranking");

– and ARWU (which we will also refer to as the "Shanghai Ranking").

These are what we will therefore focus on[1] in this chapter. Our approach being a global one, we only consider the global rankings here, and not the thematic rankings[2], despite their obvious interest[3]. We also refer to

Universities and Civilizations: Worldwide Academic Competition and Geopolitics,
First Edition. Franck Leprévost.

Usher (2017) for a particularly interesting summary of the history of the rankings.

This chapter begins with a brief analysis of the methodology of these four main international university rankings. We do not provide a detailed comparative analysis here: excellent analyses can be found in the literature, including the remarkable report by Charpin *et al*. (2017). We provide the main indicators considered by these organizations and specify those that are fully traceable and independently verifiable, and those that are less so. We also indicate the type of institutions that are most favored according to each methodology adopted. Regardless of the ranking considered, they favor universities with significant research activity, in other words, about 5% of all universities in the world.

We continue with a closer look at the Top 20, the Top 200 and the Top 1000 (the term Top 1000 refers to all of the universities ranked, which is possibly different from 1,000 institutions, see section 3.4 and Appendix 4) ranked by THE, QS, CWTS and ARWU over the periods under consideration. Let us now provide the following clarifications.

Reference periods: this term, used frequently throughout the rest of the book, covers the periods over which we are conducting this study. They differ from one ranking body to another. They are the period 2011–2020 for THE, the period 2012–2020 for QS, the period 2011–2019 for CWTS and the period 2003–2019 for ARWU.

Rankings considered: as already mentioned, we will only consider global world rankings and not thematic rankings. In addition:

– THE, QS & ARWU: we take the results of the "Overall" ranking for THE, the "Overall score" for QS and the "Total score" for ARWU according to the "PUB" indicator;

– CWTS cautiously leaves the choice of which indicators to favor to the user. We have chosen the PP (top 10%) criterion to establish "our" ranking in the Top 20, Top 200 and Top 1000 (see the paragraph explaining the methodology in section 3.1 for the meaning of this criterion).

Points versus percentages: let us remove an ambiguity of terminology that is also often a source of miscalculation and, therefore, of

misunderstanding (this kind of misunderstanding is not limited to the framework of university rankings). Increases *of* percentages are often interpreted as increases *in* percentage while keeping the *same* percentages. It is more appropriate to speak of point increases to avoid this type of conceptual error. Let us illustrate the notion of "point" and the difference between "point" and "percentage" on an example from the THE ranking for the top 200. In the table relating to the THE top 200 ranking, which one can find a little further on, the share of "other countries" increases from 59.09% in 2011 to 65.35% in 2020. We say here that it increases by 6.26 points in the interval because 65.35 − 59.09 = 6.26. It would be wrong to say that it increases by 6.26%, since such an increase would only lead 59.09% to reach 62.79% and not 65.35%. The percentage increase is actually about 10.59%, which is much higher than 6.26%. It is thus arithmetically equivalent to say that the increase is 6.26 points or 10.59%. However, this second presentation in percentage terms, regardless of how correct it may be, requires further calculation. In short: we adopt the "point" terminology, which is compact, easy to understand and easy to handle.

Origin and quality of data: the quality of the data is, of course, paramount.

– THE ranking: we used the "excel" files provided by Duncan Ross of THE covering the 2011–2020 period. The quality of the data provided is excellent, consistent over time, and in line with what appears on the site (THE n.d.);

– ARWU (Shanghai) ranking: we used the data on the site (ARWU n.d.) and created the corresponding excel files according to the countries. The quality of the data is excellent and consistent over time;

– QS ranking: we used the data found on the site in excel file format (see the second web link of the reference (QS n.d.)). One difficulty we encountered is a lack of consistency of names over time: the names of universities are not homogeneous from one year to the next, their languages change, acute or grave accents are added, etc.;

– CWTS (Leiden) ranking: we used the excel files on the site (CWTS Leiden Ranking n.d.) in the "Downloads" section. They cover the period 2011–2019. We ranked them according to the PP (top 10%) criterion. We encountered the same type of difficulty as for QS concerning the names of universities, but in much greater proportions. This happened dozens if not hundreds of times: the files are full of them. In spite of this, we tried to do

a serious job, mostly by hand, given that the automatic methods were limited. We cannot therefore guarantee the same degree of confidence regarding the result of our work on the basis of what the Leiden rating site offers. We invite the reader to keep this in mind when the results of the Leiden ranking are presented.

We would therefore like to invite the ranking organizations to clean up their files in order to facilitate the readability and portability of their results.

Taking a low estimate of at least 20,000 universities on Earth (in reality, there are probably more), these tiers – Top 20, Top 200 and Top 1000 (as defined in sections 3.2, 3.3 and 3.4) of ranked universities – roughly measure the top 1‰ (0.1%), the top 1%, and the top 5% of all universities, respectively.

The names of the universities listed in the Top 20 of the four rankings (THE, QS, ARWU and CWTS) over the available periods are given in the Appendices section. We organize the Top 20 rankings in terms of countries and civilizations, as defined by Huntington (see Appendix 1), and make a comparative analysis of the results between the rankings.

The Top 200 and Top 1000 are approached exclusively in terms of the proportions of flagship countries[4] and civilizations, as defined by Huntington, taking into account, in the latter case[5], all the countries of a given civilization that have a university ranked, both within the same ranking (THE, QS, CWTS and ARWU) and by comparing these rankings (which are, once again, global and not thematic). Here, China means mainland China; Hong Kong, Macau and Taiwan are considered separately.

Having figures available over an already relatively significant period allows trends and dynamics to be drawn. It is these trends and dynamics that we analyze more precisely, both in terms of the leading countries of certain civilizations and the civilizations themselves.

Of course, it is essential to go beyond the individual figures and their dynamics and trends over a given period of time. We must try to understand what this means, in other words, we must try to understand the origin of the observed phenomenon and the trajectory it is taking. These aspects are dealt with in the concluding Chapter 5 of this book.

3.1. The "Big Four" and their methodologies

Before recalling the main criteria, indicators and their weight in these rankings, let us point out two differences in philosophy among the Big Four: one on the objectivity of the data, the other on "the absolute and the relative".

On the one hand, ARWU and CWTS (in other words, the Shanghai and Leiden rankings) are based on objective and traceable data[6], and require almost no action from individual institutions, as the data on which they are based are essentially public. For the most part, ARWU and CWTS rank universities without the request[7] of individual institutions.

On the other hand, while THE and QS base part of their assessment on objective and traceable data, they also base it on data provided by the universities themselves, and on confidential surveys. The ranking therefore, firstly, presupposes that the data provided by the institutions are accurate. Note that this also means that individual universities are applying[8] to be ranked by THE and QS. Secondly, confidential surveys about notoriety filled in by peers are not available. This raises the question of the real value of the information provided by these surveys, especially given that the phenomenon of an "upward reputation spiral" cannot be ruled out[9].

The second important difference lies in the relative versus absolute approach. Specifically, ARWU favors absolute numbers, which tends to favor "big" structures (and thus encourage mergers of universities, for that matter). THE and QS use ratios, and therefore weight absolute data by the size of the institution under consideration. CWTS provides both absolute and relative data. Let us review the main indicators of these rankings.

THE: uses 13 performance indicators grouped into five groups (or criteria). These five groups are "teaching" (the learning environment); "research" (volume, income and reputation); citations (research influence); international outlook (staff, students and research); and industry income (knowledge transfer). The respective weights of these indicators are given in the following table.

It should be noted that THE excludes universities from its rankings that do not teach at the undergraduate level, or whose scientific production over

five years is less than 1,000 publications, with a minimum of 150 publications/year, or if more than 80% of their scientific production is only in one of the 11 scientific fields defined by THE.

Criteria	Indicator	Weight
Teaching		**30%**
	– Reputation survey	15%
	– Staff-to-student ratio	4.5%
	– PhD-to Bachelor's ratio	2.25%
	– PhD awarded-to-academic staff ratio	6%
	– Institutional income	2.25%
Research		**30%**
	– Reputation survey	18%
	– Research income	6%
	– Research productivity	6%
Citations		**30%**
International Outlook		**7.5%**
	– Proportion of international students	2.5%
	– Proportion of international staff	2.5%
	– International collaboration	2.5%
Industry Income		**2.5%**

Table 3.1. *THE – Indicators – Weights*

Universities are asked to complete a fairly precise questionnaire, from which THE calculates most of the ratios shown in the previous table. However, THE determines the "citations" indicator from the Scopus databases. THE also fills in the reputation indicators: "reputation survey" for research and training. These indicators are very important for the final position of the universities, since their cumulative weight is 33%. As much as the values given to the other indicators used by THE are traceable and transparent, these reputation indicators are not. They are based on a questionnaire sent to about 10,000 researchers, distributed geographically and by discipline. However, the list of these researchers is not published. Secondly, this survey favors institutions whose reputation has already been established for several centuries, and not the youngest institutions[10]. The number of universities ranked by THE has increased over the years to reach 1,396 in 2020.

QS: like THE (the institutions "divorced" from one another in 2009), QS uses relative indicators and survey results. Six indicators are used:

Indicator	Weight
Academic reputation	40%
Employer reputation	10%
Faculty/student ratio	20%
Citations/faculty	20%
International faculty ratio	5%
International student ratio	5%
	100%

Table 3.2. *QS – Indicators – Weights*

"Academic reputation" is the result of a survey of 80,000 higher education and research professionals, and is subject to the same criticism as the reputation surveys conducted by THE. "Employer reputation" is similar in that it is based on approximately 40,000 responses to a confidential QS survey. The citations for the fourth criterion are taken from the Scopus database. The other figures (the number of academic staff, the proportion of international staff and the proportion of international students) are obtained directly from the universities. The number of universities classified by QS has increased over the years to reach 1,002 in 2020.

CWTS – Leiden ranking: the Leiden ranking uses exclusively bibliographic data from the Web of Science, produced by Clarivate Analytics over a number of years (e.g. 2014–2017 for the 2019 ranking). Specifically, CWTS uses data from the "Science Citation Index Expanded", the "Social Sciences Citation Index" and the "Arts & Humanities Citation Index". Publications must be of the "article" or "review" type. In particular, publications in conference proceedings and books are excluded[11]. In addition, publications must be in English[12]. CWTS also conducts the "enrichment" of data from the Web of Science, for example, by monitoring the policy of more or less free access to publications, or by determining the gender of co-authors. In line with other rankings, CWTS works to classify the data according to disciplinary thematic fields (5 in 2019).

It provides a multi-dimensional perspective on the performance of individual universities. The focus is declared to be exclusively research-oriented with indicators on scientific impact, scientific collaboration, open access publications and gender diversity. The indicators are either considered in absolute or relative terms (for example, total number of publications versus percentage of publications with a high citation index), and stability intervals are provided. For our calculations, we had to make a choice. The choice we made was the scientific impact indicator "PP (top 10%)". It measures the "proportion of the publications of a university belonging to the top 10% of their field", in other words, the proportion of a university's publications, compared to other publications in the same scientific field in the same year, that are in the top 10% most cited. The number of universities ranked by CWTS has grown over the years to reach 963 in 2019.

ARWU – Shanghai ranking: the universities considered are those with Nobel Prizes, Fields Medals, Highly Cited Researchers or articles published in *Science* and *Nature*. Universities with a significant number of articles indexed by the "Science Citation Index Expanded" (SCIE) or the "Social Science Citation Index" (SSCI) are also included. More precisely, six indicators are grouped under four criteria.

Criteria	Indicator	Weight
Quality of education	Alumni holding a Nobel Prize or Fields Medal	10%
Quality of staff	Staff members holding a Nobel Prize or Fields Medal	20%
	Highly Cited Researchers in 21 subject categories	20%
Research output	Articles published in *Nature* or *Science*	20%
	Articles indexed in the SCIE and SSCI	20%
Per capita performance	Academic performance per capita	10%
		100%

Table 3.3. *ARWU – Indicators – Weights*

The undeniable advantage of the Shanghai ranking is its transparency and complete traceability, since all indicators are clearly defined and data sources published. However, the weight given to Nobel Prize and Fields Medal holders (including among alumni) makes it difficult to rank young institutions[13]. Moreover, the first five indicators are absolute numbers. This makes it easier for "big" institutions, and encourages mergers of institutions

that can add up their Nobel Prize winners, Fields Medal holders, Highly Cited Researchers and referenced articles. The only relative indicator is the last one. It is obtained by dividing the weighted scores of the first five indicators by the number of full-time academic staff or equivalents. The number of universities ranked by ARWU has increased over the years to reach 1,000 in 2019.

The general principles of the Big Four having been explained, it is now time to take a closer look at the results of the rankings.

3.2. Analysis of the Top 20

A list of the individual universities that make up the top 20 of THE, QS, CWTS and ARWU rankings can be found in the Appendices section, and can be obtained from the data on the websites of the ranking organizations. The following tables summarize the situation, in terms of the countries that make up the top 20, for each of the four rankings, in each year of the reference period.

Countries	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Canada	1	1	1	1	1					1
Switzerland	1	1	1	1	1	1	1	1	1	1
UK	3	4	4	3	3	4	4	4	4	4
USA	15	14	14	15	15	15	15	15	15	14

Table 3.4. *Top 20 – THE*

Countries	2012	2013–2014	2014–2015	2015–2016	2016–2017	2018	2019	2020
Australia	0	0	0	1	0	1	0	0
Canada	2	1	1	0	0	0	0	0
China	0	0	0	0	0	0	1	1
Singapore	0	0	0	2	2	2	2	2
Switzerland	1	2	2	2	2	2	1	2
UK	4	6	6	5	5	4	5	5
USA	13	11	11	10	11	11	11	10

Table 3.5. *Top 20 – QS*

	2011–2012	2013	2014	2015	2016	2017	2018	2019
France	0	0	0	0	0	0	0	1
Israel	0	0	0	1	1	1	1	1
Switzerland	2	1	0	1	1	2	2	2
UK	0	0	1	2	2	2	4	4
USA	18	19	19	16	16	15	13	12

Table 3.6. *Top 20 – Leiden*

	2003	2004	2005	2006	2007	2008	2009	2010
Japan	1	1	1	1	1	1	1	1
Switzerland	0	0	0	0	0	0	0	0
UK	4	2	2	2	2	2	2	2
USA	15	17	17	17	17	17	17	17

Table 3.7. *Top 20 – Shanghai (2003–2010)*

	2011	2012	2013	2014	2015	2016	2017	2018	2019
Japan	0	1	0	0	0	1	0	0	0
Switzerland	0	0	1	1	1	1	1	1	1
UK	3	2	2	3	3	3	3	3	3
USA	17	17	17	16	16	15	16	16	16

Table 3.8. *Top 20 – Shanghai (2011–2019)*

The following table lists the universities that continuously appear in the top 20 over the entire reference period for at least one of the THE, QS, Leiden or ARWU rankings (as indicated by an “X” in the corresponding column, where appropriate).

University	Country	THE	QS	CWTS	ARWU
CalTech	USA	X	X	X	X
University of Chicago	USA	X	X	X	X
Harvard University	USA	X	X	X	X
Massachusetts Institute of Technology (MIT)	USA	X	X	X	X
Princeton University	USA	X	X	X	X
Stanford University	USA	X	X	X	X
Yale University	USA	X	X	X	X
Cornell University	USA	X	X		X
Columbia University	USA	X			X
University of California – Berkeley	USA	X		X	X
University of California – Los Angeles	USA	X			X
University of California – San Francisco	USA			X	
University of California – Santa Barbara	USA			X	
University of California – San Diego	USA				X
University of Pennsylvania	USA	X	X		X
John Hopkins University	USA	X			X
University of Washington	USA				X
University of Cambridge	UK	X	X		X
University of Oxford	UK	X	X		X
Imperial College London	UK	X	X		
University College London	UK		X		
ETH Zurich	Switzerland	X	X		
Total		**17**	**14**	**10**	**17**

Table 3.9. *Top 20 – Big Four*

Top 20 conclusion: we draw these conclusions on the basis of the previous tables, and the additional tables and graphs in the "Top 20

Rankings" section, Appendix 3. For each of the rankings considered, the top 20 is very stable over the years:

– 23 universities share the THE top 20 over the 2011–2020 period;

– 27 universities share the QS top 20 over the 2012–2020 period;

– 32 universities share the CWTS top 20 over the 2011–2019 period;

– 25 universities share the ARWU top 20 over the 2003–2019 period;

– the USA's dominance is overwhelming, with 13 USA universities continuously present during all reference periods for the top 20 of the THE ranking, 9 for QS, 10 for Leiden[14] and 15 for the Shanghai ranking;

– in addition, seven universities appear in all four rankings continuously throughout their respective reference periods. They are all from the USA;

– apart from the USA, the United Kingdom and Switzerland are the only countries to have universities ranked continuously in the top 20 for the reference period of at least one ranking organization. More specifically, Oxford and Cambridge appear continuously in the THE, QS and ARWU rankings (and were included in the CWTS rankings in 2018 and 2019), while ETH Zurich appears in the THE and QS rankings (and was included in the Leiden ranking in 2017, 2018, 2019 and has been in the ARWU rankings since 2013);

– in civilizational terms, these scores indicate a predominance of Western civilization, as the four countries represented in the THE top 20, the five countries represented in the Leiden top 20, five of the seven countries represented in the QS top 20 and three of the four countries represented in the ARWU top 20 are part of it. It should be noted, however, that Japan and the University of Tokyo toggle between appearing and disappearing in the Shanghai top 20, while China and Singapore appear (since 2019, for China, and 2015–2016 for Singapore) in the QS top 20.

Overall, depending on the year, Western civilization represents between 85 and 100% of the universities in the Top 20 rankings of THE, QS, CWTS and ARWU. The top 1‰ of all universities is therefore dominated by Western civilization, at least for the time being. This stability and near-exclusiveness of Western civilization at the top of the rankings should not, however, obscure the fundamental movements taking place in the rest of the ranking. These are very important and point to a significantly different trend,

whose effects on the Top 20 will be felt in the long-term. These are what we are now looking at.

3.3. Analysis of the Top 200

Regarding the Top 200 (*a fortiori* the Top 1000), we are no longer analyzing in terms of individual universities but, in line with our approach, giving two reading grids for each of the four rankings of THE, QS, Leiden and ARWU:

– one measures the evolution of the proportional representation of the flagship countries of civilizations in these rankings;

– the other measures the evolution of the proportional representation of civilizations in these rankings.

We refer to the Appendices section for additional tables and graphs (especially for information in terms of absolute figures, and not necessarily proportions). In the last row in the tables below, divided by ranking agency, we recall the total number of universities ranked in the Top 200 by each of these agencies. These figures may sometimes vary around 200, depending on the year and the organization. There may indeed be ties (and therefore not necessarily errors), or, unfortunately, errors in the tables of these organizations (for example, when they miscounted the ties).

The Top 200 – Flagship countries: the evolution of the proportional representation of flagship countries in the four rankings is represented as follows:

	2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
China	3.03	1.52	1.01	1.00	1.49	1.00	1.99	3.45	3.50	3.47
India	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Japan	2.53	2.53	2.51	2.50	2.49	1.00	1.00	0.99	1.00	0.99
Russia	0.00	0.00	0.00	0.00	0.50	0.50	0.50	0.49	0.50	0.50
USA	35.35	36.87	37.69	38.00	36.82	31.50	31.34	30.54	30.00	29.70
Others	59.09	59.09	58.79	58.00	58.71	66.00	65.17	64.53	65.00	65.35
TOTAL	**198**	**198**	**199**	**200**	**201**	**200**	**201**	**203**	**200**	**202**

Table 3.10. *Top 200 – THE (flagship countries by percentage)*

	2012	2013–2014	2014–2015	2015–2016	2016–2017	2018	2019	2020
China	3.57	3.54	3.52	3.54	3.55	3.57	3.48	3.47
India	0.00	0.00	0.00	0.51	0.51	1.02	1.49	1.49
Japan	5.10	4.55	5.03	4.04	4.06	4.59	4.48	4.95
Russia	0.51	0.51	0.50	0.51	0.51	0.51	0.50	0.50
USA	27.55	25.76	25.63	24.75	24.37	23.98	23.88	22.77
Others	63.27	66.16	65.33	66.67	67.01	66.33	66.17	66.83
TOTAL	**196**	**198**	**199**	**198**	**197**	**196**	**201**	**202**

Table 3.11. *Top 200 – QS (flagship countries by percentage)*

	2011–2012	2013	2014	2015	2016	2017	2018	2019
China	2.96	6.07	2.88	2.96	2.48	4.78	5.00	5.00
India	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Japan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Russia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
USA	47.78	42.99	4.3.75	42.86	44.06	41.63	41.00	40.00
Others	49.26	50.93	53.37	54.19	53.47	53.59	54.00	55.00
TOTAL (PM)	**203**	**214**	**208**	**203**	**202**	**209**	**200**	**200**

Table 3.12. *Top 200 – Leiden (flagship countries by percentage)*

	2003	2004	2005	2006	2007	2008	2009	2010
China	0.00	0.00	0.50	0.50	0.50	0.00	0.00	1.00
India	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Japan	4.50	4.48	4.46	4.50	4.46	4.50	4.50	4.50
Russia	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
USA	46.50	44.78	44.55	43.50	43.56	45.00	45.00	44.50
Others	48.50	50.25	50.00	51.00	50.99	50.00	50.00	49.50
TOTAL	**200**	**201**	**202**	**200**	**202**	**200**	**200**	**200**

Table 3.13. *Top 200 – Shanghai (flagship countries by percentage, 2003–2010)*

	2011	2012	2013	2014	2015	2016	2017	2018	2019
China	0.50	2.00	2.50	3.00	3.50	4.50	4.50	6.00	8.50
India	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Japan	4.50	4.50	4.50	4.00	3.50	3.00	3.50	3.50	3.50
Russia	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
USA	44.50	42.50	42.50	38.50	39.00	35.50	35.00	34.50	33.00
Others	50.00	50.50	50.00	54.00	53.50	56.50	56.50	55.50	54.50
TOTAL	**200**	**200**	**200**	**200**	**200**	**200**	**200**	**200**	**200**

Table 3.14. *Top 200 – Shanghai (flagship countries by percentage, 2011–2019)*

The Top 200 – Civilizations: let us not just consider the flagship countries, but civilizations as a whole, and the evolution over time of their proportional representations in the top 200s of the different rankings.

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
African	0.51	0.51	0.50	0.50	0.50	0.50	1.00	0.49	0.50	0.99
Buddhist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chinese	10.10	6.57	6.53	6.00	6.97	6.00	7.96	9.36	10.00	10.40
Hindu	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Islamic	1.52	0.00	0.00	0.50	1.99	0.00	0.00	0.00	0.00	0.00
Japanese	2.53	2.53	2.51	2.50	2.49	1.00	1.00	0.99	1.00	0.99
Latin American	0.00	0.51	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Western	85.35	89.90	89.95	90.50	8.,56	92.00	89.55	88.67	88.00	87.13
Orthodox	0.00	0.00	0.00	0.00	0.50	0.50	0.50	0.49	0.50	0.50
TOTAL	**198**	**198**	**199**	**200**	**201**	**200**	**201**	**203**	**200**	**202**

Table 3.15. *Top 200 – THE (civilizations by percentage)*

	2012	2013–2014	2014–2015	2015–2016	2016–2017	2018	2019	2020
African	0.51	0.51	0.50	0.51	0.51	0.51	0.50	0.50
Chinese	11.22	11.11	11.06	12.12	12.18	11.73	11.44	11.39
Hindu	0.00	0.00	0.00	0.51	0.51	1.02	1.49	1.49
Islamic	1.02	0.51	0.50	1.01	1.02	1.02	1.49	2.97
Japanese	5.10	4.55	5.03	4.04	4.06	4.59	4.48	4.95
Latin American	1.53	1.52	2.01	2.53	3.05	3.06	2.49	2.97
Western	80.10	81.31	80.40	78.79	78.17	77.55	77.61	75.25
Orthodox	0.51	0.51	0.50	0.51	0.51	0.51	0.50	0.50
TOTAL	**196**	**198**	**199**	**198**	**197**	**196**	**201**	**202**

Table 3.16. *Top 200 – QS (civilizations by percentage)*

	2011–2012	2013	2014	2015	2016	2017	2018	2019
African	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chinese	4.93	7.94	4.33	3.94	3.47	6.22	6.50	6.50
Hindu	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Islamic	0.00	0.00	0.00	0.49	0.50	0.48	0.50	0.50
Japanese	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Latin American	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Western	95.07	92.06	95.67	95.57	96.04	93.30	93.00	93.00
Orthodox	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	**203**	**214**	**208**	**203**	**202**	**209**	**200**	**200**

Table 3.17. *Top 200 – Leiden (civilizations by percentage)*

	2003	2004	2005	2006	2007	2008	2009	2010
African	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Buddhist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chinese	1.49	1.49	1.98	2.50	1.98	1.50	1.50	3.00
Hindu	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Islamic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Japanese	4.48	4.48	4.46	4.50	4.46	4.50	4.50	4.50
Latin American	1.00	1.00	0.99	1.50	1.49	1.50	1.50	1.50
Western	92.54	92.54	92.08	91.00	91.58	92.00	92.00	90.50
Orthodox	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
TOTAL	**201**	**201**	**202**	**200**	**202**	**200**	**200**	**200**

Table 3.18. *Top 200 – Shanghai (civilizations by percentage, 2003–2010)*

	2011	2012	2013	2014	2015	2016	2017	2018	2019
African	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Buddhist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chinese	2.50	4.50	4.50	6.00	6.50	8.50	8.00	9.50	12.00
Hindu	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Islamic	0.00	0.00	0.50	1.00	1.00	1.00	1.00	1.00	1.00
Japanese	4.50	4.50	4.50	4.00	3.50	3.00	3.50	3.50	3.50
Latin American	1.50	1.50	1.50	1.00	1.00	1.50	0.50	0.50	0.50
Western	91.00	89.00	88.50	87.50	87.50	85.50	86.50	85.00	82.50
Orthodox	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
TOTAL	**200**	**200**	**200**	**200**	**200**	**200**	**200**	**200**	**200**

Table 3.19. *Top 200 – Shanghai (civilizations by percentage, 2011–2019)*

Top 200 conclusion – weakening of the USA position & awakening of China: a first lesson from these tables is that the situation is much less stable than in the Top 20. Let us analyze things by distinguishing between flagship countries and civilizations.

In terms of flagship countries:

– the first observation is the growth of "other countries". Their progression is in the range of 3 to 6 points, depending on the ranking considered. The explanations vary according to the cases[15]. This is explained for THE (+6.26 points) by the fact that Germany goes from 10–14 universities represented to 20–23 as of the date of this study. For ARWU (+6 points), the reason is different, as there is no increase in the number of German universities. This differential is, in fact, due to the accumulation of small variations in the number of universities represented from Australia, Canada, Hong Kong and Singapore. For QS (+3.56 points), the explanation also comes from small variations in the number of universities represented in different countries. However, we note the increase in the number of universities from France, India (we will come back to this country in a moment) and Italy. For CWTS (+5.74 points), the reason is not Germany at all, as it is falling. On the contrary, growth seems to be driven by Australia, Austria and the UK;

– there has been a sharp decrease in the USA's proportion in the top 200 for all four rankings. The relative position of the USA is in constant decline with falls of between 4.78 and 13.5 points, depending on the rankings considered over the reference period. However, the USA remains relatively (but not absolutely) dominant in all rankings. It accounted for almost 30% of the institutions in THE top 200, and 23%, 33% and 40% respectively for QS, ARWU and CWTS at the end of the reference period;

– the beginning of a dynamic in China can be observed around 2014–2016. Moreover, this date plays a pivotal role in the competition between Japan and China, as it marks the overtaking of the former by the latter for the THE, CWTS and ARWU rankings. However, this is not the case for QS, since Japan, with nine universities, is still ahead of China's seven universities in 2020. For THE, if we take 2014[16] as the reference point for mainland China, the number of its universities has risen from three to seven. Of course, its relative weight is only about 3.5% in 2020, but the doubling of the number of institutions represented is nevertheless significant, especially since its two top-ranked universities, Tsinghua and Beijing University, are, in fact, very highly ranked. Indeed, these two institutions are positioned as follows at the end of the reference periods:

- Tsinghua University: 43rd for ARWU in 2019, 16th for QS in 2020, 23rd for THE in 2020 and 5th for Leiden in 2019,

- Beijing University: 53rd for ARWU in 2019, 22nd for QS in 2020, 24th for THE in 2020 and 9th for Leiden in 2019.

The progress of these two institutions is remarkable. For example, Tsinghua moves from 71st place in the THE ranking in 2012 to 23rd place in 2020, from the 201–300th range in the Shanghai ranking in 2003 to 43rd place in 2019. Beijing University (also known as Peking University) moves from 49th place in the THE ranking in 2012 to 24th place in 2020, from the 201–300th range in the Shanghai ranking in 2003 to 53rd place in 2019. The progression of these institutions is certainly not over, as is the case for the institutions known as Fudan, Zhejiang or Jiao Tong, or other upcoming universities, such as the Southern University of Science and Technology, based in Shenzhen (in mainland China, in Guangdong province, opposite Hong Kong);

– Japan has declined by losing two institutions in the ARWU top 200, from 4.5% to 3.5% of this part of the ranking over the duration of study. For THE, Japan's fall is slightly steeper, from 3% to 1% over the duration of study. The drop in percentages for QS is misleading, because the number of ranked universities in Japan actually remains unchanged[17] for QS. Japan – like Russia and India – are non-existent for CWTS;

– Lomonossov is the only university in Russia to be in the top 200 rankings of THE, QS and ARWU. Although it allows Russia to occupy 0.5% of these rankings (since 2003 for ARWU, since 2012 for QS and since 2015 for THE), Russia does not appear in the Leiden ranking;

– India is not only non-existent for CWTS, but also for THE and ARWU. It makes a timid foray in QS from 2015/2016 and increases a little in this ranking, peaking at 1.5%, with three institutions.

On a civilizational level:

– the West largely continues to dominate – this time in both relative and absolute terms – the Top 200, with a share representing between 75.25% and 93% of the universities ranked over the whole reference period, depending on the ranking considered. It even increases slightly for THE, if we take 2011 as a starting point. However, it decreases continuously in THE from its peak, reached in 2016, while still remaining above the 2011 score in 2020. It also decreases for the other rankings, with, for example, a 10-point drop in the ARWU;

– Chinese civilization is the other great power, well above all the remaining civilizations in terms of rankings at the end of the reference period: it

represents between 6.5% and 12% at the end of the reference period, depending on the ranking considered. The evolution is different for THE, QS and CWTS on the one side, and ARWU on the other. It remains at around 10–12% for both QS and THE over the reference periods. It should be noted, however, that the variation in China in THE between 2011 and 2012 did, of course, have an impact on Chinese civilization at the same time, with a fall from 10.10% to 6.57% in 2012, a stability around 6% for four years, and then a rise from 2017 onwards. It grows at a gentle slope from 4.93% to 6.5% for CWTS over the reference period. The most notable growth is in the ARWU ranking, where it rises from 1.49% in 2003 to 12% in 2019;

– Japanese civilization (which matches with Japan, the flagship country) is invisible to CWTS throughout the reference period. It appears in decline in the other three rankings, while retaining a weight of around 5% for QS and 3.5% for ARWU at the end of the reference period. It also decreases to 1% for THE at the end of the reference period. It is "overtaken" by Chinese civilization as of 2014 in the Shanghai ranking, the last ranking where it still surpassed Chinese civilization;

– the Latin American and Islamic civilizations are non-existent or almost non-existent for THE, CWTS and ARWU over all reference periods (between 0 with peaks at 1.5%); however, they both grow for QS, reaching 2.97% in 2020;

– the African, Buddhist, Hindu and Orthodox civilizations are almost non-existent (ranging from 0 to 1.5%) for all rankings over all reference periods.

3.4. Analysis of the Top 1000

Terminology: the title "Top 1000" is excessive, but practical. Excessive because the maximum number of universities ranked by THE and Shanghai has not always been 1,000.

– THE ranked a total of 198 universities in 2011 (so that this ranking coincides with the THE top 200 in that year) and increased the number of universities ranked over the years: about 400 in 2012, 800 in 2016, and gradually until it reached 1,258 institutions in 2019;

– QS increased from 795 ranked universities in 2012 to 1,021 in 2019;

– Leiden classified 500 institutions in 2011 and then increased to about 900 in 2017 and 963 in 2019;

– ARWU ranked 500 universities from 2003 to 2016 (with some fluctuations around these 500), then 800 in 2017 and 1,000 from 2018 onwards.

These oratory precautions having been taken, however, we have chosen to retain the term *Top 1000* because it conveniently indicates the direction. The reader now knows what it covers. In fact, one might say "Top All", where "all" refers to all universities ranked, knowing that this "all" converges towards the number of 1,000 over the years. However, this term is not elegant, so we will continue with the "Top 1000" in the absence of a better terminology.

Impact of the number of universities ranked in the Top 1000: we focus here on the proportions of universities of the flagship countries of civilizations, and of civilizations themselves, and refer to the Appendices section for useful supplements. The results are given in tables. The fact that THE, QS (to a lesser extent), CWTS and ARWU are ranking more and more institutions has, of course, had an impact on the real meaning of the percentages we take into account. The more universities that they rank, the more the Top 1000 says when compared to the Top 200. Indeed, it is important to distinguish the analysis of the Top 1000 from that of the Top 200, so we indicate the total number of institutions ranked in a given year by these organizations in the last row of the tables.

The Top 1000 – Flagship countries: the evolution of the representation of the universities of the flagship countries in the rankings is summarized in the following tables:

	2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
China	3.03	2.54	2.29	2.53	2.77	4.63	5.30	5.71	5.72	5.80
India	0.00	0.25	0.76	1.27	1.01	2.13	3.16	3.81	3.90	4.01
Japan	2.53	4.07	3.31	2.78	3.02	5.13	7.03	8.07	8.19	7.88
Russia	0.00	0.51	0.51	0.25	0.50	1.63	2.45	2.45	2.78	2.79
USA	35.35	26.72	26.46	26.33	26.45	18.38	15.09	14.23	13.67	12.32
Others	59.09	65.90	66.67	66.84	66.25	68.13	66.97	65.73	65.74	67.19
TOTAL	**198**	**393**	**393**	**395**	**397**	**800**	**981**	**1103**	**1258**	**1396**

Table 3.20. *Top 1000 – THE (flagship countries by percentage)*

	2012	2013–2014	2014–2015	2015–2016	2016–2017	2018	2019	2020
China	3.14	3.14	3.26	3.50	3.71	4.09	3.92	4.19
India	1.26	1.25	1.33	1.28	1.24	1.89	2.45	2.40
Japan	4.78	4.77	4.59	4.43	4.39	4.51	4.31	4.09
Russia	1.89	1.88	2.18	2.22	2.47	2.41	2.64	2.50
USA	17.99	17.94	17.41	17.85	17.32	16.68	15.57	15.67
Others	70.94	71.02	71.22	70.71	70.87	70.41	71.11	71.16
TOTAL	**795**	**797**	**827**	**857**	**889**	**953**	**1021**	**1002**

Table 3.21. *Top 1000 – QS (flagship countries by percentage)*

	2011–2012	2013	2014	2015	2016	2017	2018	2019
China	6.20	7.52	11.07	12.00	13.54	15.28	15.78	17.13
India	0.80	0.81	2.13	2.27	2.26	2.21	2.56	2.60
Japan	4.80	3.66	5.07	4.93	4.51	4.54	4.37	4.36
Russia	0.40	0.41	0.13	0.27	0.24	0.22	0.21	0.31
USA	25.40	24.80	22.13	21.07	20.55	19.60	18.66	17.96
Others	62.40	62.80	59.47	59.47	58.91	58.14	58.42	57.63
TOTAL	**500**	**492**	**750**	**750**	**842**	**903**	**938**	**963**

Table 3.22. *Top 1000 – Leiden (flagship countries by percentage)*

	2003	2004	2005	2006	2007	2008	2009	2010
China	1.80	1.59	1.60	1.80	2.75	3.58	3.59	4.40
India	0,60	0.60	0.60	0.40	0.39	0.40	0.40	0.40
Japan	7.21	7.17	6.80	6.40	6.47	6.16	6.19	5.00
Russia	0.40	0.40	0.40	0.40	0.39	0.40	0.40	0.40
USA	32.26	33.86	33.60	33.40	32.55	31.61	30.34	30.80
Others	57.72	56.37	57.00	57.60	57.45	57.85	59.08	59.00
TOTAL	**499**	**502**	**500**	**500**	**510**	**503**	**501**	**500**

Table 3.23. *Top 1000 – Shanghai (flagship countries by percentage, 2003–2010)*

	2011	2012	2013	2014	2015	2016	2017	2018	2019
China	4.60	5.60	5.60	5.60	6.40	8.20	11.38	12.30	13.20
India	0.20	0.20	0.20	0.20	0.20	0.20	0.88	1.60	1.60
Japan	4.60	4.20	4.00	4.00	3.60	3.20	4.50	4.50	4.30
Russia	0.40	0.40	0.40	0.40	0.40	0.60	0.50	1.20	1.10
USA	30.20	30.00	29.80	29.20	29.20	27.40	23.75	21.70	20.60
Others	60.00	59.60	60.00	60.60	60.20	60.40	59.00	58.70	59.20
TOTAL	**500**	**500**	**500**	**500**	**500**	**500**	**800**	**1,000**	**1,000**

Table 3.24. *Top 1000 – Shanghai (flagship countries by percentage, 2011–2019)*

The Top 1000 – Civilizations: the following tables show the civilizational evolutions according to the ranking organizations:

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
African	0.51	0.76	1.02	0.76	0.76	1.25	1.22	1.09	1.27	1.29
Buddhist	0.00	0.25	0.25	0.25	0.25	0.88	1.02	1.00	1.19	1.29
Chinese	10.10	8.40	7.63	8.35	8.82	11.75	11.52	11.88	11.45	11.68
Hindu	0.00	0.25	0.76	1.27	1.01	2.13	3.16	3.81	3.97	4.08
Islamic	1.52	1.53	1.78	2.03	2.27	5.25	7.65	8.70	10.33	12.32
Japanese	2.53	4.07	3.31	2.78	3.02	5.13	7.03	8.07	8.19	7.88
Latin American	0.00	0.76	1.02	0.76	1.01	3.50	5.20	6.07	6.92	7.23
Western	85.35	83.21	83.46	83.29	82.12	66.25	58.31	54.94	51.75	49.07
Orthodox	0.00	0.76	0.76	0.51	0.76	3.88	4.89	4.44	4.93	5.16
TOTAL	**198**	**393**	**393**	**395**	**397**	**800**	**981**	**1103**	**1258**	**1396**

Table 3.25. *Top 1000 – THE (civilizations by percentage)*

	2012	2013–2014	2014–2015	2015–2016	2016–2017	2018	2019	2020
African	0.88	0.88	0.97	1.17	1.12	1.05	0.98	0.80
Buddhist	1.13	1.13	1.09	1.05	1.01	0.94	0.88	0.90
Chinese	9.56	9.54	9.55	9.80	10.24	10.49	10.19	10.48
Hindu	1.26	1.25	1.33	1.28	1.24	1.89	2.45	2.40
Islamic	6.67	6.65	7.01	7.00	7.42	7.24	9.11	9.38
Japanese	4.78	4.77	4.59	4.43	4.39	4.51	4.31	4.09
Latin American	9.94	9.91	10.04	10.27	9.90	9.13	9.11	8.78
Western	61.01	61.10	59.98	59.63	59.17	59.50	57.30	57.88
Orthodox	4.78	4.77	5.44	5.37	5.51	5.25	5.68	5.29
TOTAL	**795**	**797**	**827**	**857**	**889**	**953**	**1,021**	**1,002**

Table 3.26. *Top 1000 – QS (civilizations by percentage)*

	2011–2012	2013	2014	2015	2016	2017	2018	2019
African	0.80	1.02	0.67	0.67	0.59	0.66	0.75	0.73
Buddhist	0.40	0.41	0.40	0.40	0.59	0.55	0.53	0.62
Chinese	12.00	13.41	16.93	18.27	19.95	21.26	21.64	22.74
Hindu	0.80	0.81	2.13	2.27	2.26	2.21	2.56	2.60
Islamic	1.20	2.64	4.80	4.93	4.87	5.54	6.40	6.85
Japanese	4.80	3.66	5.07	4.93	4.51	4.54	4.37	4.36
Latin American	2.60	3.05	2.53	2.67	2.97	3.21	3.41	3.53
Western	75.60	73.78	66.40	64.67	6.,83	60.69	59.06	57.22
Orthodox	1.80	1.22	1.07	1.20	1.43	1.33	1.28	1.35
TOTAL	**500**	**492**	**750**	**750**	**842**	**903**	**938**	**963**

Table 3.27. *Top 1000 – Leiden (civilizations by percentage)*

	2003	2004	2005	2006	2007	2008	2009	2010
African	0.80	0.80	0.80	0.80	0.78	0.60	0.60	0.60
Buddhist	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chinese	5.81	5.18	5.60	6.00	6.86	7.95	8.18	9.20
Hindu	0.60	0.60	0.60	0.40	0.39	0.40	0.40	0.40
Islamic	0.40	0.00	0.40	0.20	0.39	0.20	0.60	0.80
Japanese	7.21	7.17	6.80	6.40	6.47	6.16	6.19	5.00
Latin American	1.40	1.39	1.40	1.40	1.76	1.99	2.00	2.00
Western	82.97	84.06	83.60	84.00	82.55	81.91	81.24	81.20
Orthodox	0.80	0.80	0.80	0.80	0.78	0.80	0.80	0.80
TOTAL	**499**	**502**	**500**	**500**	**510**	**503**	**501**	**500**

Table 3.28. *Top 1000 – Shanghai (civilizations by percentage, 2003–2010)*

	2011	2012	2013	2014	2015	2016	2017	2018	2019
African	0.60	0.60	0.60	0.80	0.80	0.80	1.00	0.90	0.90
Buddhist	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.40	0.40
Chinese	9.60	10.80	11.00	11.20	11.60	13.40	17.75	18.30	18.90
Hindu	0.20	0.20	0.20	0.20	0.20	0.20	0.88	1.60	1.60
Islamic	1.20	1.40	1.60	1.80	2.00	2.20	3.50	4.90	4.70
Japanese	4.60	4.20	4.00	3.80	3.60	3.20	4.50	4.50	4.30
Latin American	2.20	2.00	2.00	2.00	2.00	1.80	3.00	3.60	3.70
Western	80.80	79.80	79.60	79.20	78.80	77.20	67.88	63.50	63.10
Orthodox	0.80	1.00	1.00	1.00	1.00	1.20	1.13	2.30	2.40
TOTAL	**500**	**500**	**500**	**500**	**500**	**500**	**800**	**1,000**	**1,000**

Table 3.29. *Top 1000 – Shanghai (civilizations by percentage, 2011–2019)*

Top 1000 conclusion – the cards are heavily reshuffled – the USA and Western civilization continue to dominate, but are in sharp decline; conversely, China and Chinese civilization are gaining strength; Japan is standing still. First of all, the increase in the number of universities in the THE, QS, Leiden and Shanghai rankings reflects the fact that rankings in general, and these four in particular, are becoming more important to both individual institutions and the governments of the countries in which they

are located. Indeed, all the universities ranked by THE and QS have applied to these organizations. It should be noted that those that do not meet certain criteria are, of course, not ranked. For CWTS and ARWU, the reasons are different, but there is ultimately a natural pressure to rank more institutions. International visibility therefore increasingly depends on these rankings.

It is worth keeping in mind that the figures of the Top 1000 say more than those of the Top 200, as the number of ranked institutions increases. It therefore seems useful to us to highlight *key dates*:

– 2015 for THE: increase from 397 to 800 ranked institutions;

– 2013 for CWTS: increase from 492 to 750 ranked institutions;

– 2016 for ARWU: increase from 500 to 800 ranked institutions.

We are not highlighting a key date for QS, as its rankings cover significant numbers of institutions from the start, in 2012. We are now analyzing figures and facts by distinguishing according to flagship countries and civilizations.

In terms of flagship countries:

– THE, QS and ARWU all show relative stability and even a slight increase in "other countries" (in other words, those that are not flagship countries of civilizations). They represent about 60–67% for THE (increasing), 70–71% (stable) for QS and 57–59% (also stable) for ARWU over the reference period. The CWTS ranking, however, indicates a different direction, from 62% to 57% over the reference period (in other words, decreasing);

– the decline in the relative position of the USA is evident for THE, CWTS and ARWU. It goes from about 35% to 12% for THE, 25% to 18% for Leiden and 32% to 20% for ARWU. The decline is less significant for QS, going from 18% to 15%. However, even though the number of ranked universities has increased, the decline remains visible for all four rankings, and very significant for three of them. When comparing the end of the reference periods with the key dates, the USA loses about 14 points for THE, and 7 points for CWTS and ARWU;

– Russia is certainly on the rise for THE, QS and ARWU, but with a peak of around 2.8% at best (THE). It decreases slightly for CWTS, remaining below 0.4%;

– India is comparable to Russia in this respect: increasing for THE, QS, ARWU and also for CWTS, but peaking at around 4% at best (THE);

– the dynamics of Russia and India do not indicate that these countries will play major roles. The increase in the representation of these countries (with culminating points that ultimately remain weak) coincides with the phases of growth in the number of classified universities (at the turn of 2015, for most of them). The situation is more contrasted as far as China and Japan are concerned;

– the rise of China is clear. For THE, it almost doubles its representation over the year (reaching 5.8% in 2020), almost triples for CWTS (reaching 17% in 2019) and multiplies it by 6 for ARWU (from 2% in 2003 to 13.2% in 2019). Only QS does not see a significant increase for this country (stable, with fluctuations around 3% to 4%). We believe that the dynamic of Chinese universities is increasing and that they will grow in the future;

– Japan is also progressing strongly for THE. Its representation almost triples (it was 8.19% in 2019, then slightly decreased to 7.88% in 2020). However, Japan has a tendency to lose ground (from 7.21% to 4.3%) for the Shanghai ranking, but remains stable (in slight decline, reaching from 4 to 5%) for the QS and Leiden rankings. To us, it seems unlikely that Japanese universities will make much progress; at best, they can hope to stay put.

On a civilizational level:

– the weakening of Western civilization is evident, with the number of universities represented in the Shanghai ranking going from 83% in 2003 to 63% over the period, with an acceleration of the fall at the key date. The same amplified phenomenon (from 85% to 49%) can be observed in the THE ranking, with the fall accelerating at the key date. The weakening is also noticeable for QS (61% to 58%) and CWTS (75% to 57%);

– conversely, the rise of Chinese civilization is clear, with a threefold increase (from 6% to 19%) in its representation in the Shanghai ranking, and a rise from 12% to nearly 23% for CWTS. It rose much more modestly from 10.1% to 11.68% for THE, and from 9.56% to 10.48% for QS;

– in civilizational terms, Japan grows for THE (rising by one point in 2019 to 8.19%, followed by 7.88% in 2020), declines for QS and CWTS, and remains stable for ARWU[18];

– Islamic civilization is progressing significantly for THE, CWTS and ARWU (multiplied by 5 over the reference periods) and also for QS (from 6% to 9%) and represents between 4.7% and 12.32% of universities at the end of the reference period. It even surpasses Chinese civilization for THE in 2020. Acceleration takes place at key dates, notably via the performances of the countries in the following table. For THE, CWTS and ARWU in this table, we note the progress in the number of institutions in the countries that are significant in one of the rankings between the key date and the end of the reference period. For the record (because the growth is lower), we indicate the performance of these countries for QS, noting the difference in progression between the beginning and the end of the reference period. The countries are ranked in order of their performance at the end of the reference period for THE:

	THE (2015–2020)	**QS**	**CWTS (2013–2019)**	**ARWU (2016–2019)**
Iran	2–40	2–6	4–26	2–13
Turkey	6–34	7–9	5–20	1–12
Egypt	0–20	5–5	1–5	1–5
Pakistan	0–14	2–7	0–2	0–4
Malaysia	0–13	7–20	2–5	3–5
Algeria	0–8	0–0	0–0	0–0
Saudi Arabia	0–7	7–7	1–4	4–4
Indonesia	0–6	8–9	0–0	0–0

Table 3.30. *Evolution of the Big Four – Islamic countries*

– Latin American civilization is progressing strongly for THE, reaching 7.23%, as well as for ARWU, reaching 3.7%. It is progressing much less for CWTS, representing 3.53% at the end of the reference period. For QS, it decreased to 8.78% at the end of the reference period.

As before, the following table is designed to identify the countries that are significant in terms of progression for THE and ARWU, and that indicate the performance of these countries, for the record, for QS and CWTS:

	THE (2015–2020)	QS	CWTS (2013–2019)	ARWU (2016–2019)
Brazil	2–46	21–19	10–23	6–23
Chile	1–18	9–11	2–3	1–5
Mexico	0–17	12–13	1–3	1–2

Table 3.31. *Evolution of the Big Four – Latin American countries*

– Orthodox civilization is progressing for THE (from 0% to just over 5%, with a rise from 0.76% to 5.16% between the key date and 2020). QS shows more moderate growth (from 4.7% to 5.3%). It remains stable for CWTS and ARWU and represents between 1% and 2.4% of universities at the end of the reference period (the key date has little impact). Overall, Orthodox civilization remains academically insignificant. Its upward capacity for movement appears to be small. Indeed, Russia is the subject of a specific analysis in Chapter 4; moreover, both Greece and Ukraine have other concerns (economic, political). Kazakhstan is certainly progressing in the QS ranking, but little to none in the others[19]. The following table shows the main sources of progress for THE, and the significant countries for QS, with impacts, as a reminder, on CWTS and ARWU:

	THE (2015–2020)	QS	CWTS (2013–2019)	ARWU (2016–2019)
Russia	2–39	15–25	2–3	3–11
Greece	1–10	6–6	3–7	2–7
Ukraine	0–6	3–6	0–0	0–0
Kazakhstan	0–2	6–10	0–0	0–0

Table 3.32. *Evolution of the Big Four – Orthodox countries*

– the Hindu civilization – which almost exactly matches with the country of India, as shown in the table in Appendix 1 – is progressing in all four rankings, with a peak position, however, of between 1.6% (for ARWU) and 4.08% (for THE), which is not very significant;

– the African and Buddhist civilizations do not play an important role in university rankings (they account for 1% each, at best) and there is no indication that they will break through in the coming years.

We can therefore see that the more universities are ranked, the less it is to the benefit of Western universities, especially universities from the USA, and the more it is to the benefit of universities in China, and, more broadly, Chinese civilization.

Among the other flagship countries, Japan (along with Japanese civilization) is standing still. A praiseworthy objective would be to maintain its rank. Indeed, this country does not currently seem to be able to progress. Russia[20] and India's progress should not hide the modesty of their current performance. Orthodox and Hindu civilizations are more or less on the same trajectory, in slight progression, and will probably reach a low plateau. However, these slight progressions are well below those of the next two civilizations.

Indeed, Islamic and Latin American civilizations are experiencing a more marked progression, mainly driven by Iran and Turkey, for the former, and by Brazil, and, to a lesser extent, by Chile and Mexico, for the latter. To comment on the dynamics of these two civilizations at the academic level would require further study.

The African and Buddhist civilizations are insignificant in terms of university rankings, and this is unlikely to change.

4

How? From Russia with 5-100

> How I would like, along with having a job, working the earth, or practicing medicine, to nurture something lasting, fundamental, to write some scholarly work or something artistic.
>
> Everyone is born a Faust, to embrace everything, experience everything, express everything. The fact that Faust was a scientist was seen to by the mistakes of his predecessors and contemporaries. A step forward in science is made by the law of repulsion, with the refutation of reigning errors and false theories. That Faust was an artist was seen to by the infectious example of his teachers. A step forward in art is made by the law of attraction, with the imitation, following, and veneration of beloved predecessors.
>
> Doctor Zhivago, *Part 9*, Varykino, VII[1]
>
> Boris Pasternak (Pasternak 2011, p. 255)
>
> "The Russians never reach their goal, because they always exceed it."
>
> Madame de Staël

4.1. The land of the Tsars, of snow and Doctor Zhivago

The land of the Tsars, of snow and Doctor Zhivago. The country of Tchaikovsky, the Bolshoi and the Mariinsky Theatre. The land of Kandinsky, the Hermitage and the Tretyakov Gallery.

Universities and Civilizations: Worldwide Academic Competition and Geopolitics,
First Edition. Franck Leprévost.

Russia is a rich country, far beyond its subsoil full of strategic natural resources. It is rich in language and culture. It is home to a prosperous people with a long, turbulent and all too often ignored or misunderstood history outside the borders of the world's largest country. However, Russia is also an academic and scientific system that had its hour of glory, before experiencing a decline, then being reborn and imposing itself in the context of academic nations, as would be required by its "flagship country of orthodox civilization" status.

Indeed, the decree signed on May 7, 2012 (President of Russia, 2012) by President Putin marks Russia's ambition to join the world's elite in higher education and research. The objective of the 5-100 program, initiated by this decree, is to place five Russian universities among the world's top 100 by 2020. This excellence program, similar to that launched by other countries both in Asia (projects 985, 211, then World Class 2.0 in China) and in Europe (e.g. Exzellenzinitiative in Germany, IDEX in France), aims to shake up the predominantly Anglo-Saxon academic supremacy (see Chapter 3 for a more detailed analysis). This chapter focuses on the 5-100 project, and its first results after eight years of existence. It also attempts to describe some of the obstacles facing the Russian academic world. Lastly, it proposes some of the options for enabling a very small number of Russian universities to truly become part of the very select club of the world's best universities, at a time when the Russian government is considering renewing this program for the 2021–2025 period. Although the focus is on Russia, a number of the analyses and leads given in this chapter seem to be valid beyond the borders of this magnificent country.

4.2. The Russian excellence initiative: the 5-100 program

How does Russia plan to build a world-class university? There are at least two aspects to this question: one intrinsic, and the other related to the Russian context.

How, intrinsically? Jamil Salmi and Philip Altbach give the recipe in their books (Salmi 2009) and (Altbach & Salmi 2011). The ingredients are a vision and the ambition to achieve it; governance that combines autonomy, flexibility, and the ability to make quick decisions while taking on the related responsibilities; massive and long-term funding; setting priorities, since it is difficult to be excellent at everything; and the ability to attract the

best talent: students, faculty and leadership. The combination of these ingredients is a common trait of the best universities in the world. Let us complement this with two elements. The first is that value does not come from years. The collective work (Altbach *et al*. 2018) shows that young universities that implement this approach achieve results quickly. The second is that this approach, which may appear conceptual, must in fact be anchored locally and nationally. This anchoring is absolutely crucial for any elite university and seems to be becoming more so.

How in Russia? The Russian answer is twofold, with two asymmetrical parts:

– Lomonosov Moscow State University and St. Petersburg State University are isolated in the Russian academic landscape. These historic Russian institutions have a dedicated budget (31.3 billion rubles in 2019 for Lomonosov, and 15.7 billion rubles in 2018 for St. Petersburg State University), and are somehow "out of contest" with respect to the following. We will not go into more detail on the functioning of these institutions, but we will mention their positions in the rankings in the same way as the universities that are part of the 5-100 excellence program (from which they are excluded), that we are talking about and which form the core of this chapter;

– the real Russian response is the 5-100 program, which we will detail. As previously stated, the aim of this program was to propel five Russian universities into the top 100 in the world by 2020. To do this, the program encouraged institutional reforms to increase research potential, produce research results and education of the highest world level, integrate innovation into higher education, and increase the internationalization of Russian universities. Unsurprisingly, these objectives are often the same as those assigned to excellence programs; Russia is no exception to the rule.

More than 50 Russian universities competed in this program, and 15 were selected in a first phase in 2013. The table below (data in italics are estimates and refer to 2020 and the total amount of resources allocated to the program over the duration, expressed in rubles. It should be noted in passing that the price of the ruble has fluctuated widely over time, ranging from 40 rubles to about 86 rubles to 1 Euro in the 2013–2019 period) gives the overall amount allocated to all selected universities since the launch of the program in 2013.

Year	Budget (rubles)	Number of universities
2013	9,000,000,000	15
2014	10,500,000,000	15
2015	10,500,000,000	15
2016	11,100,155,900	21
2017	10,634,121,900	21
2018	10,265,628,100	21
2019	10,046,879,100	21
2020	*14,500,000,000*	*21*
Total	***86,546,785,000***	***21***

Table 4.1. *Project 5-100 - Budget (source: Ministry of Science and Higher Education of the Russian Federation, 2019)*

In 2016, 21 Russian universities were able to benefit from this program, and they are spread over a gigantic territory (11 time zones out of 24) with almost 1,000 universities (to be precise, Russia had 950 universities in 2017, including 548 public universities). More precisely, the westernmost (geographically speaking) of these 21 universities is in Kaliningrad, and the easternmost (idem) is in Vladivostok. While these two cities, as well as Chelyabinsk, Kazan, Krasnoyarsk, Nizhny Novgorod, Novosibirsk, Samara, Tyumen and Ekaterinburg, only have one selected university, the situation is different in Moscow (6 universities), St. Petersburg (3 universities) and Tomsk (2 universities). More precisely, the 21 universities selected are as follows, according to the cities they belong to, in descending order of the number of institutions represented in the cities concerned, then in alphabetical order within each city. Their acronyms are also specified (they are subsequently listed):

– Moscow:

- Higher School of Economics (HSE),
- National University of Science and Technology MISIS (MISIS),
- National Research Nuclear University MEPHI (MEPhI),

- Moscow Institute of Physics and Technology (MIPT),

- I.M. Sechenov First Moscow State Medical University (Sechenov University),

- RUDN University;

– Saint Petersburg:

- ITMO University,

- Saint Petersburg Electrotechnical University "LETI" (ETU "LETI"),

- Peter the Great St. Petersburg Polytechnic University (SPBPU);

– Tomsk:

- National Research Tomsk State University (TSU),

- Tomsk Polytechnic University (TPU);

– Chelyabinsk: South Ural State University (SUSU);

– Ekaterinburg: Ural Federal University named after the first President of Russia B.N. Yeltsin (URFU);

– Kaliningrad: Immanuel Kant Baltic Federal University (IKBFU);

– Kazan: Kazan Federal University (KFU);

– Krasnoyarsk: Siberian Federal University (SIBFU);

– Nizhny Novgorod: National Research Lobachevsky University of Nizhny Novgorod (UNN);

– Novosibirsk: Novosibirsk State University (NSU);

– Samara: Samara National Research University (Samara University);

– Tyumen: University of Tyumen (UTMN);

– Vladivostok: Far Eastern Federal University (FEFU).

Apart from the year of the launch in 2013, the budget allocation is no longer evenly distributed, so universities do not all receive the same amounts, as shown in the following table. The years 2014 and 2015 reflect some turbulence and adjustments, before things become structured.

Year	Amount (rubles)	Who gets what?
2013	592,400,000	Identical for the 15
2014	950,000,000 775,000,000 600,000,000 0	3 4 7 1
2015	964,000,000 930,000,000 761,000,000 482,000,000 467,000,000 425,000,000 378,000,000 0	3 1 6 1 1 1 1 1
2016	900,000,000 511,000,000 150,000,000	7 7 7
2017	849,247,700 482,183,900 141,541,300	7 7 7
2018	808,808,100 471,804,700 134,801,300	7 7 7
2019	860,956,200 430,478,100 122,993,700	7 7 7

Table 4.2. *Project 5-100 – Budget breakdown (source: Ministry of Science and Higher Education of the Russian Federation, 2019)*

Thus, since 2016, the 21 selected universities have been divided into three groups (A, B, C) of seven universities each. Allocation via the 5-100 university program depended on the group which they belonged to[2].

The "Council on Competitiveness Enhancement of Leading Russian Universities" selected the 15 and, since 2016, the 21 Russian universities and have allocated them to groups A, B and C. This council supervises the entire procedure and bases its decisions on the recommendations made by an international council of 12 personalities. Two of them are of ministerial rank and hold the responsibilities of chairman and vice-chairman. The 10 others are leaders and managers of international universities and research structures or strategic Russian companies.

Universities are evaluated on the basis of three aspects:

– their positions in the international THE, QS and ARWU rankings: these can be global or thematic rankings[3];

– a series of indicators: mainly related to the number and quality of publications, valorization, internationalization, etc.;

– and the points of the international council: they depend as much on the content of a written report made by the universities, as on an oral presentation made by the university delegation in front of the committee, and on its capacity to convince.

These three aspects are then aggregated into a total score, which ranks the universities[4]. Each of the competing universities receives a set of personalized recommendations, and all universities receive an overall recommendation, based on the evolution of this group.

4.3. The results of the 5-100 program in 2019

The results are numerous and, globally speaking, very positive. It would be illusionary to give an exhaustive list here, so we will just give a few key facts.

Let us start with a snapshot of the situation of the 21 Russian universities in 2018–2019, following the 11th meeting of the "Council on Global Competitiveness Enhancement of Russian Universities among Global Leading Research and Education Centers", held in Kaliningrad from October 25th to 27th, 2018. The institutions are divided into the following groups (here, they are listed alphabetically within each group, not necessarily in order of performance within a given group):

– Group A: HSE, ITMO University, MEPhI, MIPT, MISIS, NSU and TSU;

– Group B: KFU, RUDN University, Sechenov University, SPbPU, TPU, University of Tyumen and UrFU;

– Group C: FEFU, IKBFU, ETU "LETI", Samara University, SibFU, SUSU and UNN.

At the international level, a certain number of these universities have indeed been able to enter the rankings, in particular the thematic rankings[5].

If we restrict ourselves to the THE, QS and ARWU rankings (those taken into account by the 5-100/2020 project), the situation of Russian universities in the 5-100/2020 excellence program is given in the following table, for the latest available years of these rankings. For the record, we also indicate the position of the State universities of Moscow and St. Petersburg in these rankings. Let us clarify how to read this table, which covers both the global rankings and the thematic rankings (but excludes other rankings such as THE's "University Impact Rankings" for example, even if Russian universities are included, as they are not taken into account by the 5-100 program):

– THE: we give the global and thematic results for 2019:

- first of all, WUR - x means that the university occupies the x position in the World University Ranking in 2019. Now, let us move on to the thematic rankings,

- CS - x gives the *mutatis mutandis* ranking in the field of "Computer Science",

- ET - x gives the ranking in the field of "Engineering and Technology",

- CH - x gives the ranking in the field of "Clinical, Pre-clinical & Health",

- LS - x gives the ranking in the field of "Life Science",

- PS - x gives the ranking in the field of "Physical Science",

- Psy - x gives the ranking in the field of "Psychology",

- AH - x gives the ranking in the field of "Art and Humanities",

- E - x gives the ranking in the field of "Education",

- L - x gives the ranking in the field of "Law",

- SS - x gives the ranking in the field of "Social Sciences",

- BE - x gives the ranking in the field of "Business and Economics";

– QS: we give the global results for 2020 and the thematic results for 2019 (these are the latest available):

- WUR - x (mutatis mutandis other rankings),

- AH - x gives the ranking in the field of "Arts and Humanities",

- ET - x gives the ranking in the field of “Engineering and Technology”,

- LSM - x gives the ranking in the field of “Life Sciences and Medicine”,

- NS - x gives the ranking in the field of “Natural Sciences”,

- SSM - x gives the ranking in the field of “Social Sciences and Management”;

– ARWU: we give the global results for 2018 and the thematic results for 2016 (these are the latest available, ranking only 200 institutions), according to the PUB criterion of scientific publications:

- WUR - x (mutatis mutandis other rankings),

- SCI - x gives the ranking in the field of “Natural Sciences and Mathematics”,

- ENG - x gives the ranking in the field of “Engineering/Technology and Computer Sciences”,

- LIFE - x gives the ranking in the field of “Life and Agriculture Science”,

- MED - x gives the ranking in the field of “Clinical Medicine and Pharmacy”,

- SOC - x gives the ranking in the field of “Social Sciences”.

University	THE	QS	ARWU
Lomonosov	WUR – 199 CS-78 ET – 151–175 CH – 301–400 LS – 126–150 PS – 96 Psy – 101–125 AH – 66 E – 151–175 SS – 301–400 BE -101–125	WUR – 84 AH – 56 ET – 57 LSM – 303 NS – 21 SSM – 68	WUR – 86 SCI – 51–75

University	THE	QS	ARWU
StP State U	WUR – 501–600 CS – 201–250 ET – 401–500 CH – 501–600 LS – 301–400 PS – 251–300 Psy – 201–250 BE – 251–300 SS – 401–500 AH – 176–200	WUR – 234 AH – 114 ET – 194 NS – 131 SSM – 166	WUR – 301–400
HSE	WUR – 301–350 CS – 301–400 ET – 601–800 PS – 401–500 Psy – 151–175 AH – 201–250 SS – 126–150 BE – 101–125	WUR – 322 AH – 153 ET – 451–500 SSM – 75	WUR – 901–1000
ITMO	WUR – 501–600 CS – 71 ET – 301–400 PS – 301–400	WUR – 436 ET – 256 NS – 379	WUR – 801–900
MEPhI	WUR – 351–400 CS – 201–250 ET – 401–500 PS – 78	WUR – 329 ET – 290 NS – 165	
MIPT	WUR – 251-300 CS – 101–125 ET – 301–400 LS – 201–250 PS – 50	WUR – 302 ET – 185 NS – 111	WUR – 401–500
MISIS	WUR 601–800 ET – 501–600 PS – 501–600	WUR – 451 ET – 273 NS – 362	WUR – 801–900

University	THE	QS	ARWU
NSU	WUR – 501–600 CS – 401–500 ET – 501–600 CH – 501–600 LS – 301–400 PS – 151-175	WUR – 231 AH – 375 ET – 182 NS – 68 SSM – 391	WUR – 401–500
TSU	WUR – 501–600 CS – 501–600 ET – 301–400 LS – 401–500 PS – 201–250 AH – 201–250 E – 301–400 SS – 401–500	WUR – 268 AH – 264 ET – 401–450 NS – 272 SSM – 388	WUR – 701–800
KFU	WUR – 601–800 CH – 501–600 LS – 501–600 PS – 301–400 AH – 201–250 E – 101–125 SS – 301–400 BE – 301–400	WUR – 392 AH – 322 NS – 401–450 SSM – 384	WUR – 801–900
RUDN	WUR – 601–800 CH – 501–600 PS – 601–800	WUR – 392 AH – 366	
Sechenov	CH – 601+ LS – 601+		
SPbPU	WUR – 601–800 CS – 301–400 ET – 401–500 PS – 301–400	WUR – 439 ET – 223 NS – 359	WUR – 901–1000
TPU	WUR – 501–600 CS – 401–500 ET – 201–250 PS – 251–300	WUR – 387 ET – 277 NS – 401-450	WUR-901–1000

University	THE	QS	ARWU
Tyumen			
UrFU	WUR – 1001+ CS – 501–600 ET – 801+ PS – 601–800 SS – 601+	WUR – 364 AH – 401–450 ET – 401–450 SSM – 451–500	WUR – 701–800
FEFU	WUR – 1,001+ ET – 801+ LS – 601+ PS – 601–800	WUR – 531–540	
IKBFU			
ETU - LETI	CS – 501–600 ET – 601–800		
Samara	WUR – 801–1,000 CS – 501–600 ET – 401–500 PS – 501–600	WUR – 651–700	
SibFU	WUR – 1,001+ ET – 801+ PS – 801+		
SUSU		WUR – 801–1,000	
UNN	WUR – 1001+ ET – 801+ PS – 601–800	WUR – 601–650 NS – 451–500	

Table 4.3. *Rankings of the Russian universities supported by the Project 5-100*

Note that Russian universities (not mentioned in the table above) other than these 21 institutions appear in these rankings and are sometimes in better positions[6]. We do not go into further detail, and simply give the following information on the total number of Russian institutions (in other words, whether or not they are part of the group of 21 universities, or of the two state universities) appearing in the global or thematic rankings. When

comparing these elements with the previous table, it can be seen that some institutions are experiencing some national competition in certain fields.

– THE: WUR – 16; CS – 16; ET – 28; CH – 7; LS – 9; PS – 26; Psy – 3; AH – 5; E – 3; L – 0; SS – 6; BE – 4.

– QS: WUR – 25; AH – 10; ET – 13; LSM – 1; NS – 13; SSM – 9.

– ARWU: WUR – 12; SCI – 1; ENG – 0; LIFE – 0; MED – 0; SOC – 0.

At this stage, while Lomonosov is among the top 100 universities in the world for the QS and Shanghai rankings (as well as for several thematic rankings of THE, QS and ARWU), the situation remains contrasted for the other universities.

This reflects a healthy evolution of the universities in the program. Let us illustrate this evolution with a few examples. The number of international publications from universities in the 5-100 group has increased by between 50% and 300%. Others have seen a rise in the number of foreign professors, such as Peter the Great St Petersburg Polytechnic University, where the number of international professors has increased tenfold compared to the situation in 2013, and the number of scientific papers tripled between 2013 and 2015. Others, such as SUSU, have began to reform their education based on Problem-Based Learning, and by implementing a development that gives priority to the quality of research productions.

A detailed study of the strategies that led to these impressive results should, of course, be carried out in order to extract the substantial marrow[7] of the results[8] stated by the universities in the 5-100 group. In any case, and even if it is appropriate to set the record straight as mentioned above, there are many other positive results related to the 5-100 program.

In the end, from the perspective of the text in the decree (President of Russia, 2012), the objective set at the outset seems to have been achieved, given that it did not initially specify what type of ranking was in question (overall or by field). Five of the Russian universities in the 5-100/2020 program now do indeed belong to the top 100 in 2018/2019/2020, at least in the thematic rankings. These are HSE, ITMO, MEPhI, MIPT and NSU.

One can even consider (in accordance with the elegant words of Madame de Staël, who is co-opening this chapter) that the goal of the program is

outdated, since several Russian universities, which did not appear in the rankings at all, are beginning to enter them, as is the case of SUSU in QS, for example.

Beyond this appearance in the rankings, the 5-100 project has, above all, led to a change in the internal approach of the institutions, a more strategic approach to their activities, and a reflection on their priorities. This is no small achievement. Those who know this country can legitimately celebrate these results.

These excellent results should not, however, obscure the difficulties facing the Russian academic system. Although the letter of the decree is satisfied, the spirit is probably not quite there yet.

4.4. Obstacles to Russian academic excellence

In addition to the global competition between the elite universities of different nations, academic Russia faces a number of intrinsic difficulties.

In the article (Altbach 2016), Phil Altbach points to the "academy of science system" on the one hand, and the separation of responsibilities for medical research and education, on the other.

The first obstacle lies in the well-established tradition of a separation of tasks, with research housed in many institutes belonging to the Academy of Sciences, whilst universities had their role centered on teaching. This system, which may have been logical at one time, is now a restraint on the emergence of elite universities where the share of research must absolutely increase. Indeed, international ranking organizations count the number of scientific articles referenced per researcher affiliated to universities. However, the researchers of the Academy of Sciences are, at best, only part-time in certain universities. There is therefore a pool of full-time researchers in academic institutes that is largely cut off from universities. Such a situation is also found in other countries, such as France (with the role of CNRS, INRIA or INSERM) or Poland (with its system of institutes linked to the Polish Academy of Sciences, which is finally closer to the Russian situation). In the first case, bridges[9] exist via common research structures. In the second case, the hurdles are not very different from the Russian case. The end of the Soviet Union was accompanied by a brain drain, and many leading researchers left the institutes of the Academy of Sciences for more

rewarding positions abroad. This Russian diaspora weakened the scientific potential of these Russian institutes, while simultaneously invigorating North American and European universities in particular, whose scientific quality has been positively affected.

The other obstacle that Altbach denounces, is that the Ministry of Health is responsible for the medical universities and the largest share of medical research, not the Ministry of Education and Science. This situation, of course, is detrimental to the overall coherence of the higher education and research system. These structural obstacles further reduce the opportunities for the development of interdisciplinary research (to which we return to a little later), while many leaders of leading universities, such as Steve Kang, President of the Korea Advanced Institute of Science and Technology (KAIST), say on the contrary, "We want to tear down all the walls between different academic disciplines so faculty can mingle together, exchange ideas" (Kang 2016).

To these two central obstacles, the consequences of which are already quite serious, there should be two others added: the first being of a legislative nature and the second being the product of the legacy of the past (the latter being in line with the subject of the previous paragraph).

The first one, from which federal universities suffer more particularly and paradoxically, even though they are among the best Russian universities, is the virtual prohibition (in the legislative sense of the term) of regional anchoring. Specifically, Russian federal universities are prohibited from receiving financial support from regional authorities. For example, it is forbidden for a federal university to obtain a chair or research contract funded by the city where it is located, so as to work on jointly defined topics: if the Peter the Great St. Petersburg Polytechnic University and the municipality of St. Petersburg wish to work together on urban planning or mathematical modeling of road traffic, this will be without funding from the city. The consequences are, of course, regrettable. Not only are these universities deprived of additional financial resources, but, above all, they cannot rely on the politico-industrial network that surrounds them, and are cut off from support that goes beyond (and includes) financial aspects alone. It is, however, very difficult to aim at the academic firmament without a deep and dense anchorage in its direct environment. To grow and progress, it is good to have your feet on the ground.

The second is dependent on the government policy of the USSR after the revolution of 1917. It was decided to multiply the number of highly specialized institutions, drawing on the universities, whose scientific prism was thus de facto reduced. These decisions at the time, created a kind of academic "salami" policy, and have two consequences that are still perceptible today. On one hand, while highly specialized universities can successfully penetrate thematic rankings, they find it much more difficult to claim global rankings. On the other hand, the aspect of interdisciplinary activity, as mentioned above, is obviously globally handicapped for these institutions.

In addition to these structural obstacles, there are a plethora of concerns equal to the number of threads needed to ground the Russian academic Gulliver. Among these, the following can be mentioned (non-exhaustive):

1) although they have been and continue to be relatively upgraded (with a target of 180% of the regional average salary in 2017, and 200% in 2018), the salaries of academics are still far from being internationally competitive. One of the consequences is that, although the 5-100 project universities have been able to attract foreign researchers for varying lengths of time per year (around a few months per year), recruiting them as full-time staff, on the basis of open and competitive competitions, remains a challenge[10]. The other consequence, apart from a brain drain to universities abroad, is that part of the academic staff develop more remunerative activities outside the university, and of course to the detriment of overall productivity of research;

2) the individual teaching tasks are enormous and do not allow enough time for research. There are three main reasons for this: as noted above, the mission of academic staff in universities is to teach full-time, and to do research in their spare time. This leads to the fact that part of the staff is actually employed at 150%: 100% as a teacher, with an additional 50% as a researcher. This Stakhanovist staff is often referred to by the enlightening semantic term "Internal Part Time", since they are considered both full-time teachers and part-time researchers within their own institutions. The additional paradox is that this overloaded situation of teaching up to 700 or even 1,000 teaching hours per year, occurs when these universities have traditionally low student-teacher ratios: usually one academic staff member for every 6 to 10 students. However, the trend, encouraged by the Ministry, is to increase this ratio in order to move towards ratios close to 1:12 or even higher. It should be noted that this trend may have negative short-term consequences on the rankings. These traditionally low ratios of Russian

universities are considered an important quality factor by the ranking organizations. Therefore, if these ratios become worse (or rather become more in line with international standards), and if progress on other indicators do not compensate, the rankings of the universities concerned will fall. The third reason for this situation, is that the organization of the teaching programs themselves is far from optimal, with a very large attendance and often very small groups of students. A reasonable pooling of certain courses would make it possible to simplify and reduce the teaching task in order to free up time for research. It is, however, remarkable to note that, despite the colossal weight of teaching in the professors' days, Russian universities have seen a significant increase in their scientific production, thanks to the support of the 5-100 program. This shows that there is highly significant potential in these 21 Russian universities, which is just waiting to be tapped into;

3) administration is a science in itself. The proliferation of meetings, reports and miscellaneous accounts is of course not conducive to the optimization of resources. Ceremonial meetings can involve anywhere between three and ten times the number of people necessary. The interpretation of responsible management of public funds leads to the production of endless supporting documents, requiring multiple buffers, whereas the total cost of various checks and verifications is likely to exceed the initial price of the thing to be checked in many cases. This administrative drift is not exclusive to Russia, of course, but this country is particularly good at it;

4) governance and leadership: the President is appointed for a five-year renewable term by the Ministry, from candidates nominated by the University's Supervisory Council. The fact that he or she is appointed, not elected, is a practice that is found in many elite universities (and others as well). In contrast, the practice in Russia is that only one candidate is nominated, so competition for such a position is hardly open in practice. However, many successful universities are conducting global searches for their future presidents. Such an approach, sometimes using "head-hunters" specializing in academic leadership, makes it possible to pick up candidates with broader international profiles and experience, who are better introduced to the circle of world-class universities[11]. Russian universities also tend to increase the number of positions of responsibility, and it is quite common for a university to have about 10 vice-presidents[12]. This tradition is probably to the detriment of efficiency in many cases, and naturally leads to potential

conflicts over responsibilities that are straddling different mandates. It is likely that a tightly knit team of competent personalities working together could have a stronger impact in many cases. Recruitment of academic staff in general can be improved. In the chapter[13] on recruitment methods in Androushchak & Yudkevich (2012), the authors point out: "Formally, all the positions are filled on a competitive basis […]. In practice, however, heads of chairs, responsible for the employment decisions, tend to offer the posts of teaching assistants and full professors to their acquaintances, both in the academe and outside, who meet the formal requirements […]. Such practice leads to widespread inbreeding" (Androushchak & Yudkevich 2012, p. 269). This tendency to recruit among one another is not a factor of quality, but quite the contrary.

4.5. Analysis and options: brain, heart and soul

The brain: the rapprochement of the academy of sciences and universities, as well as the merger between medical universities and traditional universities mentioned by Phil Altbach in (Altbach 2016) are, of course, avenues to be explored without delay. Similarly, a change in legislation allowing federal universities to also benefit from regional or municipal funding, would also be beneficial. Lastly, it would be useful to explore the possibility for a number of universities with a focus on "Science & Technology", in order to densify their activities, or even to extend their prism to the humanities[14], at least to some extent. This can be done in two ways.

The first way is to merge existing institutions with complementary scientific activities. Such a choice is natural, and clarifies the offer. However, experience shows that the "digestion" of such mergers is a very long process, very complex to implement, and requires a lot of skill and stamina. One must be prepared for the expected results to be delayed and for the international ranking to be affected over several years[15].

The second way is to progressively aggregate teams. For a development aiming at interdisciplinarity, this can be done by integrating researchers from the humanities into a university focused on "Science & Technology". In this case, small groups of people are integrated, and not large structures. This path generally comes to fruition in a shorter period of time than the merger between universities of disparate academic cultures. However, it is important

to keep a close eye on the objective, and to ensure that interdisciplinary activities do indeed emerge, if this was the original motivation.

In either of these two options, great attention must be paid to the readability of the result: the university landscape must, at the very least, be as clear afterwards as it was before. In fact, it must be even clearer. Its understanding should not require a doctorate in national university history[16].

That being said, these various measures, however desirable they may be, are primarily aimed at structural change in the overall Russian higher education system. Such changes are complex and time-consuming to implement. Moreover, their generalization (desirable for some of them) to the entire Russian academic system is hardly compatible with the development of a tailor-made framework, targeted at a few universities, and allowing them to have a global impact, as aimed by the spirit of the decree signed in 2012, by President Putin.

In a way, the same ambiguity about the objectives sought can be found in the 5-100 program itself: does one want to propel some universities to true world class, in other words, put them in the global rankings and not just in the thematic rankings? Or is there an aim to change the national system in a scope that goes beyond five institutions, or even initiate a multi-speed structuring of the Russian academic landscape?

Indeed, the question arises when, instead of concentrating resources on fewer universities, as the first objective would naturally require, the number of beneficiary universities increases from 15 to 21, with a more or less constant financial scope.

Let us open a bracket: at the time of writing, that is to say, in 2019, there is talk of relaunching an excellence program for the 2021–2025 period (Indicator.ru, 2019). The envisaged budget envelope is still unknown, but it is estimated to be around 70 billion rubles. Compared to the circa 50 billion rubles of the current program over the last five years, this is an undeniable increase in resources. However, there seems to be a plan to increase the number of selected universities to at least 30 (not necessarily including the current 21). In this case, starting from a low hypothesis of 30 winning universities, the endowments would decrease from an average of 476 million

rubles/year/university to 466 million rubles/year/university. The outcome amounts to a decrease in funding per institution on average[17].

This increase from 21 to more than 30 universities, reinforces the argument we made in the paragraph preceding the opening of this bracket, which we are closing. Let us close this bracket.

The current approach is inevitably accompanied by a dilution of efforts, but has the advantage of a wider impact on the Russian system as a whole. We return later to this aspect of scientific irrigation on the scale of the world's largest country.

There are many unknowns about the 5-100 program, starting with its sustainability and the budget envelope that will be allocated to it, although, as shown above, there are indications that this project could be pursued in a new form. 2020 is at our doorstep: is the initial phase launched in 2012 sufficient enough to create a dynamic that is capable of sustaining itself in the event that the program comes to a halt, or its financial endowment is reduced? This is unlikely, because building a world-class university requires at least 30 years of continuous effort.

Just as "Dan" reflects the stages in the rise of martial arts experts, so too does the academic progression towards global excellence. The current structure of the 5-100 program has achieved remarkable results for many universities and marks a milestone. If the goal is indeed the emergence of Russian universities among the best in the world, perhaps it is time to change the scheme for the next stage, to one where several orientations are possible and compatible with each other.

Experiences from abroad can inform the decisions to be made.

Hong Kong, Singapore, Switzerland, the Netherlands[18], Germany and, to a lesser extent, France and Luxembourg (see (Leprévost 2018) for the latter example), have seen some of their respective universities become increasingly competitive on a global scale. However, the reasons behind this progression are difficult to transpose in a Russian context. It is therefore preferable to look at what more comparable nations, in terms of size, population, resources, political, economic, or academic systems, are doing: Kazakhstan and Saudi Arabia on the one hand, and China on the other. They illustrate two possible options.

Creation of new universities – Kazakhstan and Saudi Arabia: some countries, which have a web of many universities, have taken the option of creating ex-nihilo universities of global ambition. They have endowed them with a status, funding and governance separate from the rest of the national system. This is the case, for example, of Nazarbayev University in Kazakhstan and King Abdullah University of Science and Technology (KAUST) in Saudi Arabia. The campuses of these two institutions, built rapidly (in less than 1,000 days and 1,001 nights for the KAUST campus), are equipped with state-of-the-art laboratories and equipment. Above all, they have chosen to recruit their staff internationally, including the president of the university. At the time of writing (2019), the Japanese Shigeo Katsu presides over the destiny of Nazarbayev University. The Frenchman Jean-Lou Chameau, former president of Caltech in the USA, is the founding president of KAUST. Tony Chan, former President of the Hong Kong University of Science and Technology, succeeded him in 2018. These two institutions benefit from a very important endowment, directly from the State in the case of Nazarbayev University, and via the state company Aramco in the case of KAUST. Having been created in 2010 and 2009 respectively, it is, of course, still too early to measure their international positioning. However, taking a number of complex initial conditions into account, the approach taken by these two universities seems correct and promising.

Ramping up of existing universities – China: mainland China has decided to massively support two of its universities: Tsinghua and Beijing universities. They perform very well in international rankings for their overall ranking (bearing in mind that they occupy top positions in the thematic rankings as well). At the cost of a small redundancy with the 3rd paragraph of Part 3, we think it is useful to repeat their scores:

– Tsinghua University: 45th for ARWU in 2018, 16th for QS in 2020, 22nd for THE in 2019, 5th for Leiden in 2019;

– Beijing University: 57th for ARWU in 2018, 22nd for QS in 2020, 31st for THE in 2019, 9th for Leiden in 2019.

Other Chinese universities, which were already very good to begin with, have made further progress via the Chinese excellence programs (985, 211, World Class 2.0 programs). The Chinese choice has been to favor two existing universities among all, and to retain a larger group of universities in the national excellence programs. Of course, such a policy option was

top-down at government level. Such an approach is in no way to be condemned *a priori*, all the more so as the results are there. In China.

Russia is not China. It mimics China, but with less success. Yet, like China, it also has two privileged universities, the two state universities: Moscow State University and Saint Petersburg State University. It has a set of universities with an excellence program. It has a web of hundreds of other universities, which do not benefit from the excellence program. Therefore, Russia, like China, has three levels of universities. The comparison stops there, at least for the moment, despite a proven capacity for government decision-making in Russia (to say the least). As far as the two upper levels are concerned, the situations are very different. Indeed, neither of the two Russian state universities are in the same league as Tsinghua and Beijing, and the other institutions benefiting from the 5-100 excellence program are less dynamic than their Chinese counterparts.

The heart: because of its immense space, the bipolarity between creating academic champions and the academic irrigation of the country is exacerbated in Russia, probably more than in any other country. This is *a fortiori* true on the academic level. Here, we give a list of government options that can be conceived on the "intellectual level". We will put our hearts into it (partly or totally, it depends). These options reflect the tug-of-war between a return to the (recent) past, elitism (necessarily concentrated), the academic irrigation of the country (at the potential price of a half-hearted status quo), and the assumed politics of a three-tier system (our favorite, let's say).

So, what are the government options? Which ones are desirable? What are their consequences?

Option 1: the status quo for state universities and discontinuation of the excellence program: Russia may decide to discontinue all financial support for the excellence program, regardless of its purpose. The adventure will then have just been a flash in the pan, and habits will take over. This decision will mark a return to the recent past[19] and the frustrations that will inevitably accompany it.

At the same time, Russia can continue to maintain its support for its two state universities at around the current level. These two state universities are reasonably well placed, but no more than that. They do not currently occupy

a leading position in the world, nor, indeed, do they show any sign of ambition in this direction that is perceptible internationally. A decision to discontinue the excellence program and to maintain the status quo for the state universities would not result in world-class champions, nor the building of an appropriate network of good universities nationally. This is obviously the least desirable of the scenarios, but it cannot be theoretically excluded.

Option 2: the elite and nothing else: Russia can bet massively on two or three universities and end support for the 20 or so universities currently benefiting from the 5-100 program. We will come back to what "massively" means (both in the context of Option 2 and in the context of subsequent options), and also to who these two or three winning universities might be. In this case, the system will be for a certain period of time at three speeds, then at two speeds. Indeed, the universities selected by the 5-100 program (which would not be part of the two or three winners discussed here) will continue to advance a little further at the speed achieved through the program, and will form an intermediate group between the group of two or three that truly have global ambition, and the hundreds of universities outside of the program. However, realism dictates that the difference between the second group and the third will probably gradually diminish as momentum is lost. The narrowing of this gap between the two groups will not be to the benefit of quality. The third group will not see its level rise to approach that of the second, but the opposite. The level of the majority in the second group will gradually move towards that of the third. The asymptote will once again be a two-speed system: on one hand, there will be the group of two or three world-class universities, and on the other, the group of hundreds of universities, where the aura of the 20 or so universities will gradually fade away and ultimately merge into the mass, creating an abysmal gap between the two groups. The group of the twenty or so universities, which will have benefited for a time from the 5-100 excellence program, will continue to be perceived as disparate in national terms for some time, before fading away; the perception of this difference will be much shorter internationally.

Option 3: the status quo for state universities and renewal of the excellence program: maintaining the status quo for state universities will lead to the situation already identified in Option 1, where both universities will remain reasonably positioned in international competition, but no more. They will not be true champions. On the other hand, if Russia continues to moderately support about 20 universities, like it is now, or even continues to

expand the number of beneficiaries, then it will come to a point where it will need to build a network of good universities throughout the country. It will stabilize the system it created in 2012 (subject to increasing the endowment, because dividing a near-fixed sum into an ever-increasing number of beneficiaries obviously reduces the amount of each one, and what it can do with it). The aim of the program will therefore be to respond to the important issue of the academic irrigation of the country, while favoring a moderate three-stage system. However, it will not succeed in bringing out the real world-class gems. The subject matter of the program will be different from the official one. This approach is perfectly understandable and useful, but has a high probability of only reaching its original target at a slower pace, at least in the spirit that guided the program at its inception, unless strong adjustments are made, which we will return to later.

Option 4: Elite and the academic irrigation of the country: Russia may decide to deal with both problems simultaneously: the emergence of champions on the one hand, and spatial development on the other. In other words, Russia may decide to implement a program that is adapted to the emergence of two or three world champions, and a second program aimed at making some 20 or 30 universities in the country into institutions of high international standing. Russia will then move towards a Chinese-style stratification, which will be totally assumed. There will be the group of two or three world-class universities supported by a dedicated, tailor-made program, then the group of about twenty (or more) very good universities spread across the country, and finally, the group of hundreds of other universities (which will have to be addressed one day, but that is another matter). This three-tier option is probably the most beneficial for this country in the long-term. It implies a substantial increase in the resources allocated, which we will be discussing shortly.

The probable option: we think Option 3 is going to happen. It has the advantage of not fundamentally challenging the peaceful situations of the politically well-connected state universities, while allowing for a gradual evolution of the national academic web. It is also likely, that the dedicated budget envelopes will remain of the same order, and that individual endowments to the winning universities will be reduced (especially if their number increases to around 30, without a substantial increase in the budget). The aim is then, in a nutshell, to cover spatial development policy. This seems a realistic option for stabilizing a Russian excellence program system that is still young. This choice is also likely to spur the state universities,

resting on their historical laurels, by showing them that national and international hierarchies are not fixed. This choice can finally be a step, perhaps when things have matured, to reach a higher speed. The form of the latter could take into account what we are currently describing.

The desirable option: from our perspective, Option 4, with a substantial increase in resources, is the best for Russia. It involves the creation of two separate programs, a clarification of the objectives and missions for each of them, in addition to major reforms, both in terms of legislation and governance practices. Let us address these presuppositions.

First of all, real ambition requires far greater resources than those allocated to the 5-100 program, or to state universities. The order of magnitude must be increased from billions of rubles to billions of dollars or euros, and must be built around two programs.

A first program, designed to produce two or three world champions, should concentrate very substantial funds on two or three institutions chosen *a priori*. This would therefore imply a top-down decision-making capacity on the new government's part. This approach should not pose an insurmountable problem for Russia. These universities require very strong political support. To do so, these beneficiaries must be located in strategic cities and connected to decision-makers, to the rest of the country and to the world[20]. Moscow and St. Petersburg meet these criteria in Russia. Independently of the university context, these two cities play the role of attractors for the whole of Russia. One goes to Moscow, to St. Petersburg, but does one ever leave? Realistically, no, except to go from one to the other. The choice of any other city should be weighed carefully and be accompanied by very strong measures of attractiveness. Now that we have an idea of the place, we still need to know who we are talking about. Who should these two or three institutions be? The most natural choice is to entrust these missions to the two state universities, and to choose one of the most promising institutions from Group A of the current 5-100 program. Such a decision requires a review of the mode of governance of these universities, the establishment of coherent strategies, the definition of internal and external indicators, and the establishment of professionalized monitoring.

A second program, in line with what the current 5-100 program is doing, should be initiated in order to address Russia's asymmetry problem. The attractiveness of Moscow and St. Petersburg puts forward problems for the rest of Russia. It sees the departure of so many of its brains and life forces to these two cities, without return. The academic sector is obviously not immune to this general phenomenon. It is not unreasonable to estimate that half of Russia's national potential for academic research lies in Moscow and a quarter in St. Petersburg. The rest of Russia, as a whole, shares the remaining 25%. This second program must rebalance things by taking account of regional disparities. For this, the same type of reform as the first program is needed. However, in order for it to become efficient, the distance from Moscow and St. Petersburg, for many of the universities, must be compensated for. If taking advantage of these cities is impossible in practice because of the distance, and the "lion's share" of support taken by the laureates of the first program, regional and municipal anchoring must be possible for the laureates of the second program. It is therefore essential that federal universities (which make up the bulk of the universities in the current 5-100 program) are able to benefit from regional or municipal funding. The law prohibiting them from doing so must be repealed, or at least substantially amended.

These universities must be granted a special status in comparison with other Russian universities, giving them a high degree of autonomy in the creation and abolition of teaching programs, research structures, staff recruitment and financial management, and move towards a great simplification of administrative burdens. In the absence of this type of flexibility, as Saul Perlmutter, Nobel Prize winner in Physics, recalled in the conference given at Berkeley in September 2016 (mentioned in Chapter 1), "you can be very good at not wasting money and also very good at not making any discoveries".

In addition to the recommendations of Phil Altbach, to which we adhere, here are our own recommendations summarized below, as a result of the reflections above [21]:

– creation of two amply funded programs with different purposes;

– the first program aims to strongly endow and transform the two state universities (Moscow State University and St. Petersburg State University), and one university selected from Group A of the current 5-100 program, into

world champions, with the potential to enter the top 50 in the overall rankings of THE, QS and ARWU within 10 years;

– the second program aims to develop the national academic territory by providing 20 to 30 selected universities with substantial funding, with a concern for regional balance. The individual endowments brought by this second program to these institutions, must be able to represent up to 25% of their budgets outside the program, and come as a supplement (and obviously not as a substitute). All of them should be able to isolate 5% of their standard budget (meaning excluding the budget from the excellence program) for innovative projects, and to strengthen the attractiveness of their institutions to post-docs and confirmed researchers of international standing. A third of these universities must be able to enter the Top 200 of the world's best universities for at least one of the global rankings of THE, QS and ARWU within 10 years;

– legislation prohibiting federal universities from benefiting from regional or municipal funds must be repealed, without reducing federal endowments to universities.

In our opinion, this is the price that Russia has to pay in order to be able to lay claim to true world class, shake up a hierarchy under Anglo-Saxon domination for its current leading group and penetrate the top 200 universities in the world on a long-term basis, while China deploys a legitimately greedy ambition (we refer to Chapter 3 for a finer analysis of who is dominating and who is emerging).

The soul: a delicate question inevitably arises for any institution outside the naturally Anglo-Saxon sphere, and therefore, *a fortiori* for Russian universities: in which language will one teach? In what language will one speak to the other? English offers undeniable advantages in academic context, which would be useless to detail here[22]. These advantages have led many universities around the world to adopt English as their sole language. However, we are talking about Russia. We are talking about a country that is privileged to have a superb language, spoken by more than 300 million people in the world. There is no reason for Russian universities to give up the language of their country *a priori*, quite the contrary.

We advocate the skillful implementation of bilingualism between Russian and English. The coexistence of different languages is certainly complex. However, if deftly conducted, such a decision should not penalize these

institutions but, on the contrary, raise their profile. This choice is also a signal: international openness does not mean the loss of identity, at least for Russia. The issues at stake go beyond the mere framework of innovation or performance. They are also an issue of civilization. For Russia, this challenge is expressed through its language.

These universities, with a dedicated program, must attract talent from wherever it comes: from Russia (this country is not short of outstanding researchers), but also from elsewhere. Such an international recruitment must be done without any kind of a "hunting ground", including top leadership. The general state of mind must tend towards that which Thomas Rosenbaum spoke of[23] at the Asia University Summit 2016 of THE:

> When people ask me what my job is as president of Caltech, I say it's to maintain a culture where people dream; that they want to come to Caltech; that they believe it's the place where they can realize their dreams; and we have the resources – physical, financial, intellectual – to make those dreams come true.

However, while academic excellence is necessary, and even if it reaches the levels Thomas Rosenbaum suggests, it is not enough. Newcomers must gradually lose their identity as "outsiders". They need to understand that they are working on a project that goes far beyond their personal careers. They should not see themselves as being "lost in translation" in one place, or even worse, "in transit" between two places that are important in their professional lives. Rather, they should fully appreciate that part of success lies in the effort to understand their host country, and their willingness to do so as much as possible. This challenge is not presented in the same terms, depending on whether a country has adopted a (possibly allegedly) multicultural model or whether it rightly claims a cultural identity of its own, such as Russia. In other words, it is important to attract talent from all over the world (not only students and teachers, but also leadership), but it is also essential to anchor this talent locally. Like any country with this kind of ambition for global academic excellence, Russia does not need mercenaries from the academic stratosphere, however talented they may be. On the contrary, Russia needs personalities ready to join and nurture a project for several years of their lives; one that is both national in its commitment and global in its impact.

In other words, beyond the brain, the heart and soul must also accept the gift of the culture, history and language of the land of the Tsars, the snow and Doctor Zhivago. The "outsiders" themselves will be surprised to find, шаг за шагом[24], the conviction of the Austrian writer Rainer Maria Rilke emerging and growing within them: "That my homeland is Russia is one of the great and mysterious certainties I live by."

5

Conclusion: Analysis and Perspectives

If a man take no thought about what is distant,
he will find sorrow near at hand.

Confucius – The Analects (15:11) (2014)

Let us outline what we wish to cover in the final stretch of this book, while strongly encouraging the reader to continue their efforts by consulting "Notes, Insertions and Tangents", at the end of the book. First of all, we draw lessons from the analyses made in Chapter 3, as well as explain the reasons for them, and even risk drawing trajectories for both the flagship countries of civilizations and for the civilizations themselves. Europe – particularly its continental part – plays a very special role in the global academic context. We have not yet addressed it as such in this book: it is time to do so, even if we only touch upon it here. Lastly, the world is confronted with a multitude of problems which are all calls to universities, wherever they come from. Some are directed primarily at elite universities. We will not, of course, deal with all of these problems here (some are mentioned in Chapter 2). A choice has to be made, if only to keep this book short enough to be read. We propose just one, which we believe is also at the heart of the missions of elite universities, wherever they may be.

We will address these different points by again calling on writers. They have two merits: they are often excellent analysts of the phenomena, and their books convey pleasure and/or (the "or" is non-exclusive) irritation to the author of this current book. The analysis and perspectives of this conclusion owe much to them, so much so that one of them will have the last word.

Universities and Civilizations: Worldwide Academic Competition and Geopolitics,
First Edition. Franck Leprévost.

5.1. Winners of the race for global academic leadership

Chapter 3 provided proportional trends for flagship countries and civilizations across all rankings:

– USA's and Western civilization's dominance over time in the top 20 of the world ranking, with very stable institutions present. A total of 25 institutions have been sharing the top 20 places since 2003, all rankings combined, and 7 American institutions have been in the top 20 continuously since the beginning, all rankings combined;

– the USA dominates the Top 200 and the Top 1000. However, the USA is experiencing a sharp eroding of its position, particularly since 2015/2016. Western civilization is following a parallel path;

– India's non-existence and Russia's near non-existence in the Top 200, and weak growth of these countries in the Top 1000, with a modest role. In Chapter 4, we provide ideas on how to improve the situation of Russian universities. The 5-100 excellence program, as it stands, cannot do everything. It is currently torn between global excellence for two or three institutions and the development of national academic territory;

– Hindu and Orthodox civilizations follow a path parallel to the trajectories of India and Russia, in other words, non-existence or near non-existence in the Top 200, and a modest presence in the Top 1000;

– African and Buddhist civilizations are almost non-existent in both the Top 200 and the Top 1000;

– Latin American and Islamic civilizations are non-existent or almost non-existent in the Top 200. On the other hand, they are making significant progress in the Top 1000, thanks to the performances of Brazil, Chile and Mexico for the former, and Iran, Turkey, Egypt, Pakistan, Malaysia and Saudi Arabia, primarily, for the latter;

– Japan, which occasionally has an institution in the Top 20, is slightly losing ground in the Top 200 and was overtaken by China around 2014/2016. In the Top 1000, the relative position of Japan increases for THE and decreases for all the others. Japanese civilization follows a parallel path;

– China (and its civilization) is progressing substantially in the Top 200 and in the Top 1000. Its national strategy and excellence programs (211, 985, WorldClass 2.0, etc.) are bearing fruit. Not only are the Beijing and Tsinghua universities making substantial progress, but others such as

SUSTech are also actively progressing. Universities in Hong Kong have also made strong progress in recent years. The strategy, initiated in Hong Kong and taken up in mainland China, is simple: attract the best brains (especially those of the Chinese academic diaspora) by providing them with remuneration and working conditions that are highly competitive worldwide, and carry out a strict selection of students in these universities. The period when Western universities would offer training and market in China is probably coming to an end. The opposite is happening.

Given the dynamics of the rankings, can we predict the evolution in the next 10–15 years? To predict with certainty is, of course, impossible. Universities are dependent on a local, national and global environment that affects their functioning. At the national level, countries may review their strategies, economic crises may affect some countries more than others, and conflicts may arise and have an impact.

This type of impact is not necessarily negative as far as universities are concerned, since the US university system experienced a golden age during the Cold War, as recalled in the question put to Berkeley at the beginning of this book (see Chapter 1). In view of the recent growing tensions between the USA and China (which was indeed predicted by Huntington in his book), one may legitimately wonder about the parallelism between what the USA did for its universities at the time of the Cold War with the Soviet bloc, and what China is currently doing for its universities at a time of increased – and lasting – tensions between itself and the USA.

Prognosis: having taken all these precautions, let us risk a prognosis, however crude, in which we include the conclusions of the next paragraph on the situation in Europe. Measured by university rankings, we believe that China will pull away from the rest, that its civilization will increase its capacity for intellectual dominance (as measured not only by university rankings, incidentally), that Western dominance will continue to decline to the benefit of Chinese civilization, and that other leading countries and civilizations will, at best, only play a secondary role[1].

Specifically, by focusing on flagship countries:

– it is not unreasonable to think, in view of the numbers and their dynamics, that China will be able to place one or even two (Tsinghua University and Beijing University) of its universities in the Top 20 within the next 15 years in the rankings of QS, THE and ARWU (three of the Big Four),

and that SUSTech will experience very strong growth and also join the top 100 for several of these rankings, competing with Hong Kong universities across the bay (this type of competition can also lead to an increase in the competitiveness of Hong Kong universities, especially the still young[2] Hong Kong University of Science and Technology);

– the greatest degree of uncertainty concerns Japan. It is extremely difficult to anticipate how academic Japan will evolve. Although not very open to the international scene, its culture and the sense of national pride of its citizens make it an academically strong country. It is unlikely, however, that even Japan's academic elite will be able to hold out against China in the long run. Currently better placed than the best Chinese universities, Tokyo University and Kyoto University will have to work hard to maintain their standing against the three mainland Chinese institutions mentioned above, in addition to those in Hong Kong;

– past high-level initiatives and rhetoric in India are unlikely to enhance the credibility of current efforts. There has been a lot of talk and little action in the past. We are pessimistic about India's ability to take and implement the right decisions to make significant progress;

– Russia has not taken all the steps to enter the court of great academics. It is unlikely that the two state universities (Lomonosov and Saint Petersburg State University) will make any progress (they are, instead, likely to fall in the rankings). The other institutions are not really equipped for global competition, unless substantial measures, such as those proposed in Chapter 4, are put in place;

– the USA's position will continue to dominate the Top 20 but will also continue to weaken in the Top 200 and Top 1000, mainly to the benefit of China. Can the Western surge come from continental Europe? We are not optimistic, for reasons that are discussed in the following section.

5.2. Europe – Paul Valéry's anticipation

We have not covered Europe thus far as our primary concern has been with civilizations and their flagship countries, and we have made the observations and regrets of Régis Debray our own: the United States, and not Europe, is the driving force of Western civilization. However, we could not end this book without touching on Europe, the cradle of universities and

academic knowledge. The first difficulty is to clarify what we mean by Europe, given there is no official evidence[3] on the subject. We have cautiously announced that we will only touch lightly on the subject of Europe at this stage: this precaution means that we do not need to give a precise definition[4]. We will therefore only cover part of it, while remaining guided by the international rankings of universities.

The short study that follows is based mainly on the data found in the Appendices, in particular the section dedicated to Continental and Western Europe (abbreviated as CWE in the following), in other words, the group of countries that are part of both Western civilization and Continental Europe.

The following table shows the number of CWE countries included in the Top 200 and Top 1000 rankings, at some point during the reference period.

	THE	QS	CWTS	ARWU
CWE – Top 200	13	12	10	12
CWE – Top 1000	23	22	21	23

Table 5.1. *Rankings of universities belonging to CWE countries*

Top 200 and Continental and Western Europe: CWE is remarkably stable. More specifically, over the reference period of the different rankings, it grew from 25.76% to 33.17% of the THE top 200 (thanks to Germany's rise), and remained stable for the other rankings. It thus varies between 26.02% and 28.22% for QS (with slight growth through small positive variations from France and Italy); between 27.59% and 25.50% for CWTS (with a decrease from Germany); and hovers around 28% for ARWU. So, even if the USA falls in the Top 200 – leading to a decline in the share of Western civilization in most rankings – Continental and Western Europe, overall, will maintain its ranking.

Top 1000 and Continental and Western Europe: CWE is also fairly stable in this part of the ranking, although it is impacted by the increase in the number of universities ranked over the reference period of the different rankings. Notably, CWE hovers around 30% when THE ranks around 400 institutions, then decreases to 23.07% when THE ranks 1,396 institutions. For QS, CWE remains globally stable at around 25%. For CWTS, CWE

decreases continuously from 33.60% to 27.21%. Finally, for ARWU, CWE remains stable at around 31%, as long as ARWU classifies 500 institutions, then also remains stable at around 28% when ARWU classifies 800–1,000 institutions.

This relative stability of Continental and Western European countries in the Top 200 and Top 1000 reflects aggregated data. It is, we are aware, still pretty rough. Indeed, it is natural to want to find out more about certain countries, by further disaggregating what the rankings for individual countries reflect. Such a development would require an entire chapter; we are therefore not doing it in full at this stage. However, we do develop some fairly consistent initial elements in an insertion[5] focusing on six countries: Belgium, France, Germany, Holland and Switzerland, compared with the United Kingdom, a country that follows a different university model from the one predominantly used in Continental Europe. This insertion also contains a brief development on the idea of a European university and the specific case of France.

Conclusion on Europe: for the time being, CWE is holding up fairly well. As can be seen in the insertion mentioned above, universities in the western countries of Continental Europe are, however, faring much worse than their counterparts in the United Kingdom, with the exception of Switzerland and Holland, in particular. Germany is beginning to do well but France is slow, despite the fact that its universities, supported by joint teams with research organizations (CNRS, INRIA, INSERM), (still) have a large pool of talented researchers. Among the reasons for this, which are of course numerous and the result of a long history, it seems to us that governance of French universities is the most urgent issue to be addressed. It is also the most difficult.

We close[6] this European (and French) door by recalling a century-old thought of a French poet. Two letters (Valéry 1919) addressed to the Athenaeum in 1919 summarize Paul Valéry's vision of the "crisis of the mind" and the evolution of civilizations, which he reminds us that "we now know that they are mortal". He anticipated the mercantile evolution of knowledge, the mobility of this "commodity" and the impact of these phenomena on the decline of European supremacy[7]. In Valéry's historical context, the "castling" between Europe and the United States that Debray spoke of has not yet taken place: Europe is still the dominant Western force. Valéry's speech can be understood as a warning, both about the change in

the center of gravity between Europe and the USA, as far as Western civilization is concerned, and between Western civilization and the others. In any case, Europe has lost out. Thus, in his second letter, dated May 2, 1919, Valéry states:

> I was arguing that the inequality that has existed so long in favor of Europe was bound by its own effects to change progressively into an inequality of a contrary kind. I called this by the ambitious name of a fundamental theorem. […] I take the same example, the geometry of the Greeks, and I ask the reader to consider through the ages the effects of this discipline. […] Modern science is the product of this education in the grand style. But once produced, once tried and rewarded by its material applications, our science, become a means of power, a means of concrete domination, a stimulant of wealth, an instrument for exploiting the planetary riches, ceases to be an end in itself and an artistic activity. Knowledge, which was a value in itself, becomes an exchange value. The utility of knowledge makes knowledge a commodity, desired no longer by a few very distinguished amateurs, but by Everybody.
>
> This commodity, then, will be prepared in forms more and more manageable or comestible; it will be distributed to a more and more numerous clientele; it will become an article of commerce, an article of export, one that is imitated and produced to some extent everywhere.
>
> […] Thus the balance which inclined to our side, although we appeared the lighter, begins to lift us gently again, as though we had foolishly passed the mysterious aid which was with us into the other scale. We have stupidly made the forces again proportional to the masses. (Valéry 1919, p. 280)

5.3. Universities for what? Automation, demographics and flow

Paul Valéry's Europe prefigures the contemporary world. In this context, what is the purpose of universities today? In particular, are there challenges that transcend the differences between countries and civilizations, while at

the same time being a shared responsibility of universities, especially elite universities?

One role of "elite" universities is to deal with difficult problems. Defining what is a difficult problem is… difficult. And unstable. It is easier to give a list that is valid for a given period of time, while being careful about the expiration date. Most research funding agencies provide and refine this list of difficult problems, on which they focus their financial resources and investment programs over time. While they differ from country to country, the differences are often not that great. Many of the difficult problems are large-scale and often global. This list certainly includes energy, pollution and environmental issues, health, etc. In a less universal way (while concerning a large part of humanity anyway), there are also problems of population ageing and personalized medicine, security of information systems, etc. Others could be added, detailed and justified without any concern[8]. All of these problems are legitimate and our aim is in no way to undermine their relevance.

Here, we propose adding one more to this already long list. We have selected it for the following reasons:

– it questions the missions of universities;

– it questions the responsibility of elite universities;

– it questions all societal models, especially those of Western countries and China;

– it is, after all, very little studied.

This issue not only concerns the impact on the employability of graduates but also on the very notion of employment, from the convergence of automation[9] and demography, in an era of technological mobility and mass migration.

More precisely, human beings – students or not – are caught between two forces whose pressure increases day after day:

– *on the one hand, the automation of tasks*: the combination of machines, artificial intelligence and self-learning methods in these systems[10] means that machines replace humans for a set of tasks that are not only repetitive but predictable. The prism of activities that can be automated

continues to grow; the possession of diplomas is no longer a guarantee of employment, nor is it a protection;

– *on the other hand, demographics*: the world population has grown from about 1 billion in 1800 to 1.6 billion in 1900, to 2.5 billion in 1950 to reach 7.55 billion in 2017, according to the United Nations (United Nations 2017). In 2019, the earth will have between 7.6 and 7.7 billion people, and is expected to reach 11.2 billion in 2100, according to studies by the same organization (United Nations 2019).

These two concurrent forces are exacerbated by the increasing mobility of both technology[11] and people from one country, or even continent, to another[12]. This convergence of forces and this exacerbation of flows increases competition in the labor market for all citizens, including graduates.

Although rarely addressed by universities, this phenomenon of social pressure, more specifically, that emanating from automation, is increasingly perceived by society *outside* universities. Let us first look at how two contemporary writers shed light on this first phenomenon.

The following monologue, taken from the novel *Vernon Subutex 3* by Virginie Despentes, takes place in Paris, France:

> He didn't mention the money to Kilo this morning when they had coffee. They hugged, manfully. Kilo was having endless conversations with Charles – the trader explained why he thought the class struggles from below could never again come to nothing: '*The time of the abolition of slavery or the Popular Front is over. No one wants to put an end to misery any more. We needed manpower, we were condemned to negotiate with you, the workers. We had no choice. But with automation – who cares about the proles? We are going to kill you. I'm not talking about shooting into crowds during demonstrations, we have always done that. No, we are going to mass exterminate you. You are useless. That is what you are late for. You keep thinking like you did under Papa Marx – when the proletariat was necessary for guys like me to accumulate surplus value. Maybe with the progress of science, we will still be breeding strong proletarians, to take blood, organs and skin, to bear our children so that our women don't have to be damaged [...] but even for that, frankly, with the bio-printers and incubators of*

> *the future, we will be able to do without you. We are going to eliminate you. It's pragmatic. You create too many problems for what you are bringing in. That is why it is inevitable: the poor classes, they will wipe you off the map*.' (Despentes 2017, pp. 74–75)

The following dialogue, taken from Ian Manook's novel *The Nomadic Death* (Manook 2016), takes place in Mongolia near Ulaanbaatar. We pick up this adventure in Chapter 56, as the chief engineer in charge of automation operations at the Colorado company answers the interrogation of Mongolian kidnappers.

[…]

– Our iron mine at Pilbara. It's already been running like this for eight years. The excavators are automated, the ore is transported by automated railcars, automatically unloaded into 930 E Komatsu unmanned trucks that automatically go up to the top of this mine and unload their iron by themselves into trains that we are currently automating.

– How many men are involved in this operation?

– None, sir.

– Can you repeat that?

– No miners at Pilbara, I just told you.

– Drivers, conveyors, mechanics?

– None, damn it. No one, nothing! […]

– Who's in charge?

– It's a team of computer scientists who control everything from our operations center in Perth.

– The operations center isn't on site?

– I just told you. The operations center is in Perth, 1,300 kilometers from the mine.

– So, everything works remotely.

– Like a fucking video game, you can say it.

[…] The Tokarev reappeared in the image, and this time, the girl pressed it so hard on his forehead that the man kept a mark. *In Mongolia too?*

– We've already mapped our mines there. Sensors are being installed and the machines will be equipped and autonomous within the next two years.

– Who will command all this, an operational center in Mongolia?

– No, you don't have the training for it. Ideally, everything would be controlled from Perth. Worst case scenario, a center in Korea.

– What about the ten thousand miners?

– ...

For the first time, the woman struck him with a rifle butt and wounded him in the forehead. A flash of panic tore the man's eyes:

Our system saves them a lot of hard and dangerous work, what do you think?

– Your system is keeping them out of work. Ten thousand miners. Ten thousand families. What are you going to do for them? This system makes you rich by destroying jobs by the tens of thousands, doesn't it?

– Shit, the man got angry as if he was pleading a just cause*, we've been giving these savages jobs for almost ten years. They've been dying like miserable bastards in their fucking felt tents, warming themselves with the shit from their horses. Ten thousand families lived for ten years because of us.*

This time, the rifle butt cracked his cheekbone before the young woman's hand crushed his cheeks and stuck the barrel of her gun in his mouth:

We are not savages. We conquered two-thirds of the inhabited land of the world before your country even existed. You weren't even these bunch of criminals and convicts yet, and you hadn't even tried to exterminate the blacks who had been inhabiting the island for over fifty thousand years before you stole it from them… (Manook 2016, pp. 349–352)

These excerpts, from two very different novels, express the same concern: that of a world of unemployment, social distress and one which is dehumanized, where machines replace humans. Is this concern purely fictional? One can doubt it when Elon Musk, the businessman and founder of SpaceX,

PayPal, Tesla and OpenAI, says, at the World Government Summit organized in Dubai in February 2017:

> What to do about mass unemployment? This is going to be a massive social challenge. There will be fewer and fewer jobs that a robot cannot do better [than a human]. These are not things I wish will happen. These are simply things that I think probably will happen. (Musk 2017)

The physicist Stephen Hawking agreed in an editorial published by *The Guardian* in December 2016:

> The automation of factories has already decimated jobs in traditional manufacturing, and the rise of artificial intelligence is likely to extend this job destruction deep into the middle classes, with only the most caring, creative or supervisory roles remaining. (Hawking 2016)

The previous arguments stated by Musk, Hawking and by the characters of Despentes and Manook, although alarmist, only relate to one part of the equation: automation. They do not include the other side of the equation: demographics. Again, the world's population more than tripled in 69 years between 1950 and 2019. Studies show that it will increase by almost 50% by 2100 to reach 11.2 billion people. In concrete terms, this means an increase of more than 44 million people per year from today to 2100. Imagine if Argentina or Ukraine were to add to the world's population every year.

Each of the two elements – automation and demographics – taken separately would already be enough to seriously disrupt the labor market. In an era of increasingly massive human migration and rapid transfer (literally and figuratively) of technology from one end of the world to the other, the combined effects of these two elements are increasing, and competition on the labor market will become more intense in the long run.

Is Man, the "tool-making machine" as Benjamin Franklin defines it, entering a new era? What is the role of leading universities in the context of globalization and automation? In other words: universities perhaps but for what purpose? If jobs are being destroyed by increasing automation, is it clear that new jobs will be created in proportions that are not only

comparable but even greater to the increase in the world's population? This is doubtful in light of some recent studies. As Martin Ford points out:

> […] the American economy is moving into a new era. It is an era that will be defined by a fundamental shift in the relationship between workers and machines. That shift will ultimately challenge one of the most basic assumptions about technology: that *machines are tools* that increase the productivity of workers. Instead, machines themselves are turning into workers, and the line between the capability of labor and capital is blurring as never before. (Ford 2015, p. 12)

He continues:

> As the technological frontier advances, many jobs that we would today consider non-routine, and therefore protected from automation, will eventually be pulled into the routine and predictable category. (Ford 2015, p. 59)

Elsewhere he still says:

> The fundamental assumption, of course, is that a dynamic economy like the United States will always be capable of generating sufficiently higher-wage, higher-skill jobs to absorb all those newly freed up workers – given that they succeed in acquiring the necessary training. That assumption rests on increasingly shaky ground. […] the machines are coming for the high-wage, high-skill jobs as well. (Ford 2015, p. 27)

Ford is therefore very pessimistic about the possibility of economies creating new trades and jobs, in proportions not only comparable to those rendered obsolete by automation, but even in much smaller proportions (see (Frey *et al.* 2016) for a further study motivated by the success of Ford's work). The numbers, hardly reassuring, do not prove him wrong[13]. On January 2, 2010, the Washington Post (Irwin 2010) summed up the number of jobs created in the USA in the first 10 years of the new millennium: zero.

In order to properly grasp the magnitude of the challenges of globalization and automation, let us summarize what is happening. Entire economic sectors are disappearing. The number and quality of tasks that are being done better, faster and at lower cost by machines is constantly increasing. This comes at a time when the human population is exploding and migrating. As a result, there are fewer and fewer jobs with more and more job seekers. Universities are therefore confronted with questions of a completely different nature than in the past. Leading universities are, of course, also leading-edge when it comes to innovation. The technological innovations they help to develop are an accelerating factor in the phenomenon described by Ford (2015). Mass universities, for their part, are faced with the challenge of training students for an era of professional work that is likely to do without them to a significant extent. Higher education, from open sesame to the world of employment, risks becoming more of a means of postponing the deadline for entry into a shrinking labor market, and also risks seeing its role of increasing the chances of finding a job as a significant factor becoming warped, as these chances diminish, regardless of the quality of the training offered.

The population explosion combined with the automation of jobs, mobility of technology and mass migration will pose societal problems on a scale hitherto unknown in the history of humankind. The current demand for engineers and skilled personnel by business leaders reflects a time lag between the pace of change in technology, requirements and competencies, but does not contradict the problem we are raising.

It seems to us that it is twice the responsibility of the elite universities to take up this problem, and to do so without further delay. On the one hand, these universities, through the technological advances they produce, have a share of responsibility for the increasing automation of tasks, and the ultimate destruction of jobs (in the sense of paid employment for a task performed by a human being). On the other hand, they are also the best intellectually equipped organizations to propose societal models for the new situation thus created; a situation in which machines will outperform humans in virtually all tasks, will be able to increase their efficiency at high speed themselves, and will be able to assign new tasks to themselves, potentially without human intervention (see (Bostrom 2014) for these last two points).

5.4. Work and occupation: the need for a political project

This reflection will be smooth for the economic models of the universities themselves, including elite universities. This may seem anecdotal in view of the challenges involved. However, it allows us to identify two ideological foundations of the models of our societies. Although different, both will be jointly impacted.

Indeed, universities are schematically part of two societal models: "public good" and "private investment"[14]. Most Continental European models include a "public good" component. More precisely, this notion of public good stipulates that having a population that is very well educated is a factor of national competitiveness and in the reduction of unemployment in a given country. The Anglo-Saxon models (which have been copied far beyond the Anglo-Saxon world[15]) favor "private investment". Conversely, this notion is understood as an individual investment by learners in their future, in their employment prospects and in their salaries, through the training courses that they receive, for which they pay high tuition fees; salaries that will then enable them to pay back these fees and ancillary costs.

In the end, these two models illustrate the tensions between conceptions that either favor the collective or the individual, with employability and the creation of wealth to be shared as a goal in both cases.

However, these concepts of "public good" and "private investment" could both be challenged. More specifically, in the more or less long-term, what is meant and understood by these terms, as recalled above, will lose relevance and even become misleading if the dynamics continue.

Indeed, both "public good" (with the delightful ambiguity of the term "good") and "private investment" presuppose that learners will one day have a paid job. This basic premise seems self-evident. We believe, however, that it is no longer self-evident to anyone, whether graduate or not, although graduates and those who are better educated will be the last to be affected.

Indeed, it seems very unwise to us, out of optimism, to exclude one of the main consequences of the phenomenon of the convergence of automation of tasks, population growth and mobility of both technology and people, as being the emergence of a divergence, or rather a disjunction, for a substantial

and growing proportion of the working-age population, between the concept of occupation on the one hand and the concept of work on the other.

For the time being, what is included in the concept of work (in the sense of paid employment for a given task) is included in that of occupation: there is work in life, but there is not only work in life; there are other occupations, work in the sense of paid employment being one of them. This perception is in danger of dissipating for a growing proportion of the working-age population, simply because of the absence of work, given the combination of automation, population growth, technological mobility and the migration of people. We believe it is vital to anticipate this divergence and even disjunction, and to develop an appropriate societal model. We do not have the answer. We are raising the issue.

"To name things wrongly is to add to the world's misfortune," Camus used to say. In light of what is emerging, we therefore think that it is necessary to redefine what is meant by "public good" and "private investment", and obviously within a scope that goes far beyond the epiphenomenon of the economic model of knowledge, which was conveyed by the universities. It is a matter of politics here[16].

Assuming that an appropriate and viable societal model is possible (which we do not know), the aim is to propose options for political decisions in order to have them implemented it in a viable way. The pressure we have described, which is growing daily, also provides an opportunity for politics to assert its pre-eminence over economism. In this relationship between politics and economism, we hope for the indocility of the former in the face of the latter.

Doesn't this primacy of politics over economism largely make the difference between nations and civilizations that are strong, and those that resign themselves?

5.5. Western civilization – the judgment of "elementary particles"

This book has been bolstered by statistics, government texts and laws, university strategies and participation in numerous conferences around the world. Beginning in sunny California, this journey took us across time zones to the rhythm of the civilizations described by Huntington, before reaching the Russian snow. This journey was also fueled by readings, more or less on

the fringes, which took us from the Caribbean Sea to Ulaanbaatar, from San Francisco to St. Petersburg via Beijing, New Delhi and Paris.

Digesting this information, reading and travel has not so much led us to propose a fixed portrait of higher education and high-level research, but a description of trends in this sector worldwide. We believe that these trends are set to last. The dynamics we have highlighted also say something about the state of the world. We believe that Paul Valéry was right and see premonitions in his 1919 letters regarding what is happening a century later: the mobility of knowledge makes power much more dependent on demographics than in the past. Europe and the West are logically seeing their relative influences erode in favor of Asia, at a time when China is accelerating its scientific research effort and thus strengthening the coherence of its global geostrategic ambitions. We can see this Chinese consistency and strength. We deplore the lack of such coherence in other countries, in Europe, starting with our native country. We believe that this coherence and strength in China is correlated with the collective sense of belonging to a nation, with all that this implies in terms of awareness of its history and identity. These notions, which are not derided in this country, are intensifying. Chinese universities are redefining and restructuring themselves by integrating this component.

We risked predicting trajectories. We have presumed avenues of reform for certain countries with the ambition of influencing these trajectories. Luckily, we have had the presence of mind to make a list of the challenges that elite universities should address, regardless of the country they belong to and the civilization that underlies them. We have even given priority to a problem on which there is very little consensus, whose solution and deadline we do not know, but which we believe is arriving at an increasing speed, and for which it is the responsibility of elite universities to deal with, and that of governments to address. Caught up in the momentum, we therefore called on the political to be indocile in the face of the economic, and on the economic to be humble in the face of issues that are beyond its grasp, even if it was beneficiary in the short-term. Do we have to make things worse? Do we also need to conclude this book with a judgment?

We prefer to take our leave by fading into the background for a final reading. The final word goes to the French writer Michel Houellebecq. The third part of his novel *Les particules élémentaires* (*Atomised*), published in the final years of the 20th Century, shows the director of the scientific department, Desplechin, at the time of his retirement. Biology researcher Michel Djerzinski finds him in his office where a few boxes are still lying around. On the verge of leaving the premises and putting an end to his career, Desplechin tells him about his desire for knowledge that is still intact and about the power that researchers hold. The solemnity of the moment and the quality of his interlocutor push him to open up more. He confides in himself after leaving an empty office for the sunny terrace of a café on the outskirts of the Musée d'Orsay:

> Everything they [researchers] say is true is sooner or later recognized as true by the general population. No economic, political, social or religious power is capable of standing up to the evidence of rational certainty. It can be said that the West has been interested beyond measure in philosophy, in politics, that it has fought in a perfectly unreasonable way around philosophical or political questions; it can also be said that the West has passionately loved literature and the arts; but nothing in reality has had as much weight in its history as the need for rational certainty. To this need for rational certainty, the West will finally have sacrificed everything: its religion, its happiness, its hopes, and ultimately its life. This is something to be remembered when making an overall judgment of Western civilization. (Houellebecq 1998, p. 270)

Appendices

Appendix 1

Huntington's Country – Civilization Dictionary

Here, we provide some information on the assignment of the 98 countries (for comparison, as of 2019, the UN recognizes 193 countries) or geographical areas listed in at least one ranking to given civilizations according to the Huntington approach. This thus allows us to create civilizational rankings as elaborated in Chapter 3 of this book.

Some countries simultaneously belong to several civilizations. Thus Kenya, Nigeria and Tanzania are linked to both Islamic and African civilizations. In this book, we have given priority to the African civilization. Similarly, Kazakhstan belongs to the Orthodox and Islamic civilizations. Here, we have categorized it as an Orthodox civilization. Thailand belongs to the Buddhist and Islamic civilization; we have categorized it under the former rather than the latter. Additionally, THE classifies certain universities as part of "Northern Cyprus" (this is the "Eastern Mediterranean University", which appeared in THE top 1000 in 2018 and 2019). Apart from Turkey (and THE), no international institution recognizes this area as a country in its own right. For the sake of thoroughness, while also taking the massive influx of the Muslim population in this area into account, we have linked it to Islamic civilization. However, this does not, of course, constitute recognition of it being a State of the area. Similarly, QS ranks "Birzeit University" as being part of the Palestinian Territories (this institution appeared in the QS top 1000 ranking in 2018 and 2019). We link the Palestinian Territories (the UN term used to designate this area since 1993) to Islamic civilization without,

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however, this linkage meaning recognition as a State of this area under Israeli control since the Six-Day War. Lastly, we italicize the countries of Western civilization which are also part of Continental Europe (this is useful for the part on Europe in the concluding chapter, as well as for the statistics and tables at the end of these Appendices, also relating to Europe). Taking these considerations and precautions into account, we present the following table, where the flagship country of a civilization is indicated in bold:

African	Buddhist	Chinese	Hindu	Islamic	Japanese	Latin American	Western	Orthodox
Ghana	Sri Lanka	**China**	**India**	Algeria	**Japan**	Argentina	Australia	Belarus
Kenya	Thailand	Hong Kong	Nepal	Azerbaijan		Brazil	Austria	Bulgaria
Nigeria		Macao		Bahrain		Chile	*Belgium*	Cyprus
South Africa		The Philippines		Bangladesh		Colombia	Canada	Georgia
Tanzania		Singapore		Bosnia and Herzegovina		Costa Rica	*Croatia*	Greece
Uganda		South Korea		Brunei		Cuba	*Czech Republic*	Kazakhstan
		Taiwan		Egypt		Ecuador	*Denmark*	Romania
		Vietnam		Indonesia		Jamaica	*Estonia*	**Russian Federation**
				Iran		Mexico	*Finland*	Serbia
				Iraq		Panama	*France*	Ukraine
				Jordan		Peru	*Germany*	
				Kuwait		Puerto Rico	*Hungary*	
				Lebanon		Uruguay	Iceland	
				Malaysia		Venezuela	Israel	
				Morocco			*Italy*	
				Northern Cyprus			*Latvia*	
				Oman			*Lithuania*	
				Pakistan			*Luxembourg*	
				Palestinian Territories			*The Netherlands*	
				Qatar			New Zealand	
				Saudi Arabia			*Norway*	
				Tunisia			*Poland*	
				Turkey			*Portugal*	
				United Arab Emirates			Republic of Ireland	

African	Buddhist	Chinese	Hindu	Islamic	Japanese	Latin American	Western	Orthodox
							Slovakia	
							Slovenia	
							Spain	
							Sweden	
							Switzerland	
							United Kingdom	
							United States	

Table A1.1. *Huntington's country–civilization dictionary*

Appendix 2

Top 20 Rankings

We start by giving a graphical representation of the countries represented in the top 20 for each of the THE, QS, Leiden and ARWU rankings. This form is, of course, derived from the tabulated figures in the "Analysis of the Top 20" section of Chapter 3 (section 3.2).

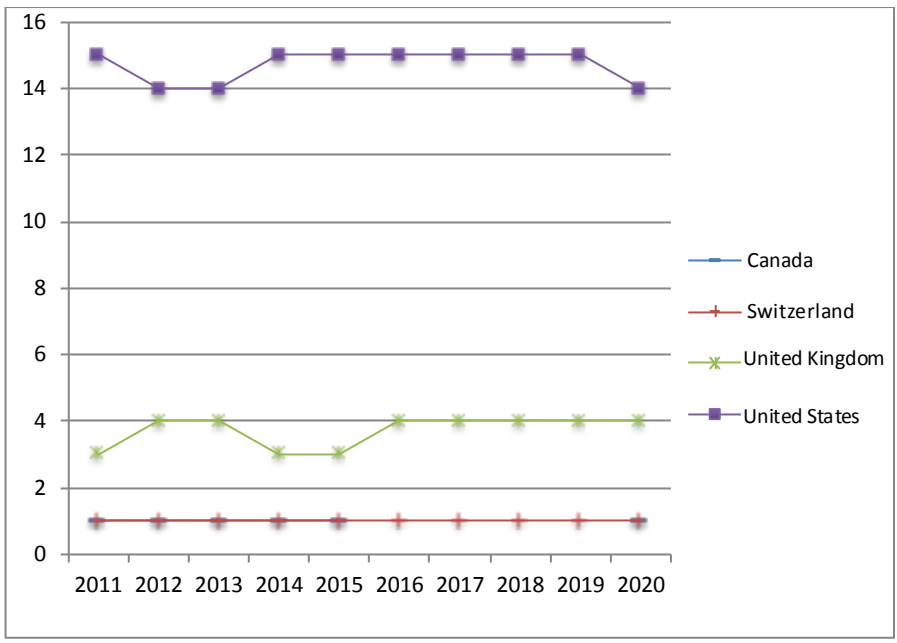

Figure A2.1. *Top 20 – THE*

For a color version of all figures in this book, see www.iste.co.uk/leprevost/universities.zip.

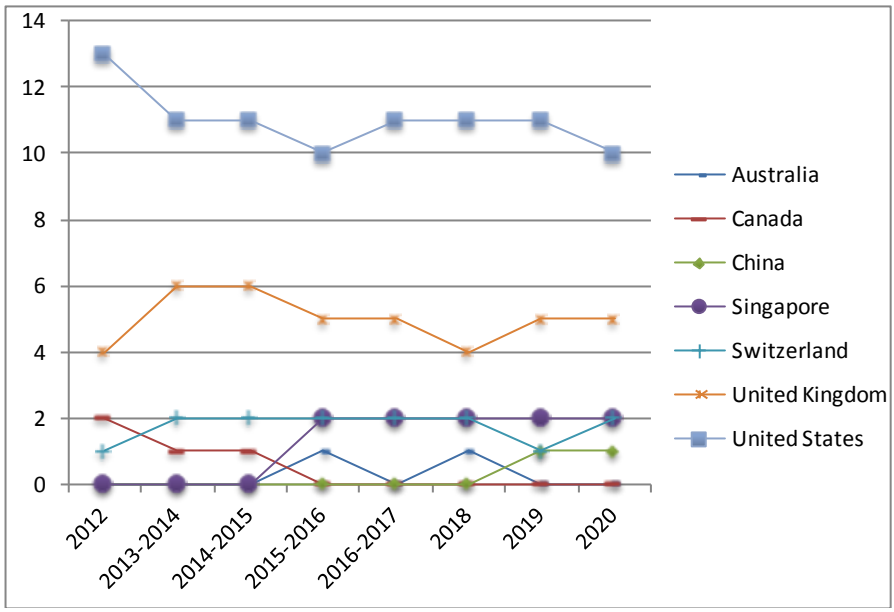

Figure A2.2. *Top 20 – QS*

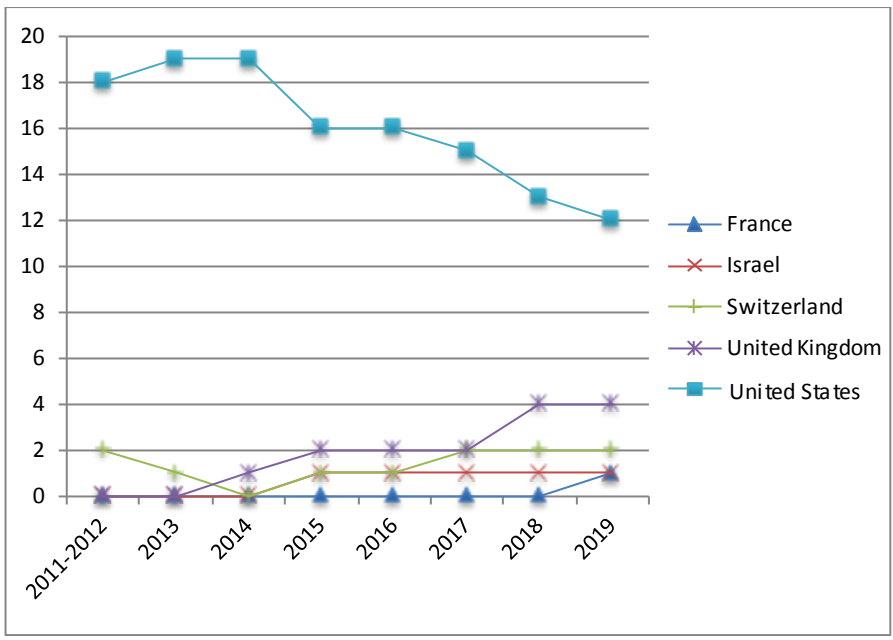

Figure A2.3. *Top 20 – Leiden*

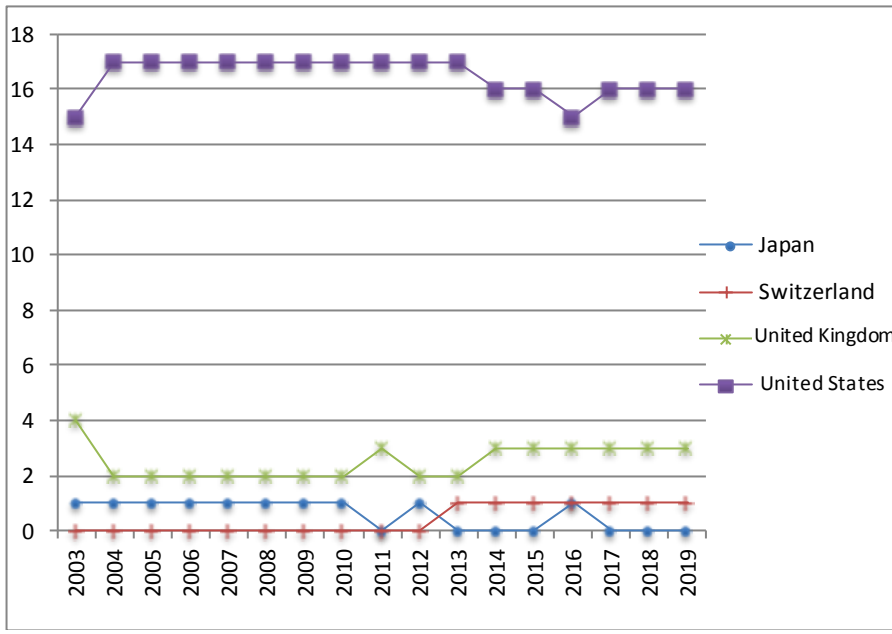

Figure A2.4. *Top 20 – Shanghai*

In the following tables for THE, QS, Leiden and ARWU, the annual rankings of the 20 best universities in the world during the reference periods are given. Some of the rankings are shown in brackets: this only concerns the universities that were not always in the Top 20 during the reference period. The ranking in brackets indicates where they were when they were not in the Top 20. An "=" sign precedes certain rankings: it indicates that these universities are tied with others in this position for the year in question.

University	Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
University of Oxford	UK	=6	4	=2	=2	3	2	1	1	1	1
University of Cambridge	UK	=6	6	7	7	5	4	4	2	1	3
Stanford University	USA	4	=2	=2	4	4	3	3	=3	3	4
Massachusetts Institute of Technology (MIT)	USA	3	7	5	5	6	5	5	5	4	5

University	Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
California Institute of Technology	USA	2	1	1	1	1	1	2	=3	5	2
Harvard University	USA	1	=2	4	=2	2	6	6	6	6	7
Princeton University	USA	5	5	6	6	7	7	7	7	7	6
Yale University	USA	10	11	11	11	=9	12	12	12	8	8
Imperial College London	UK	9	8	8	10	=9	8	8	8	9	10
University of Chicago	USA	12	9	10	9	11	10	=10	9	10	9
ETH Zurich	Switzerland	=15	15	12	14	13	9	9	=10	11	=13
University of Pennsylvania	USA	19	16	15	16	16	17	13	=10	=12	11
John Hopkins University	USA	13	14	16	15	15	11	17	13	=12	12
University College London	UK	(22)	17	17	(21)	(22)	14	15	16	14	15
University of California, Berkeley	USA	8	10	9	8	8	13	=10	18	15	=13
Columbia University	USA	18	12	14	13	14	15	16	14	16	16
University of California, Los Angeles	USA	11	13	13	12	12	16	14	15	17	17
Duke University	USA	(24)	(22)	(23)	17	18	20	18	17	18	20
Cornell University	USA	14	20	18	19	19	18	19	19	19	19
University of Michigan	USA	=15	18	20	18	17	(21)	(21)	(21)	20	(21)
Northwestern University	USA	(25)	(26)	19	(22)	(21)	(25)	20	20	(25)	(22)
University of Toronto	Canada	17	19	21	20	20	19	(22)	(22)	(21)	18
Carnegie Mellon University	USA	20	(21)	(22)	(24)	(24)	(22)	(23)	(24)	(24)	(27)

Table A2.1. *Top 20 – THE*

University	Country	2012	2013–2014	2014–2015	2015–2016	2016–2017	2018	2019	2020
Massachusetts Institute of Technology (MIT)	USA	1	1	1	1	1	1	1	1
Stanford University	USA	15	7	7	=3	2	2	2	2
Harvard University	USA	3	2	4	2	3	3	3	3
California Institute of Technology	USA	10	=10	8	5	5	4	4	5
University of Oxford	UK	5	6	=5	6	6	6	5	4
University of Cambridge	UK	2	3	=2	=3	4	5	6	7
ETH Zurich	Switzerland	13	12	12	9	8	10	7	6
Imperial College London	UK	6	5	=2	8	9	8	8	9
University of Chicago	USA	8	9	11	10	10	9	9	10
University College London	UK	4	4	=5	7	7	7	10	8
National University of Singapore	Singapore	(25)	(24)	(22)	12	12	15	11	=11
Nanyang Technological University	Singapore	(47)	(=41)	(39)	13	13	11	12	=11
Princeton University	USA	9	=10	9	11	11	13	13	13
Cornell University	USA	14	15	19	17	16	14	14	14
Yale University	USA	7	8	10	15	15	16	15	17
Columbia University	USA	11	14	=14	(22)	20	18	16	=18
Tsinghua University	China	(48)	(48)	(47)	(25)	(=24)	(25)	17	16
University of Edinburgh	UK	(21)	=17	=17	(21)	19	(=23)	18	20
University of Pennsylvania	USA	12	13	13	18	18	19	19	15
University of Michigan	USA	17	(22)	(23)	(=30)	(23)	(=21)	20	(21)
Johns Hopkins University	USA	16	16	=14	16	17	17	(21)	(24)
EPFL Lausanne	Switzerland	(29)	=19	=17	14	14	12	(22)	=18
Australian National University	Australia	(24)	(27)	(25)	=19	(22)	20	(24)	(=29)
Duke University	USA	20	(23)	(26)	(29)	(=24)	(=21)	(26)	(=25)
University of Toronto	Canada	19	=17	20	(34)	(32)	(31)	(28)	(=29)
King's College London	UK	(26)	=19	16	=19	(21)	(=23)	(31)	(=33)
McGill University	Canada	18	(21)	(21)	(24)	(30)	(32)	(33)	(=35)

Table A2.2. *Top 20 – QS*

University	Country	2011–2012	2013	2014	2015	2016	2017	2018	2019
Massachusetts Institute of Technology (MIT)	USA	1	1	2	1	2	2	2	1
Princeton University	USA	2	4	7	5	5	5	3	2
Stanford University	USA	5	3	5	3	3	4	4	3
Harvard University	USA	3	5	3	2	4	3	5	4
Caltech	USA	6	8	6	6	6	7	7	5
University of California, Berkeley	USA	8	7	4	4	7	6	6	6
Weizmann Institute of Science	Israel	(25)	(23)	(22)	10	13	13	9	7
London School of Hygiene & Tropical Medicine	UK	(33)	(33)	(23)	11	11	8	8	8
University of California, San Francisco	USA	10	9	9	8	9	10	10	9
University of Chicago	USA	14	16	18	18	14	14	15	10
University of Oxford	UK	(36)	(30)	(24)	17	17	16	13	11
Yale University	USA	11	10	10	13	15	12	12	12
University of California, Santa Barbara	USA	7	2	8	7	8	11	14	13
ETH Zurich	Switzerland	18	(26)	(25)	(25)	(23)	20	18	14
Columbia University	USA	17	19	(26)	19	(22)	19	19	15
EPFL Lausanne	Switzerland	12	13	(21)	15	12	18	17	16
University of Cambridge	UK	(31)	(24)	19	(23)	(24)	(21)	16	17
University College London	UK	(59)	(50)	(41)	(32)	(30)	(26)	20	18

University	Country	2011–2012	2013	2014	2015	2016	2017	2018	2019
École Normale Sup, Paris	France			(57)		(77)		(31)	19
University of California, San Diego	USA	19	15	14	16	19	17	(21)	20
Northwestern University	USA	16	17	13	(21)	(21)	(23)	(24)	(22)
Rice University	USA	4	6	11	9	10	9	11	(23)
University of Pennsylvania	USA	(22)	18	17	(24)	(26)	(28)	(23)	(25)
Rockfeller University	USA			1		1	1	1	
University of Colorado, Boulder	USA	(24)	14	15	(22)	20	(31)	(22)	(36)
UT Southwestern Medical Center, Dallas	USA		12	16	14	18	15	(25)	(27)
University of California, Santa Cruz	USA	(21)	11	12	12	16	(22)	(27)	(29)
University of California, Los Angeles	USA	20	(25)	20	20	(25)	(24)	(29)	(28)
University of Washington, Seattle	USA	13	(27)	(31)	(27)	(31)	(25)	(32)	(26)
University of Massachusetts Medical School	USA	(41)	20	(30)	(26)	(29)	(37)	(26)	(44)
Carnegie Mellon University	USA	9	(21)	(46)	(65)	(67)	(42)	(61)	(57)
Georgia Institute of Technology	USA	15	(34)	(50)	(49)	(60)	(77)	(76)	(80)

Table A2.3. *Top 20 – Leiden*

University	Country	2003	2004	2005	2006	2007	2008	2009	2010
Harvard University	USA	1	1	1	1	1	1	1	1
Stanford University	USA	2	2	3	3	2	2	2	3
California Institute of Technology	USA	3	6	6	6	6	6	6	6

University	Country	2003	2004	2005	2006	2007	2008	2009	2010
University of California, Berkeley	USA	4	4	4	4	3	3	3	2
University of Cambridge	UK	5	3	2	2	4	4	4	5
Massachusetts Institute of Technology (MIT)	USA	6	5	5	5	5	5	5	4
Princeton University	USA	7	7	8	8	8	8	9	7
Yale University	USA	8	11	11	11	11	11	11	11
University of Oxford	UK	9	8	10	10	10	10	10	10
Columbia University	USA	10	9	7	7	7	7	7	8
University of Chicago	USA	11	10	9	8	9	9	9	9
Cornell University	USA	12	12	12	12	12	12	12	12
University of California, San Francisco	USA	13	17	18	18	18	18	18	18
University of California, San Diego	USA	14	13	13	13	14	14	14	14
University of California, Los Angeles	USA	15	16	14	14	13	13	13	13
University of Washington	USA	16	20	17	17	16	16	16	16
Imperial College of Science, Technology and Medicine	UK	17	(23)	(23)	(23)	(23)	(26)	(26)	(26)
University of Pennsylvania	USA	18	15	15	15	15	15	15	15
The University of Tokyo	Japan	19	14	20	19	20	19	20	20
University College London	UK	20	(25)	(26)	(26)	(25)	(22)	(21)	(21)
Johns Hopkins University	USA	(24)	(22)	19	20	19	20	19	18
ETH Zurich	Switzerland	(25)	(27)	(27)	(27)	(27)	(24)	(23)	(23)
Washington University in St. Louis	USA	(22)	(28)	(28)	(29)	(29)	(29)	(29)	(30)
University of Wisconsin-Madison	USA	(27)	18	16	16	17	17	17	17
University of Michigan, Ann Arbor	USA	(21)	19	(21)	(21)	(21)	(21)	(22)	(22)

Table A2.4. *Top 20 – Shanghai (2003–2010)*

University	Country	2011	2012	2013	2014	2015	2016	2017	2018	2019
Harvard University	USA	1	1	1	1	1	1	1	1	1
Stanford University	USA	2	2	2	2	2	2	2	2	2
California Institute of Technology	USA	6	6	6	7	7	8	9	9	9
University of California, Berkeley	USA	4	4	3	4	4	3	5	5	5
University of Cambridge	UK	5	5	5	5	5	4	3	3	3
Massachusetts Institute of Technology (MIT)	USA	3	3	4	3	3	5	4	4	4
Princeton University	USA	7	7	7	6	6	6	6	6	6
Yale University	USA	11	11	11	11	11	11	11	12	=11
University of Oxford	UK	10	10	10	9	10	7	7	7	7
Columbia University	USA	8	8	8	8	8	9	8	8	8
University of Chicago	USA	9	9	9	9	9	10	10	10	10
Cornell University	USA	13	13	13	13	13	13	14	12	13
University of California, San Francisco	USA	17	18	18	18	19	(21)	(21)	(21)	=20
University of California, San Diego	USA	15	15	14	14	14	14	15	15	18
University of California, Los Angeles	USA	12	12	12	12	12	12	12	11	=11
University of Washington	USA	16	16	16	15	15	15	13	14	14
Imperial College of Science, Technology and Medicine	UK	(24)	(24)	(24)	(22)	(23)	(22)	(27)	(24)	(23)
University of Pennsylvania	USA	14	14	15	16	17	18	17	16	17
The University of Tokyo	Japan	(21)	20	(21)	(21)	(21)	20	(24)	(22)	(25)

University	Country	2011	2012	2013	2014	2015	2016	2017	2018	2019
University College London	UK	20	(21)	(21)	20	18	17	16	17	15
Johns Hopkins University	USA	18	17	17	17	16	16	18	18	16
ETH Zurich	Switzerland	(23)	(23)	20	19	20	19	19	19	19
Washington University in St. Louis	USA	(31)	(31)	(32)	(32)	(32)	(23)	20	20	(22)
University of Wisconsin-Madison	USA	19	19	19	(24)	(24)	(28)	(28)	(28)	(27)
University of Michigan, Ann Arbor	USA	(22)	(22)	(23)	(22)	(22)	(23)	(24)	(27)	=20

Table A2.5. *Top 20 – Shanghai (2011–2019)*

Appendix 3

Top 200 Rankings

In this Appendix, we give the tables of the top 200 universities according to the THE, QS, Leiden and ARWU ranking organizations over the reference periods. More precisely, for each of these organizations, we structure the information according to "all countries", then "flagship countries" and then "civilizations". The tables and graphs below clarify or supplement the information already present in the "Analysis of the Top 200" section of Chapter 3 (section 3.3):

– for the "all countries" section, a table lists the countries with at least one university in the top 200 of the ranking considered during the reference period. For each year of the reference period, the table specifies the evolution of the number of universities for these countries;

– for the "flagship countries" section, a table gives the number of universities from the flagship countries in the top 200 of the ranking considered, for each year of the reference period; the number of universities not coming from a flagship country is added to the "others" section. It should be recalled that the total number of universities may differ from 200 (a little more or a little less, see Chapter 3). The absolute numbers in this table are then represented in a graph. The relative data (percentage and therefore proportions) are then given in a second graph;

– the "civilizations" section is, *mutatis mutandis*, structured like the "flagship countries" section with one table and two graphs.

For a color version of all figures in this book, see www.iste.co.uk/leprevost/universities.zip.

THE Ranking – Top 200 – All Countries

It should be noted that, until 2018, THE only included universities in its ranking from countries with at least two universities. We have added the universities that were or have been included in this top 200 regardless of the number of universities in the country in question, for an obvious question of equity. A collateral effect is that the University of Luxembourg, created in 2003, and introduced to the ranking challenges by the author of this book, for the three rankings of 2016, 2017 and 2018, appears in this way.

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Australia	7	7	8	7	8	8	8	8	9	11
Austria	2	1	1	1	1	1	1	1	1	1
Belgium	2	3	4	5	4	4	3	4	3	4
Brazil	0	1	1	0	0	0	0	0	0	0
Canada	9	9	8	7	8	7	8	6	9	7
China	6	3	2	2	3	2	4	7	7	7
Denmark	3	3	3	3	3	3	3	3	4	3
Egypt	1	0	0	0	0	0	0	0	0	0
Finland	1	1	1	1	1	1	1	4	2	2
France	4	5	7	8	7	5	4	7	4	5
Germany	14	12	11	10	12	20	22	20	23	23
Hong Kong	4	4	4	3	4	3	5	5	5	5
Israel	0	2	3	2	1	1	1	0	0	1
Italy	0	0	0	0	1	3	2	2	3	3
Japan	5	5	5	5	5	2	2	2	2	2
Luxembourg	0	0	0	0	0	1	1	1	0	0
The Netherlands	10	12	12	12	11	12	13	13	12	11
New Zealand	1	1	1	1	1	1	1	1	0	1
Norway	1	2	0	1	1	2	1	1	2	1
Republic of Ireland	2	2	2	2	1	2	1	1	1	1
Russia	0	0	0	0	1	1	1	1	1	1
Singapore	2	2	2	2	2	2	2	2	2	2
South Africa	1	1	1	1	1	1	2	1	1	2
South Korea	4	3	4	4	4	4	4	4	5	6
Spain	2	1	0	1	1	3	2	2	2	2

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Sweden	6	5	5	5	5	6	6	6	5	5
Switzerland	6	7	7	7	7	7	7	7	7	7
Taiwan	4	1	1	1	1	1	1	1	1	1
Turkey	2	0	0	1	4	0	0	0	0	0
UK	29	32	31	31	29	34	32	31	29	28
USA	70	73	75	77	74	63	63	62	60	60
TOTAL	**198**	**198**	**199**	**200**	**201**	**200**	**201**	**203**	**200**	**202**

Table A3.1. *Top 200 – THE (all countries)*

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
China	6	3	2	2	3	2	4	7	7	7
India	0	0	0	0	0	0	0	0	0	0
Japan	5	5	5	5	5	2	2	2	2	2
Russia	0	0	0	0	1	1	1	1	1	1
USA	70	73	75	76	74	63	63	62	60	60
Others	117	117	117	116	118	132	131	131	130	132
TOTAL	**198**	**198**	**199**	**200**	**201**	**200**	**201**	**203**	**200**	**202**

Table A3.2. *Top 200 – THE (flagship countries)*

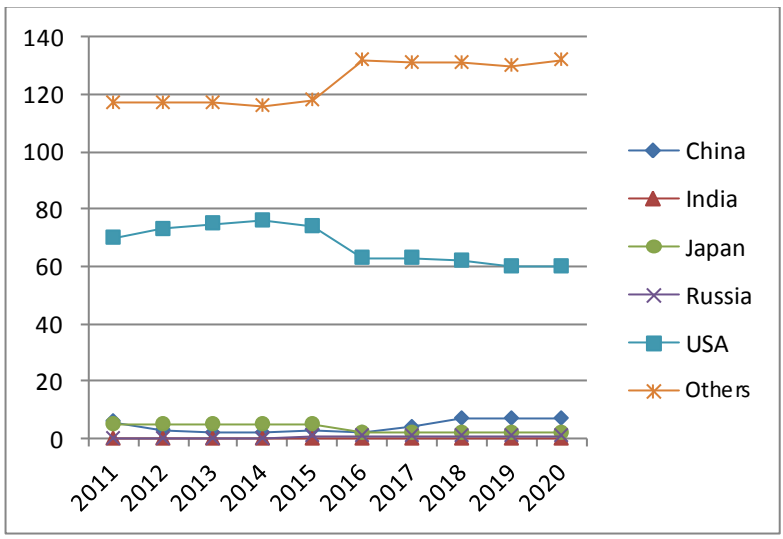

Figure A3.1. *Top 200 – THE (flagship countries)*

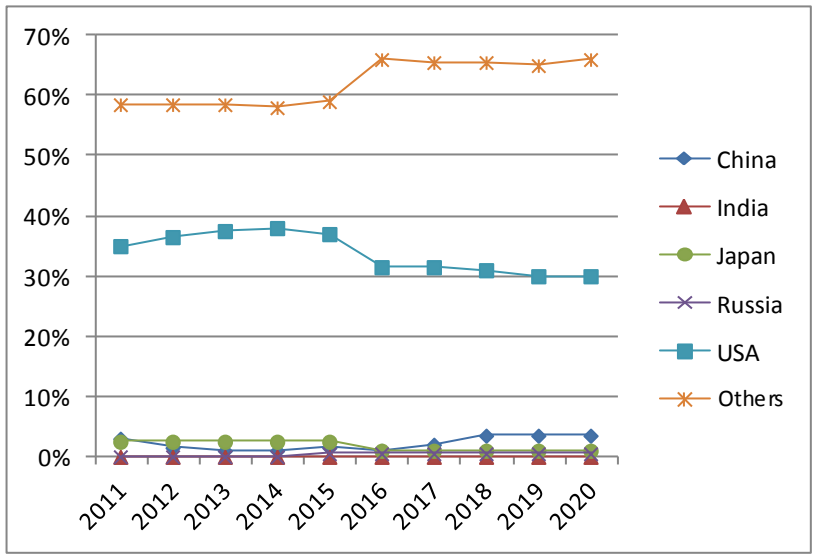

Figure A3.2. *Top 200 – THE (flagship countries by percentage)*

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
African	1	1	1	1	1	1	2	1	1	2
Buddhist	0	0	0	0	0	0	0	0	0	0
Chinese	20	13	13	12	14	12	16	19	20	21
Hindu	0	0	0	0	0	0	0	0	0	0
Islamic	3	0	0	1	4	0	0	0	0	0
Japanese	5	5	5	5	5	2	2	2	2	2
Latin American	0	1	1	0	0	0	0	0	0	0
Western	169	178	179	181	176	184	180	180	176	176
Orthodox	0	0	0	0	1	1	1	1	1	1
TOTAL	**198**	**198**	**199**	**200**	**201**	**200**	**201**	**203**	**200**	**202**

Table A3.3. *Top 200 – THE (civilizations)*

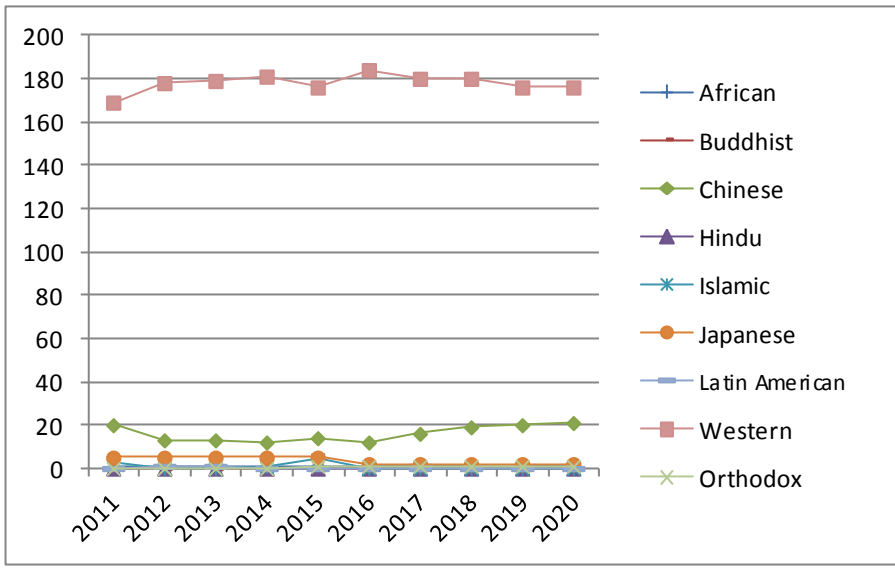

Figure A3.3. *Top 200 – THE (civilizations)*

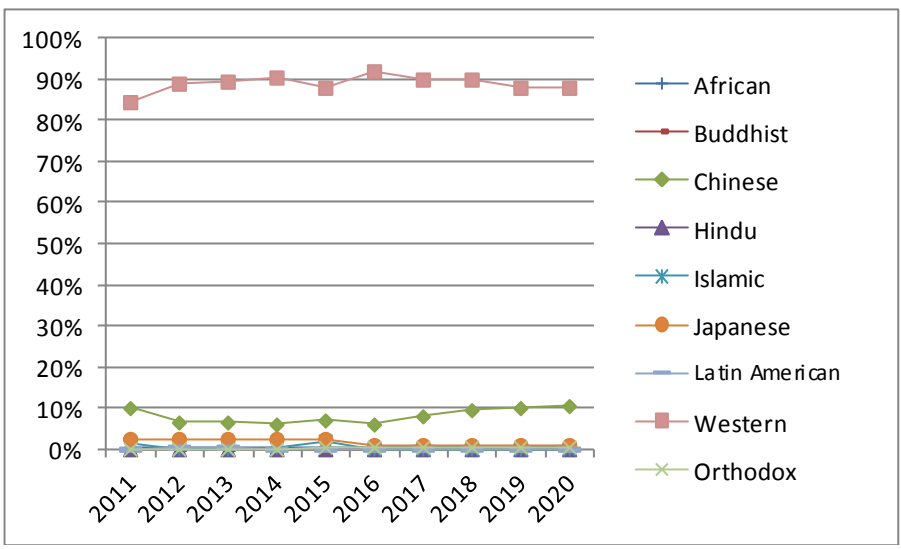

Figure A3.4. *Top 200 – THE (civilizations by percentage)*

	2012	2013–2014	2014–2015	2015–2016	2016–2017	2018	2019	2020
Argentina	0	0	1	1	1	1	1	1
Australia	8	8	8	8	9	9	9	9
Austria	1	1	1	2	2	2	2	2
Belgium	6	6	5	4	4	4	4	4
Brazil	1	1	1	2	2	2	1	1
Canada	9	9	10	8	9	7	7	7
Chile	1	1	1	1	2	1	1	2
China	7	7	7	7	7	7	7	7
Denmark	3	3	3	3	3	3	3	3
Finland	1	2	2	2	2	2	2	2
France	1	3	2	3	3	3	5	5
Germany	11	13	13	11	11	12	12	12
Hong Kong	5	5	5	5	5	5	5	5
India	0	0	0	1	1	2	3	3
Ireland	3	2	2	2	2	2	2	2
Israel	1	3	3	2	1	1	1	1
Italy	1	2	1	1	1	3	4	3
Japan	10	9	10	8	8	9	9	10
Malaysia	1	1	1	1	1	1	2	4
Mexico	1	1	1	1	1	2	2	2
The Netherlands	11	11	11	12	12	10	9	9
New Zealand	2	2	2	2	2	2	2	2
Norway	2	2	2	2	2	2	2	2
Russia	1	1	1	1	1	1	1	1
Saudi Arabia	1	0	0	1	1	1	1	2
Singapore	2	2	2	2	2	2	2	2
South Africa	1	1	1	1	1	1	1	1
South Korea	6	6	6	7	7	7	7	7
Spain	2	3	3	3	1	3	3	3
Sweden	5	4	5	5	5	5	5	5
Switzerland	7	7	7	7	7	7	7	7
Taiwan	2	2	2	3	3	2	2	2
UK	29	29	29	30	30	28	29	28
USA	54	51	51	49	48	47	48	46
TOTAL	**196**	**198**	**199**	**198**	**197**	**196**	**201**	**202**

Table A3.4. *Top 200 – QS (all countries)*

	2012	2013–2014	2014–2015	2015–2016	2016–2017	2018	2019	2020
China	7	7	7	7	7	7	7	7
India	0	0	0	1	1	2	3	3
Japan	10	9	10	8	8	9	9	10
Russia	1	1	1	1	1	1	1	1
USA	54	51	51	49	48	47	48	46
Others	124	130	130	132	132	130	133	135
TOTAL	**196**	**198**	**199**	**198**	**197**	**196**	**201**	**202**

Table A3.5. *Top 200 – QS (flagship countries)*

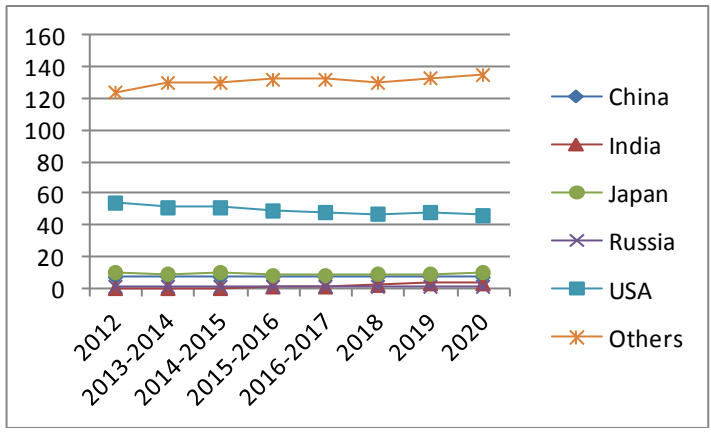

Figure A3.5. *Top 200 – QS (flagship countries)*

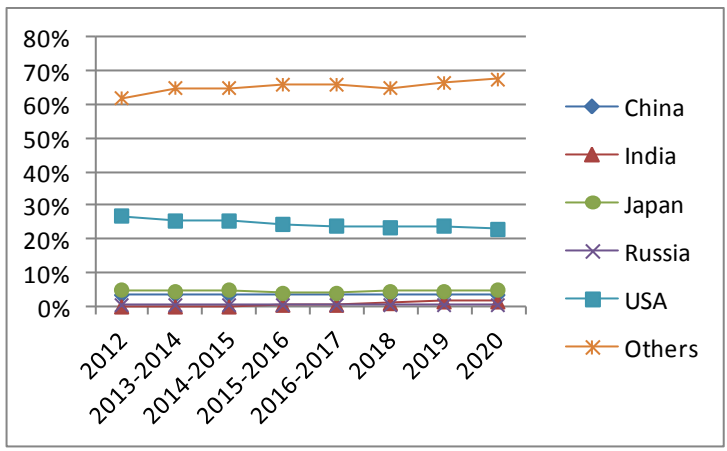

Figure A3.6. *Top 200 – QS (flagship countries by percentage)*

	2012	2013–2014	2014–2015	2015–2016	2016–2017	2018	2019	2020
African	1	1	1	1	1	1	1	1
Chinese	22	22	22	24	24	23	23	23
Hindu	0	0	0	1	1	2	3	3
Islamic	2	1	1	2	2	2	3	6
Japanese	10	9	10	8	8	9	9	10
Latin American	3	3	4	5	6	6	5	6
Western	157	161	160	156	154	152	156	152
Orthodox	1	1	1	1	1	1	1	1
TOTAL	**196**	**198**	**199**	**198**	**197**	**196**	**201**	**202**

Table A3.6. *Top 200 – QS (civilizations)*

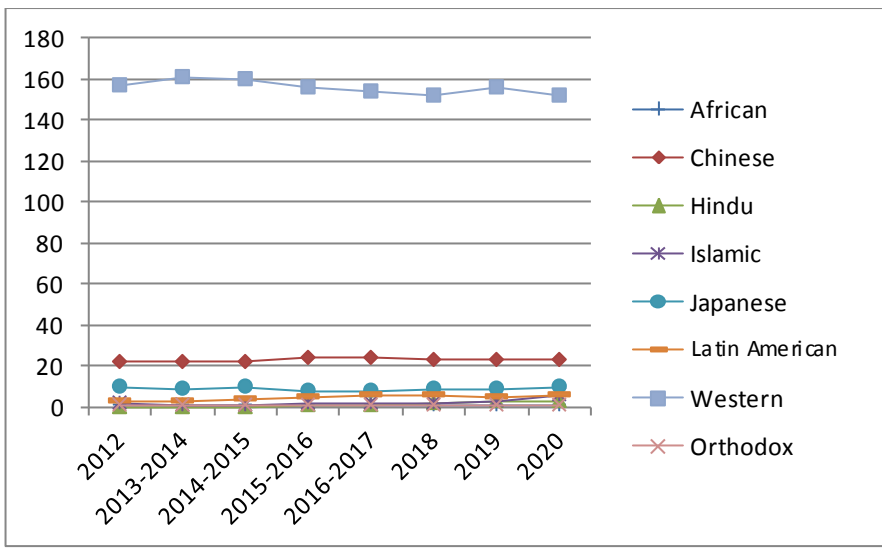

Figure A3.7. *Top 200 – QS (civilizations)*

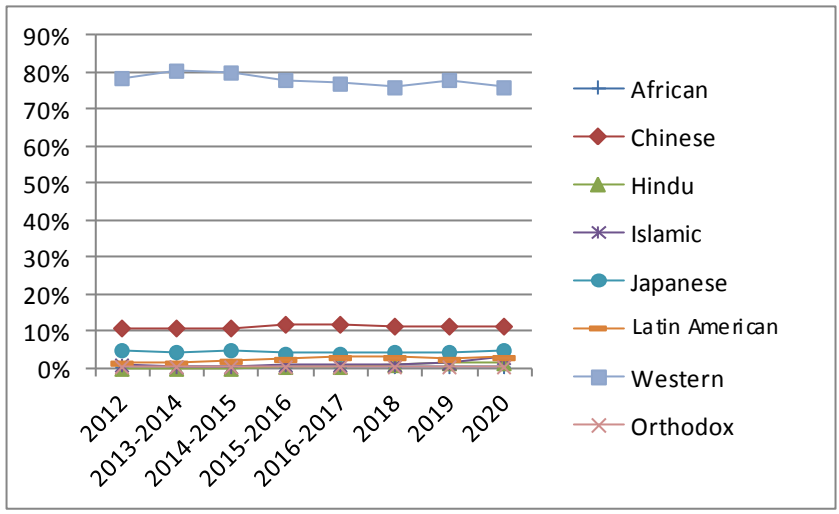

Figure A3.8. *Top 200 – QS (civilizations by percentage)*

	2011–2012	2013	2014	2015	2016	2017	2018	2019
Australia	4	6	7	6	10	10	10	11
Austria	1	2	1	3	2	3	2	4
Belgium	3	4	2	4	3	4	3	3
Canada	7	6	6	6	5	5	5	5
China	6	13	6	6	5	10	10	10
Denmark	4	3	3	3	2	3	2	2
France	10	11	13	10	12	9	11	9
Germany	17	19	16	19	13	14	10	7
Ireland	1	2	3	2	1	1	1	2
Israel	1	1	1	2	2	1	1	1
Italy	0	0	1	0	0	0	1	2
The Netherlands	11	12	12	12	12	12	12	12
Saudi Arabia	0	0	0	1	1	1	1	1
Singapore	2	2	2	2	2	2	2	2
South Korea	2	2	1	0	0	1	1	1
Spain	0	0	1	0	1	1	1	1
Sweden	3	3	2	1	1	1	2	4
Switzerland	7	7	7	7	7	7	7	7
UK	27	29	33	32	34	37	36	36
USA	97	92	91	87	89	87	82	80
TOTAL	**203**	**214**	**208**	**203**	**202**	**209**	**200**	**200**

Table A3.7. *Top 200 – Leiden (all countries)*

	2011–2012	2013	2014	2015	2016	2017	2018	2019
China	6	13	6	6	5	10	10	10
India	0	0	0	0	0	0	0	0
Japan	0	0	0	0	0	0	0	0
Russia	0	0	0	0	0	0	0	0
USA	97	92	91	87	89	87	82	80
Others	100	109	111	110	108	112	108	110
TOTAL	**203**	**214**	**208**	**203**	**202**	**209**	**200**	**200**

Table A3.8. *Top 200 – Leiden (flagship countries)*

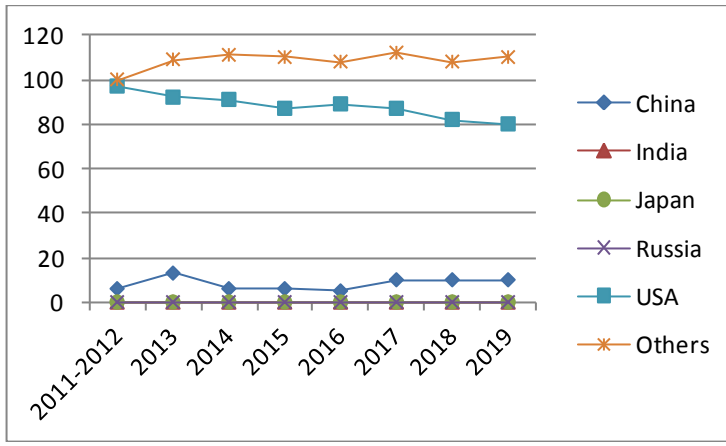

Figure A3.9. *Top 200 – Leiden (flagship countries)*

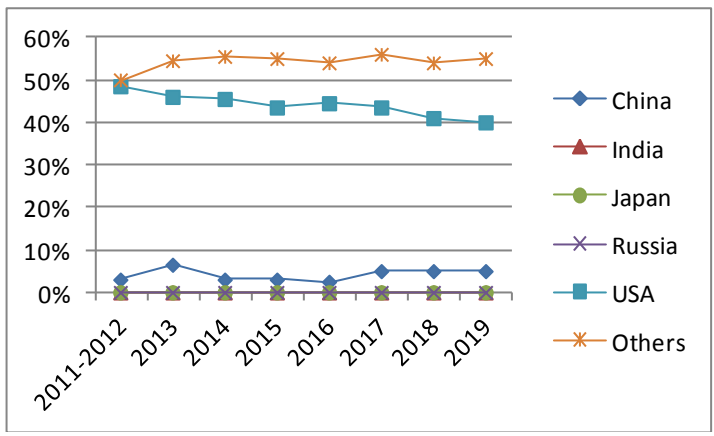

Figure A3.10. *Top 200 – Leiden (flagship countries by percentage)*

	2011–2012	2013	2014	2015	2016	2017	2018	2019
African	0	0	0	0	0	0	0	0
Chinese	10	17	9	8	7	13	13	13
Hindu	0	0	0	0	0	0	0	0
Islamic	0	0	0	1	1	1	1	1
Japanese	0	0	0	0	0	0	0	0
Latin American	0	0	0	0	0	0	0	0
Western	193	197	199	194	194	195	186	186
Orthodox	0	0	0	0	0	0	0	0
TOTAL	**203**	**214**	**208**	**203**	**202**	**209**	**200**	**200**

Table A3.9. *Top 200 – Leiden (civilizations)*

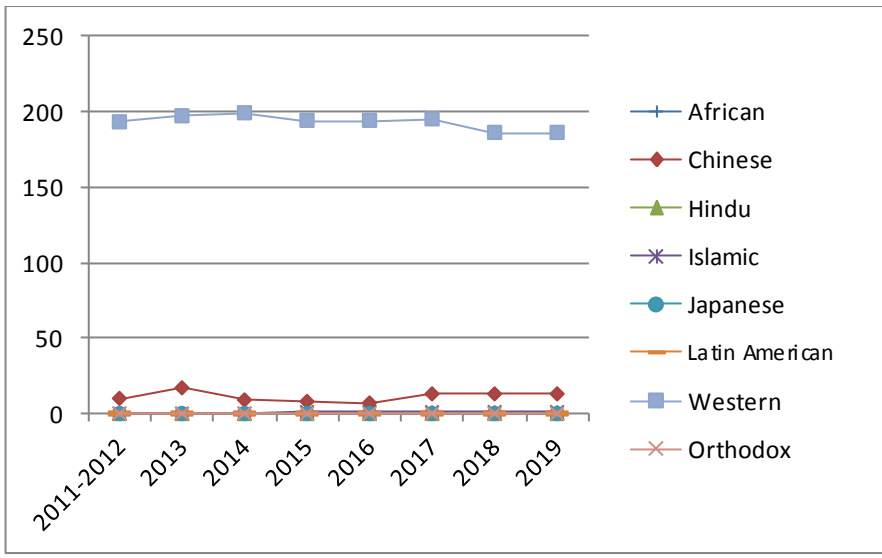

Figure A3.11. *Top 200 – Leiden (civilizations)*

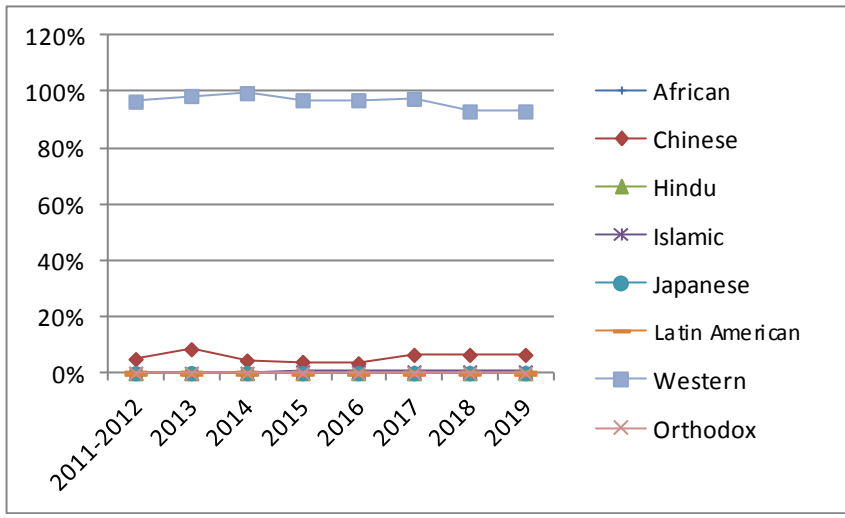

Figure A3.12. *Top 200 – Leiden (civilizations by percentage)*

	2003	2004	2005	2006	2007	2008	2009	2010
Argentina	0	0	0	1	1	1	1	1
Australia	7	6	6	6	7	6	6	7
Austria	1	1	1	1	1	1	1	1
Belgium	2	4	4	4	4	4	4	4
Brazil	1	1	1	1	1	1	1	1
Canada	7	9	8	8	7	6	6	8
China	0	0	1	1	1	0	0	2
Denmark	2	3	3	3	3	3	3	3
Finland	1	1	1	1	1	1	1	1
France	8	8	8	6	7	7	7	7
Germany	16	17	16	15	14	14	14	14
Hong Kong	0	0	0	1	0	0	0	1
Israel	3	3	4	4	4	4	4	4
Italy	4	5	5	6	5	5	4	4
Japan	9	9	9	9	9	9	9	9
Mexico	1	1	1	1	1	1	1	1

	2003	2004	2005	2006	2007	2008	2009	2010
The Netherlands	8	7	7	7	9	9	9	9
New Zealand	0	0	0	0	0	0	0	0
Norway	1	1	1	1	1	1	1	1
Portugal	0	0	0	0	0	0	0	0
Republic of Ireland	0	0	0	0	0	0	0	0
Russian Federation	1	1	1	1	1	1	1	1
Saudi Arabia	0	0	0	0	0	0	0	0
Singapore	1	1	1	1	1	1	1	1
South Korea	1	1	1	1	1	1	1	1
Spain	1	1	2	1	1	1	1	0
Sweden	6	6	5	4	4	4	4	4
Switzerland	6	6	6	6	6	6	6	6
Taiwan	1	1	1	1	1	1	1	1
UK	19	18	19	22	23	22	23	19
USA	93	90	90	87	88	90	90	89
Total	**200**	**201**	**202**	**200**	**202**	**200**	**200**	**200**

Table A3.10. *Top 200 – Shanghai (all countries, 2003–2010)*

	2011	2012	2013	2014	2015	2016	2017	2018	2019
Argentina	1	1	1	1	1	1	0	0	0
Australia	7	7	7	8	8	8	10	9	8
Austria	1	1	1	1	1	2	2	1	1
Belgium	4	4	4	4	4	4	4	4	4
Brazil	1	1	1	1	1	1	1	1	1
Canada	8	7	7	7	6	6	8	9	9
China	1	4	5	6	7	9	9	12	17
Denmark	3	3	3	3	3	3	3	3	3
Finland	1	1	1	1	1	1	1	1	1
France	8	8	8	8	8	9	9	8	9
Germany	14	14	14	13	13	14	15	14	10
Hong Kong	1	2	1	2	2	1	2	2	2
Israel	4	4	4	4	4	4	4	4	4
Italy	4	4	4	6	5	2	2	1	3

	2011	2012	2013	2014	2015	2016	2017	2018	2019
Japan	9	9	9	8	7	6	7	7	7
Mexico	1	1	1	0	0	1	0	0	0
The Netherlands	9	8	8	8	8	9	9	9	9
New Zealand	0	1	0	0	0	1	0	0	0
Norway	1	1	1	1	2	2	2	2	2
Portugal	0	0	0	0	0	1	1	1	1
Republic of Ireland	0	0	0	1	1	1	1	1	1
Russian Federation	1	1	1	1	1	1	1	1	1
Saudi Arabia	0	0	1	2	2	2	2	2	2
Singapore	1	1	1	2	2	2	2	2	2
South Korea	1	1	1	1	1	3	1	2	2
Spain	0	0	0	1	1	1	0	1	1
Sweden	4	5	5	5	5	5	5	5	5
Switzerland	6	6	6	7	6	6	7	7	7
Taiwan	1	1	1	1	1	2	2	1	1
UK	19	19	19	20	21	21	20	21	21
USA	89	85	85	77	78	71	70	69	66
TOTAL	**200**	**200**	**200**	**200**	**200**	**200**	**200**	**200**	**200**

Table A3.11. *Top 200 – Shanghai (all countries, 2011–2019)*

	2003	2004	2005	2006	2007	2008	2009	2010
China	0	0	1	1	1	0	0	1
India	0	0	0	0	0	0	0	9
Japan	9	9	9	9	9	9	9	89
Russia	1	1	1	1	1	1	1	0
USA	93	90	90	87	88	90	90	2
Others	97	101	101	102	103	100	100	99
TOTAL	**200**	**201**	**202**	**200**	**202**	**200**	**200**	**200**

Table A3.12. *Top 200 – Shanghai (flagship countries, 2003–2010)*

	2011	2012	2013	2014	2015	2016	2017	2018	2019
China	1	4	5	6	7	9	9	12	17
India	0	0	0	0	0	0	0	0	0
Japan	9	9	9	8	7	6	7	7	7
Russia	1	1	1	1	1	1	1	1	1
USA	89	85	85	77	78	71	70	69	66
Others	100	101	100	108	107	113	113	111	109
TOTAL	**200**	**200**	**200**	**200**	**200**	**200**	**200**	**200**	**200**

Table A3.13. *Top 200 – Shanghai (flagship countries, 2011–2019)*

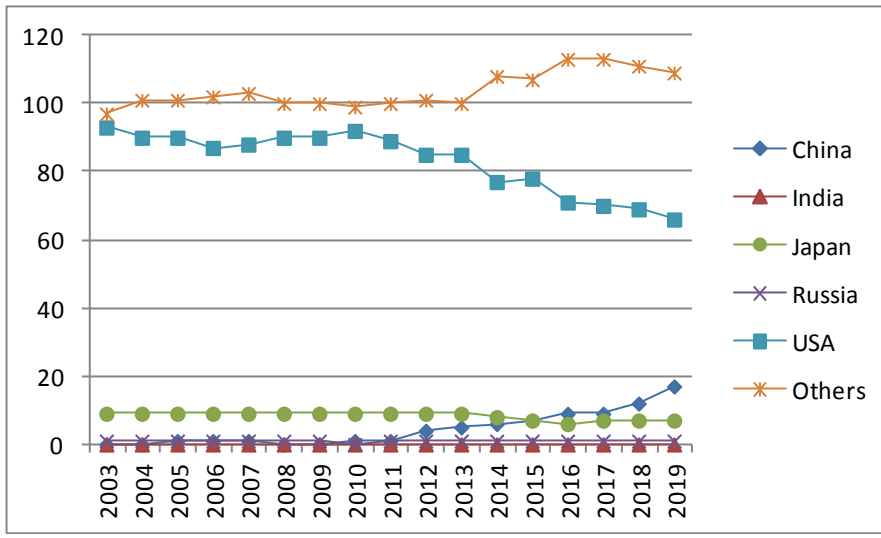

Figure A3.13. *Top 200 – Shanghai (flagship countries)*

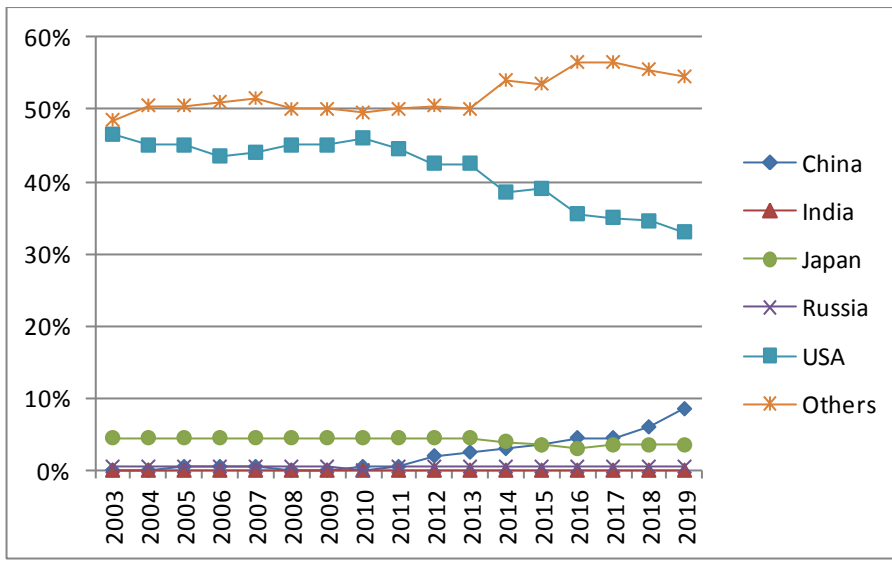

Figure A3.14. *Top 200 – Shanghai (flagship countries by percentage)*

	2003	2004	2005	2006	2007	2008	2009	2010
African	0	0	0	0	0	0	0	0
Buddhist	0	0	0	0	0	0	0	0
Chinese	3	3	4	5	4	3	3	6
Hindu	0	0	0	0	0	0	0	0
Islamic	0	0	0	0	0	0	0	0
Japanese	9	9	9	9	9	9	9	9
Latin American	2	2	2	3	3	3	3	3
Western	186	186	186	182	185	184	184	181
Orthodox	1	1	1	1	1	1	1	1
TOTAL	**201**	**201**	**202**	**200**	**202**	**200**	**200**	**200**

Table A3.14. *Top 200 – Shanghai (civilizations, 2003–2010)*

	2011	2012	2013	2014	2015	2016	2017	2018	2019
African	0	0	0	0	0	0	0	0	0
Buddhist	0	0	0	0	0	0	0	0	0
Chinese	5	9	9	12	13	17	16	19	24
Hindu	0	0	0	0	0	0	0	0	0
Islamic	0	0	1	2	2	2	2	2	2
Japanese	9	9	9	8	7	6	7	7	7
Latin American	3	3	3	2	2	3	1	1	1
Western	182	178	177	175	175	171	173	170	165
Orthodox	1	1	1	1	1	1	1	1	1
TOTAL	**200**	**200**	**200**	**200**	**200**	**200**	**200**	**200**	**200**

Table A3.15. *Top 200 – Shanghai (civilizations, 2011–2019)*

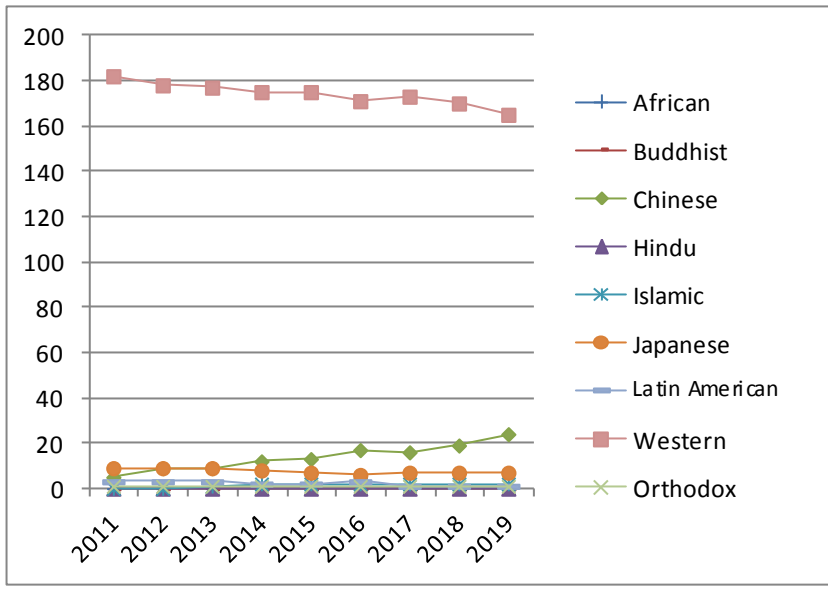

Figure A3.15. *Top 200 – Shanghai (civilizations)*

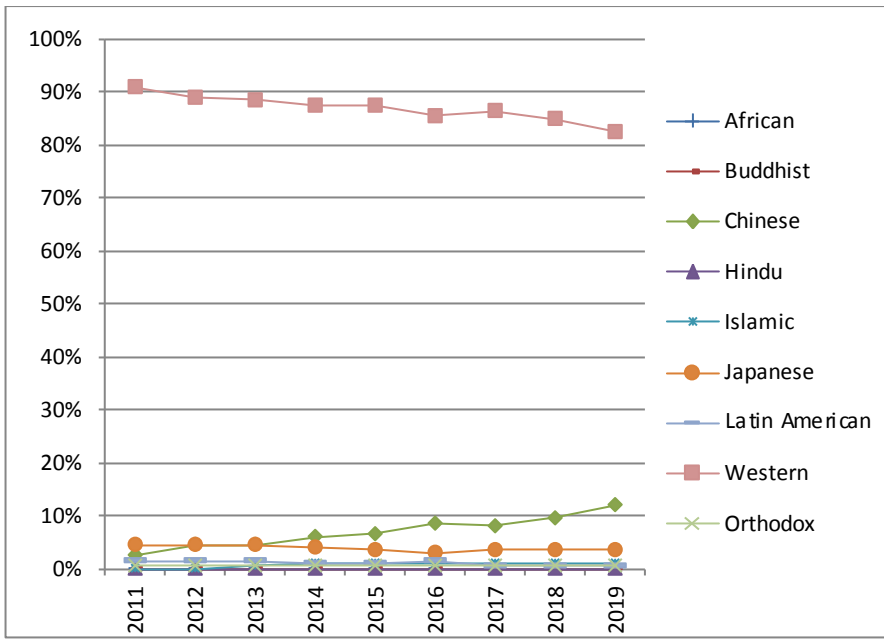

Figure A3.16. *Top 200 – Shanghai (civilizations by percentage)*

Appendix 4

Top 1000 Rankings

The approach of this Appendix is broadly similar to that in Appendix 3 for the Top 200, with a few differences.

It should be remembered that the term "Top 1000" is inappropriate, since the ranking organizations have not systematically ranked 1000 universities throughout the reference periods, but rather have done so from 2017/2018 onwards. The term "Top 1000" is therefore fairer for the last few years than for the first few. The increase in the number of ranked universities also has a significant impact on both absolute numbers and percentages. The tables and graphs show the total number of universities ranked by each organization in each year of the reference periods.

For each of the THE, QS, CWTS and ARWU ranking organizations, we structure the information according to "flagship countries" and then "civilizations" in the form of a table and two graphs on the reference periods. These complete the "Analysis of the Top 1000" section in Chapter 3 (section 3.4):

– for the "flagship countries" section, a table gives the number of universities from the flagship countries, ranked annually over the reference period; the number of universities not coming from a flagship country is added to the "others" section. The last row shows the total number of universities ranked by the organization concerned per year. The absolute figures in this table are then represented in a graph. The relative data (percentage and therefore proportions) are then given in a second graph;

For a color version of all figures in this book, see www.iste.co.uk/leprevost/universities.zip.

– the "civilizations" section is, *mutatis mutandis*, structured like the "flagship countries" section.

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
China	6	10	9	10	11	37	52	63	72	81
India	0	1	3	5	4	17	31	42	49	56
Japan	5	16	13	11	12	41	69	89	103	110
Russia	0	2	2	1	2	13	24	27	35	39
USA	70	105	104	104	105	147	148	157	172	172
Others	117	259	262	264	263	545	657	725	827	938
TOTAL	**198**	**393**	**393**	**395**	**397**	**800**	**981**	**1103**	**1258**	**1396**

Table A4.1. *Top 1000 – THE (flagship countries)*

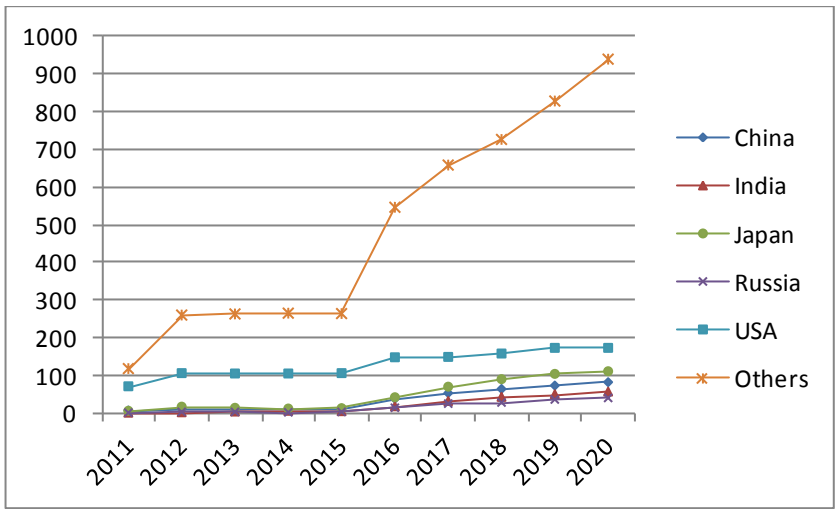

Figure A4.1. *Top 1000 – THE (flagship countries)*

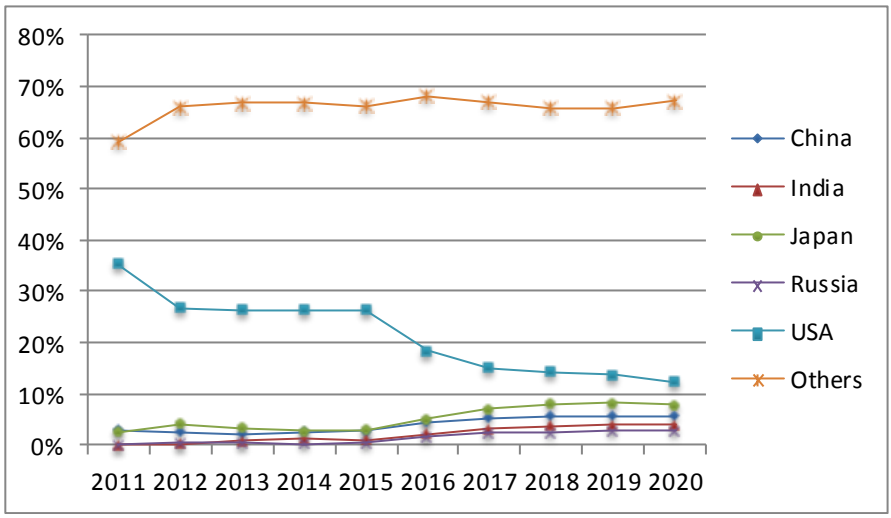

Figure A4.2. *Top 1000 – THE (flagship countries by percentage)*

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
African	1	3	4	3	3	10	12	12	16	18
Buddhist	0	1	1	1	1	7	10	11	15	18
Chinese	20	33	30	33	35	94	113	131	144	163
Hindu	0	1	3	5	4	17	31	42	50	57
Islamic	3	6	7	8	9	42	75	96	130	172
Japanese	5	16	13	11	12	41	69	89	103	110
Latin American	0	3	4	3	4	28	51	67	87	101
Western	169	327	328	329	326	530	572	606	651	685
Orthodox	0	3	3	2	3	31	48	49	62	72
TOTAL	**198**	**393**	**393**	**395**	**397**	**800**	**981**	**1103**	**1258**	**1396**

Table A4.2. *Top 1000 – THE (civilizations)*

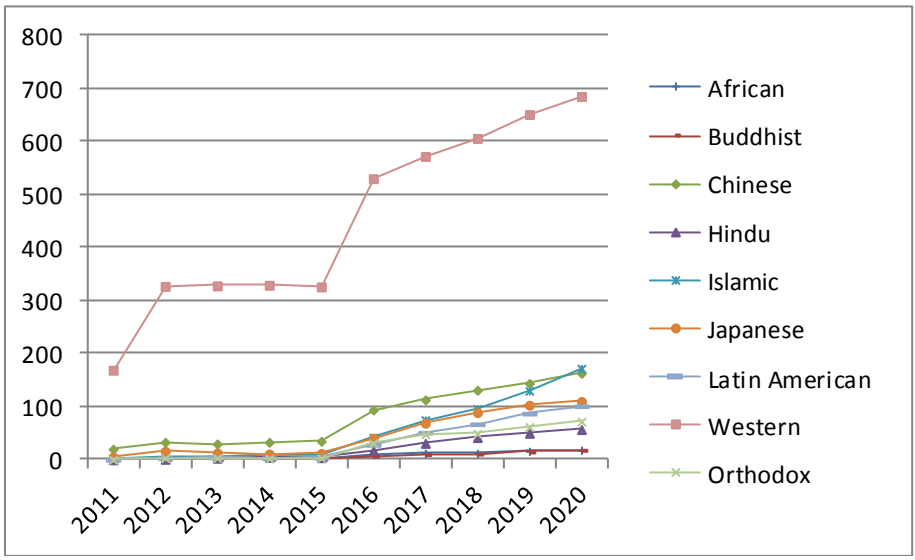

Figure A4.3. *Top 1000 – THE (civilizations)*

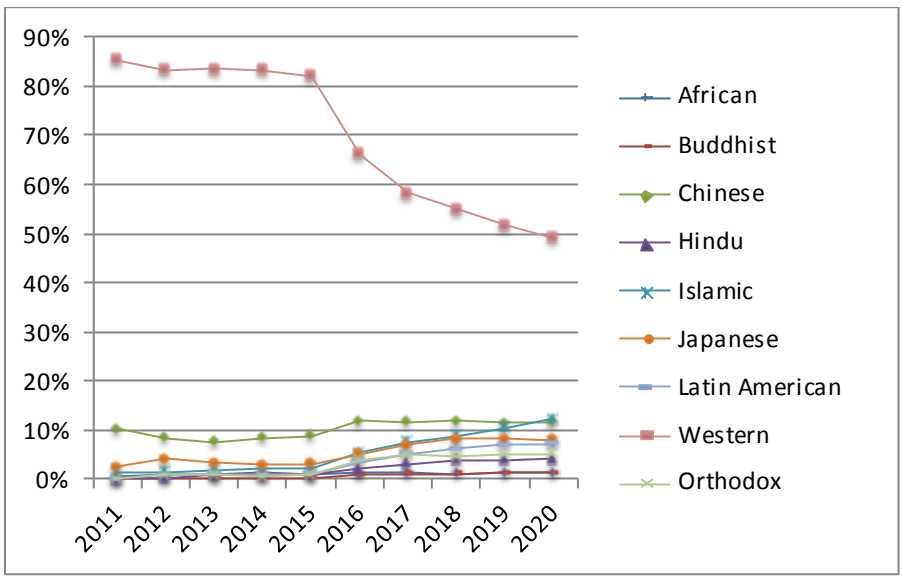

Figure A4.4. *Top 1000 – THE (civilizations by percentage)*

	2012	2013–2014	2014–2015	2015-2016	2016–2017	2018	2019	2020
China	25	25	27	30	33	39	40	42
India	10	10	11	11	11	18	25	24
Japan	38	38	38	38	39	43	44	41
Russia	15	15	18	19	22	23	27	25
USA	143	143	144	153	154	159	159	157
Others	564	566	589	606	630	671	726	713
TOTAL	**795**	**797**	**827**	**857**	**889**	**953**	**1021**	**1002**

Table A4.3. *Top 1000 – QS (flagship countries)*

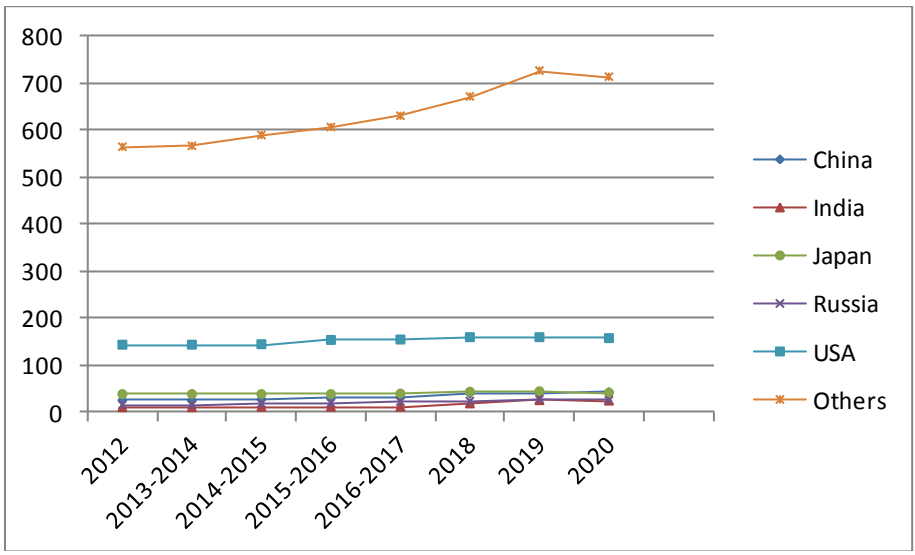

Figure A4.5. *Top 1000 – QS (flagship countries)*

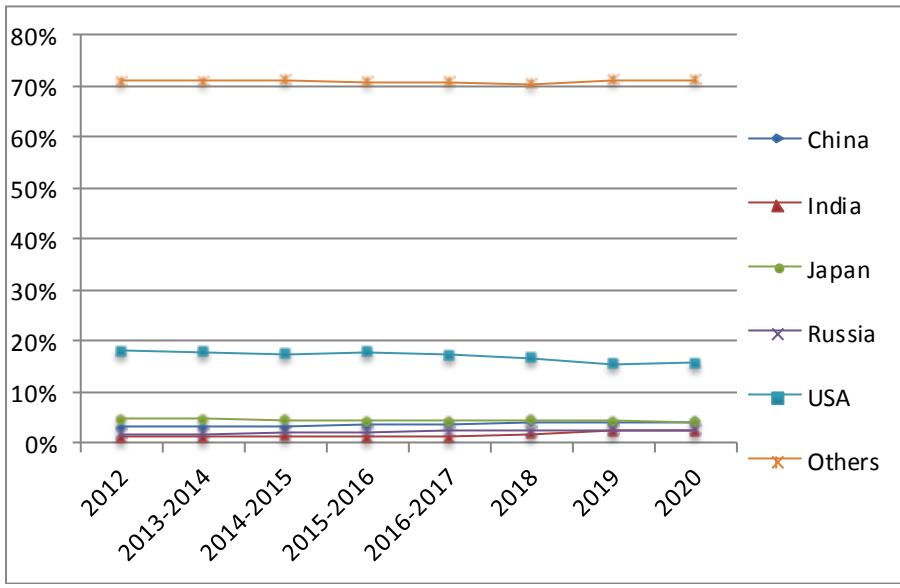

Figure A4.6. *Top 1000 – QS (flagship countries by percentage)*

	2012	2013–2014	2014–2015	2015–2016	2016–2017	2018	2019	2020
African	7	7	8	10	10	10	10	8
Buddhist	9	9	9	9	9	9	9	9
Chinese	76	76	79	84	91	100	104	105
Hindu	10	10	11	11	11	18	25	24
Islamic	53	53	58	60	66	69	93	94
Japanese	38	38	38	38	39	43	44	41
Latin American	79	79	83	88	88	87	93	88
Western	485	487	496	511	526	567	585	580
Orthodox	38	38	45	46	49	50	58	53
TOTAL	**795**	**797**	**827**	**857**	**889**	**953**	**1021**	**1002**

Table A4.4. *Top 1000 – QS (civilizations)*

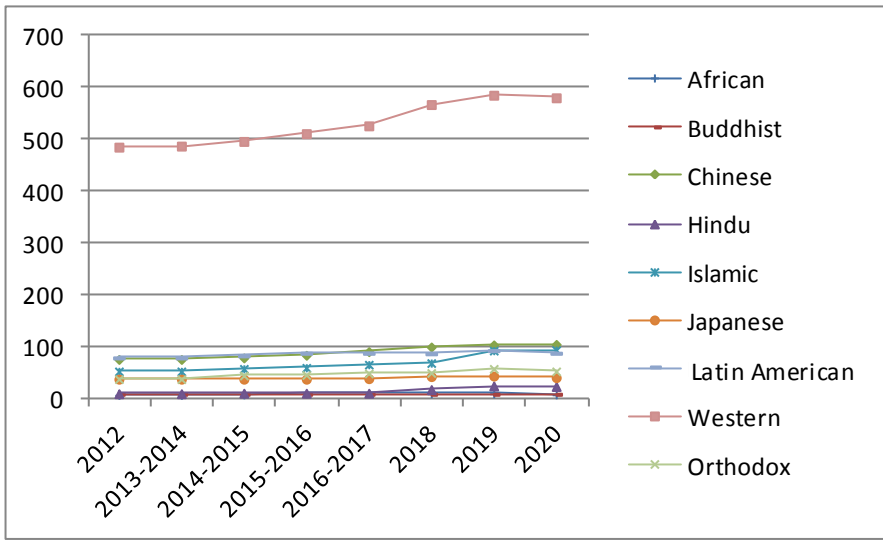

Figure A4.7. *Top 1000 – QS (civilizations)*

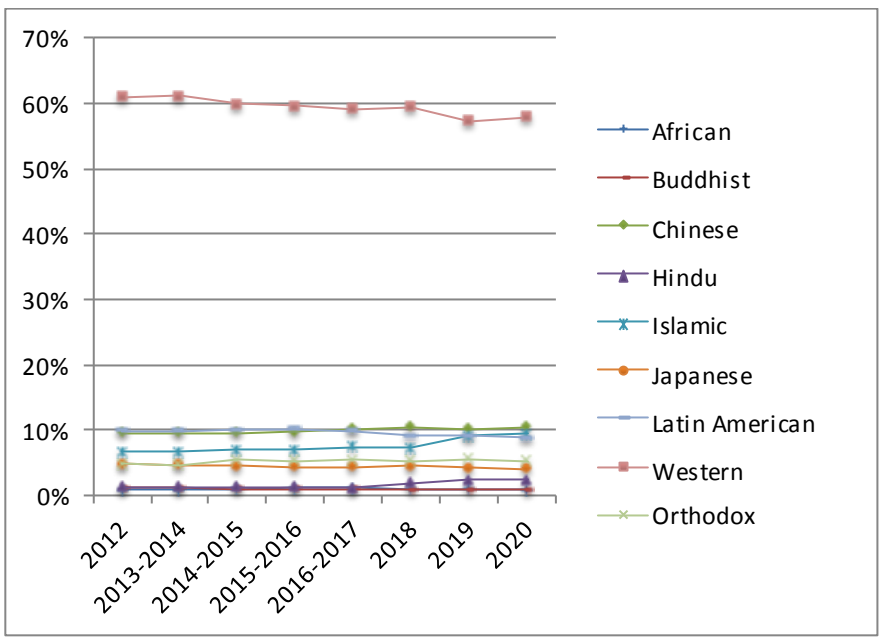

Figure A4.8. *Top 1000 – QS (civilizations by percentage)*

	2011–2012	2013	2014	2015	2016	2017	2018	2019
China	31	37	83	90	114	138	148	165
India	4	4	16	17	19	20	24	25
Japan	24	18	38	37	38	41	41	42
Russia	2	2	1	2	2	2	2	3
USA	127	122	166	158	173	177	175	173
Others	312	309	446	446	496	525	548	555
TOTAL	**500**	**492**	**750**	**750**	**842**	**903**	**938**	**963**

Table A4.5. *Top 1000 – Leiden (flagship countries)*

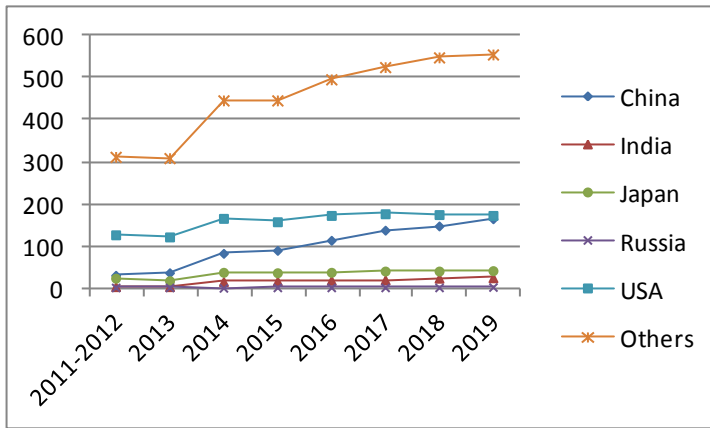

Figure A4.9. *Top 1000 – Leiden (flagship countries)*

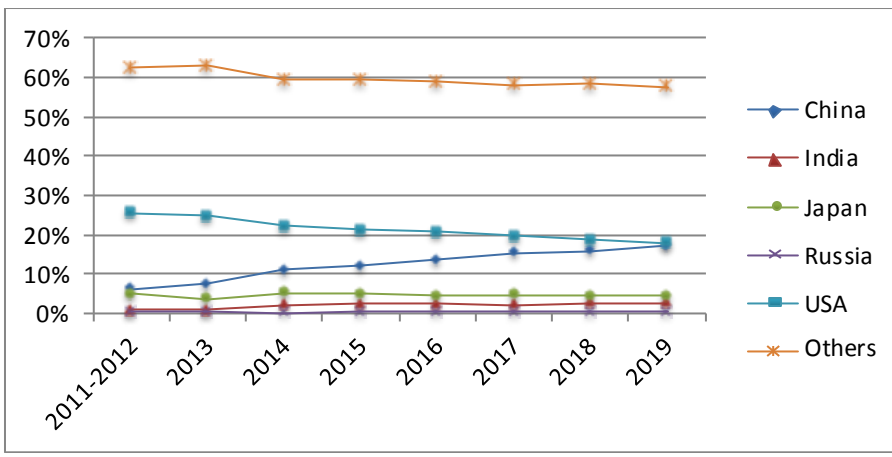

Figure A4.10. *Top 1000 – Leiden (flagship countries by percentage)*

	2011–2012	2013	2014	2015	2016	2017	2018	2019
African	4	5	5	5	5	6	7	7
Buddhist	2	2	3	3	5	5	5	6
Chinese	60	66	127	137	168	192	203	219
Hindu	4	4	16	17	19	20	24	25
Islamic	6	13	36	37	41	50	60	66
Japanese	24	18	38	37	38	41	41	42
Latin American	13	15	19	20	25	29	32	34
Western	378	363	498	485	529	548	554	551
Orthodox	9	6	8	9	12	12	12	13
TOTAL	**500**	**492**	**750**	**750**	**842**	**903**	**938**	**963**

Table A4.6. *Top 1000 – Leiden (civilizations)*

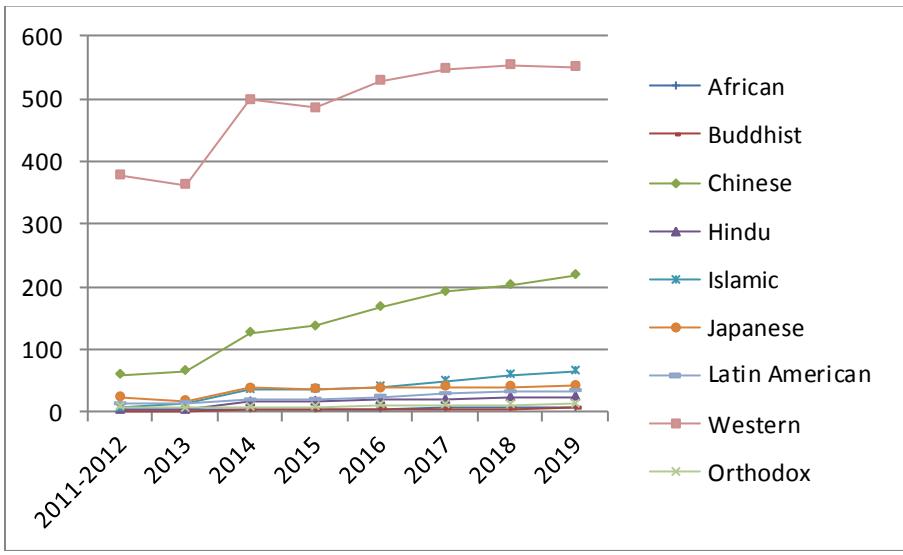

Figure A4.11. *Top 1000 – Leiden (civilizations)*

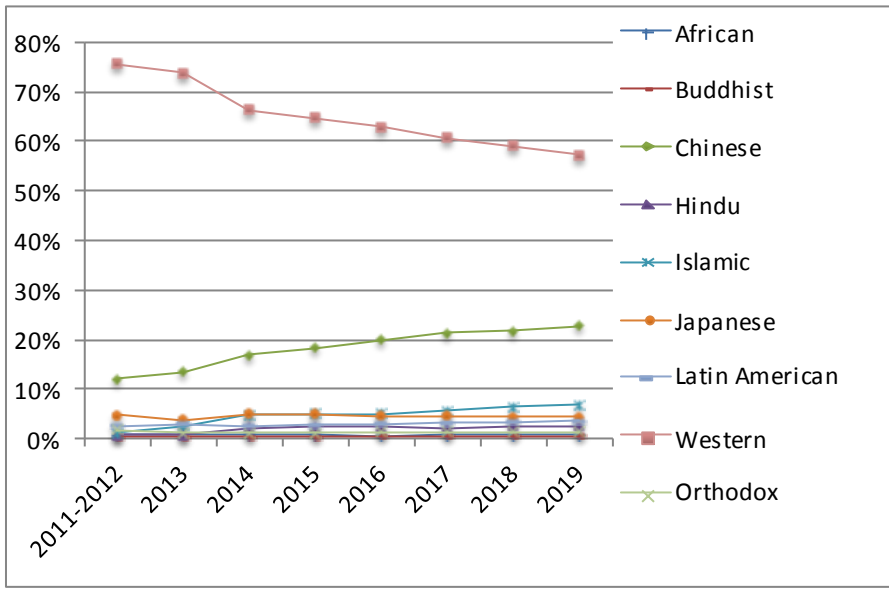

Figure A4.12. *Top 1000 – Leiden (civilizations by percentage)*

	2003	2004	2005	2006	2007	2008	2009	2010
China	9	8	8	9	14	18	18	22
India	3	3	3	2	2	2	2	2
Japan	36	36	34	32	33	31	31	25
Russia	2	2	2	2	2	2	2	2
USA	161	170	168	167	166	159	152	154
Others	288	283	285	288	293	291	296	295
TOTAL	**499**	**502**	**500**	**500**	**510**	**503**	**501**	**500**

Table A4.7. *Top 1000 – Shanghai (flagship countries, 2003–2010)*

	2011	2012	2013	2014	2015	2016	2017	2018	2019
China	23	28	28	28	32	41	91	123	132
India	1	1	1	1	1	1	7	16	16
Japan	23	21	20	20	18	16	36	45	43
Russia	2	2	2	2	2	3	4	12	11
USA	151	150	149	146	146	137	190	217	206
Others	300	298	300	303	301	302	472	587	592
TOTAL	**500**	**500**	**500**	**500**	**500**	**500**	**800**	**1000**	**1000**

Table A4.8. *Top 1000 – Shanghai (flagship countries, 2011–2019)*

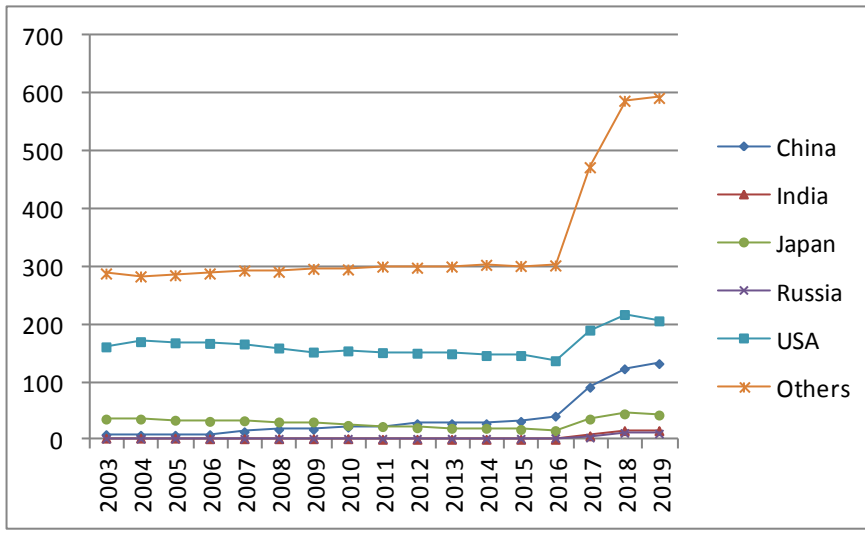

Figure A4.13. *Top 1000 – Shanghai (flagship countries)*

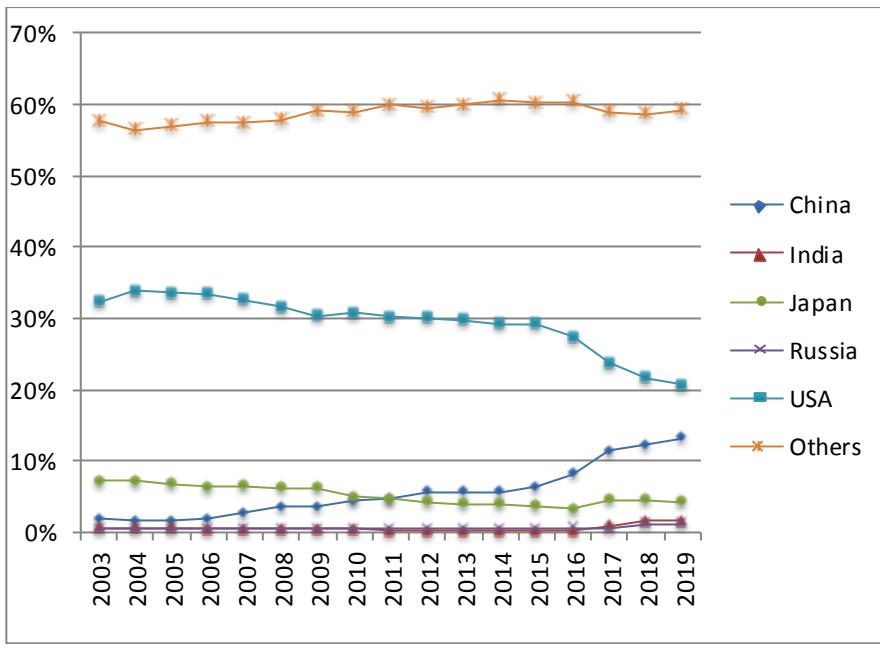

Figure A4.14. *Top 1000 – Shanghai (flagship countries by percentage)*

	2003	2004	2005	2006	2007	2008	2009	2010
African	4	4	4	4	4	3	3	3
Buddhist	0	0	0	0	0	0	0	0
Chinese	29	26	28	30	35	40	41	46
Hindu	3	3	3	2	2	2	2	2
Islamic	2	0	2	1	2	1	3	4
Japanese	36	36	34	32	33	31	31	25
Latin American	7	7	7	7	9	10	10	10
Western	414	422	418	420	421	412	407	406
Orthodox	4	4	4	4	4	4	4	4
TOTAL	**499**	**502**	**500**	**500**	**510**	**503**	**501**	**500**

Table A4.9. *Top 1000 – Shanghai (civilizations, 2003–2010)*

	2011	2012	2013	2014	2015	2016	2017	2018	2019
African	3	3	3	4	4	4	8	9	9
Buddhist	0	0	0	0	0	0	3	4	4
Chinese	48	54	55	56	58	67	142	183	189
Hindu	1	1	1	1	1	1	7	16	16
Islamic	6	7	8	9	10	11	28	49	47
Japanese	23	21	20	19	18	16	36	45	43
Latin American	11	10	10	10	10	9	24	36	37
Western	404	399	398	396	394	386	543	635	631
Orthodox	4	5	5	5	5	6	9	23	24
TOTAL	**500**	**500**	**500**	**500**	**500**	**500**	**800**	**1000**	**1000**

Table A4.10. *Top 1000 – Shanghai (civilizations, 2011–2019)*

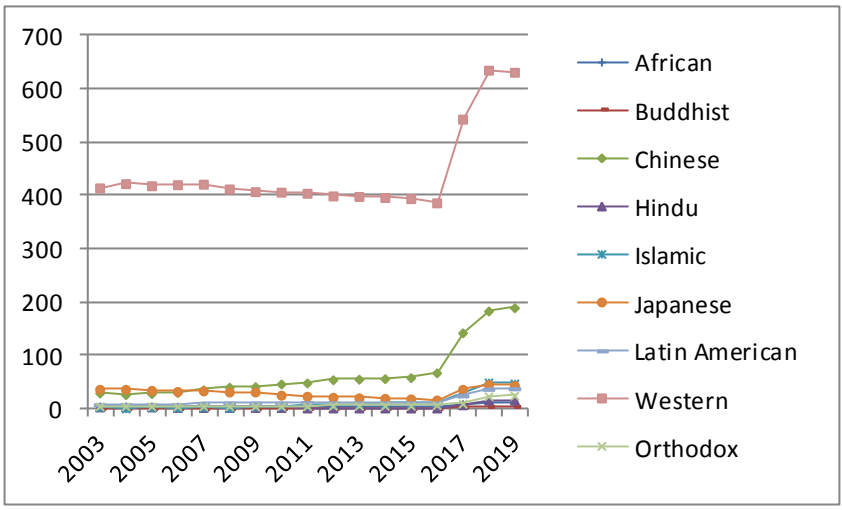

Figure A4.15. *Top 1000 – Shanghai (civilizations)*

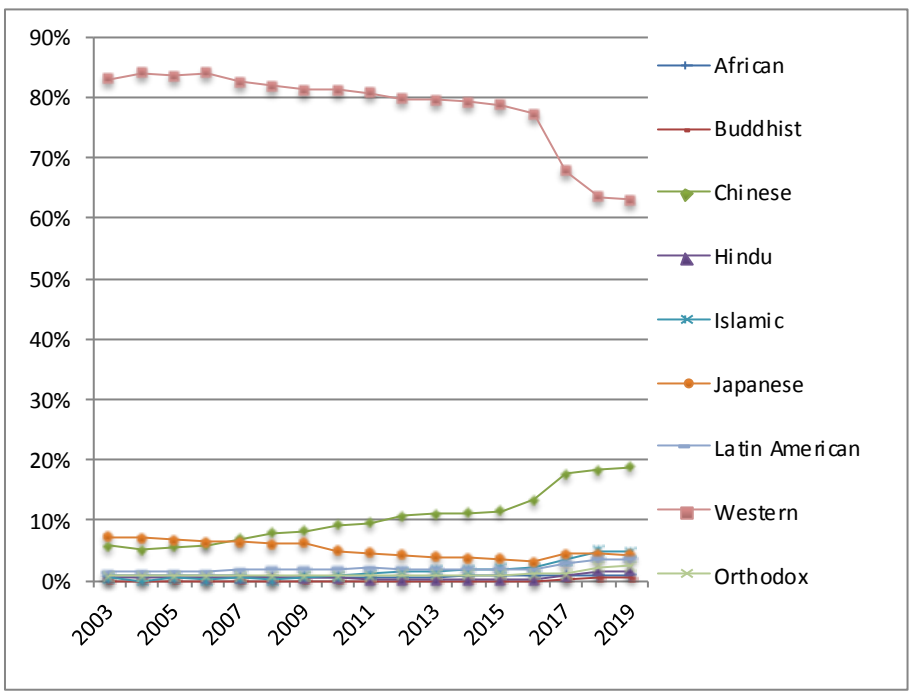

Figure A4.16. *Top 1000 – Shanghai (civilizations by percentage)*

Appendix 5

Continental and Western Europe

The following tables and graphs support the section on Europe in the concluding chapter.

Top 200 – the share of Continental and Western Europe: for the top 200 of each of the rankings, we give a table for the countries of Western and Continental Europe (abbreviated here as CWE). The last line shows the exact number of universities actually ranked in the Top 200 (which may therefore differ from 200). The first line gives the number (in absolute figures) of universities in Continental and Western European countries (these are the countries in italics in "Huntington's country – civilization dictionary", located at the beginning of these appendices) for each of the years of the reference period. The second line shows the absolute number and the fourth line the percentage of universities in Western countries (abbreviated as OCC) in the Top 200 per year. The third line gives the relative share of Continental and Western European countries in Western civilization, with respect to the number of their universities in the Top 200 per year. The fifth line gives the percentage of Continental and Western European universities in the Top 200 per year.

	2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
CWE	51	52	51	54	54	68	66	71	68	67
OCC	169	178	179	181	176	184	180	180	176	176
CWE/OCC	30.18%	29.21%	28.49%	29.83%	30.68%	36.96%	36.67%	39.44%	38.64%	38.07%
OCC/TOP 200	85.35%	89.90%	89.95%	90.50%	87.56%	92%	89.55%	88.67%	88.00%	87.13%
CWE/TOP 200	25.76%	26.26%	25.63%	27.00%	26.87%	34.00%	32.84%	34.98%	34.00%	33.17%
TOTAL	**198**	**198**	**199**	**200**	**201**	**200**	**201**	**203**	**200**	**202**

Table A5.1. *Top 200 – THE (Western and Continental Europe)*

For a color version of all figures in this book, see www.iste.co.uk/leprevost/universities.zip.

	2012	2013–2014	2014–2015	2015–2016	2016–2017	2018	2019	2020
CWE	51	57	55	55	53	56	58	57
OCC	157	161	160	156	154	152	156	152
CWE/ OCC	32.48%	35.40%	34.38%	35.26%	34.42%	36.84%	37.18%	37.50%
OCC/ TOP 200	80.10%	81.31%	80.40%	78.79%	78.17%	77.55%	77.61%	75.25%
CWE/ TOP 200	26.02%	28.79%	27.64%	27.78%	26.90%	28.57%	28.86%	28.22%
TOTAL	**196**	**198**	**199**	**198**	**197**	**196**	**201**	**202**

Table A5.2. *Top 200 – QS (Western and Continental Europe)*

	2011–2012	2013	2014	2015	2016	2017	2018	2019
CWE	56	61	58	59	53	54	51	51
OCC	193	197	199	194	194	195	186	186
CWE/OCC	29.02%	30.96%	29.15%	30.41%	27.32%	27.69%	27.42%	27.42%
OCC/TOP 200	95.07%	92.06%	95.67%	95.57%	96.04%	93.30%	93.00%	93.00%
CWE/TOP 200	27.59%	28.50%	27.88%	29.06%	26.24%	25.84%	25.50%	25.50%
TOTAL	**203**	**214**	**208**	**203**	**202**	**209**	**200**	**200**

Table A5.3. *Top 200 – CWTS (Western and Continental Europe)*

	2003	2004	2005	2006	2007	2008	2009	2010
CWE	56	60	59	55	56	56	55	54
OCC	186	186	186	182	185	184	184	181
CWE/OCC	30.11%	32.26%	31.72%	30.22%	30.27%	30.43%	29.89%	29.83%
OCC/TOP 200	92.54%	92.54%	92.08%	91.00%	91.58%	92.00%	92.00%	90.50%
CWE/TOP 200	27.86%	29.85%	29.21%	27.50%	27.72%	28.00%	27.50%	27.00%
TOTAL	**201**	**201**	**202**	**200**	**202**	**200**	**200**	**200**

Table A5.4. *Top 200 – ARWU (Western and Continental Europe, 2003–2010)*

	2011	2012	2013	2014	2015	2016	2017	2018	2019
CWE	55	55	55	58	57	59	60	57	56
OCC	182	178	177	175	175	171	173	170	165
CWE/OCC	30.22%	30.90%	31.07%	33.14%	32.57%	34.50%	34.68%	33.53%	33.94%
OCC/TOP 200	91.00%	89.00%	88.50%	87.50%	87.50%	85.50%	86.50%	85.00%	82.50%
CWE/TOP 200	27.50%	27.50%	27.50%	29.00%	28.50%	29.50%	30.00%	28.50%	28.00%
TOTAL	**200**	**200**	**200**	**200**	**200**	**200**	**200**	**200**	**200**

Table A5.5. *Top 200 – Shanghai (Western and Continental Europe, 2011–2019)*

Top 1000 – the share of Continental and Western Europe: the approach for the Top 1000 is similar to that of the Top 200, *mutatis mutandis*, with one difference. We provide an extended table, specifying the number of universities per country in Western and Continental Europe. This was not necessary in the case of the Top 200, as we have detailed the "All countries" information in Appendix 3, "Top 200 Rankings", from which the concatenated information for the Top 200 is derived. Here, we specify matters but not for all countries; only for those in Continental and Western Europe.

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Austria	2	5	6	6	5	7	6	8	9	11
Belgium	2	7	7	7	7	7	8	8	8	8
Croatia							1	2	2	2
Czech Republic		1	1	1	1	9	12	13	14	17
Denmark	3	5	5	5	5	6	7	7	7	7
Estonia		1	1	1		2	2	2	2	3
Finland	1	5	5	5	7	9	9	9	9	9
France	4	8	12	11	11	27	29	31	34	38
Germany	14	21	25	26	27	37	41	44	47	48
Hungary						6	7	7	7	8
Italy		14	14	15	17	34	38	40	43	45
Latvia						1	2	2	2	3

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Lithuania						1	2	2	2	3
Luxembourg						1	1	1	1	1
Netherlands	10	13	13	13	13	13	13	13	13	13
Norway	1	4	4	4	4	4	5	5	5	5
Poland		2	2	1	1	7	9	12	12	14
Portugal		4	3	2	2	7	8	9	13	13
Slovakia						2	2	3	3	4
Slovenia						2	2	2	2	2
Spain	2	8	7	9	6	25	27	29	38	45
Sweden	6	10	10	10	10	11	11	11	11	12
Switzerland	6	7	8	8	8	10	10	10	10	11
ECO	51	115	123	124	124	228	252	270	294	322
OCC	169	327	328	329	326	530	572	606	651	685
ECO/OCC	30.18%	35.17%	37.50%	37.69%	38.04%	43.02%	44.06%	44.55%	45.16%	47.01%
OCC/TOP 1000	8535%	83.21%	83.46%	83.29%	82.12%	66.25%	58.31%	54.94%	51.75%	49.07%
ECO/TOP 1000	25.76%	29.26%	31.30%	31.39%	31.23%	28.50%	25.69%	24.48%	23.37%	23.07%
TOTAL	**198**	**393**	**393**	**395**	**397**	**800**	**981**	**1103**	**1258**	**1396**

Table A5.6. *Top 1000 – THE (Western and Continental Europe)*

	2012	2013–2014	2014–2015	2015–2016	2016–2017	2018	2019	2020
Austria	7	7	7	7	7	8	8	8
Belgium	7	7	7	7	8	8	8	8
Croatia	1	1	1	1	1	1	1	1
Czech Republic	5	5	5	4	5	6	6	9
Denmark	5	5	5	5	5	6	6	5
Estonia	2	2	2	2	2	2	3	3
Finland	9	9	9	9	10	10	10	9
France	26	26	28	31	32	37	41	31
Germany	42	42	42	43	43	46	46	46
Hungary	3	3	4	4	6	6	7	6
Italy	26	26	26	26	28	30	31	34

	2012	2013–2014	2014–2015	2015–2016	2016–2017	2018	2019	2020
Latvia	1	1	1	1	1	2	3	3
Lithuania	4	4	4	4	4	4	4	4
Netherlands	13	13	13	13	13	13	13	13
Norway	4	4	4	4	4	5	5	4
Poland	5	5	5	5	5	8	14	16
Portugal	4	4	5	5	5	7	7	7
Slovakia				1	1	1	3	3
Slovenia	1	1	1	1	2	2	2	2
Spain	18	18	18	18	20	23	25	27
Sweden	8	8	8	8	8	10	10	8
Switzerland	8	8	8	8	8	9	9	9
ECO	199	199	203	207	218	244	262	256
OCC	485	487	496	511	526	567	585	580
ECO/OCC	41.03%	40.86%	40.93%	40.51%	41.44%	43.03%	44.79%	44.14%
OCC/TOP 1000	61.01%	61.10%	59.98%	59.63%	59.17%	59.50%	57.30%	57.88%
ECO/TOP 1000	25.03%	24.97%	24.55%	24.15%	24.52%	25.60%	25.66%	25.55%
TOTAL	**795**	**797**	**827**	**857**	**889**	**953**	**1021**	**1002**

Table A5.7. *Top 1000 – QS (Western and Continental Europe)*

	2011–2012	2013	2014	2015	2016	2017	2018	2019
Austria	5	4	8	9	9	10	10	10
Belgium	7	7	7	7	7	7	7	7
Croatia	1	1	1	1	1	1	1	1
Czech Republic	1	1	3	3	4	5	5	7
Denmark	4	3	5	5	5	5	5	5
Estonia	0	0	1	1	1	1	1	1
Finland	6	4	7	7	8	8	8	8
France	20	19	25	23	24	24	26	25
Germany	39	40	47	47	49	50	50	50
Hungary	2	0	5	5	5	5	5	5
Italy	25	24	33	33	37	39	39	40
Lithuania	0	0	0	0	1	1	1	1

	2011–2012	2013	2014	2015	2016	2017	2018	2019
Netherlands	12	12	13	13	13	13	13	13
Norway	3	3	4	4	4	5	5	5
Poland	3	2	8	7	13	19	23	24
Portugal	6	6	6	6	6	6	6	6
Slovakia	0	0	1	1	1	1	1	1
Slovenia	1	1	1	1	1	1	1	1
Spain	16	15	28	28	32	34	34	34
Sweden	10	10	10	10	10	10	11	11
Switzerland	7	7	7	7	7	7	7	7
ECO	168	159	220	218	238	252	259	262
OCC	378	363	498	485	529	548	554	551
ECO/OCC	44.44%	43.80%	44.18%	44.95%	44.99%	45.99%	46.75%	47.55%
OCC/TOP 1000	75.60%	73.78%	66.40%	64.67%	62.83%	60.69%	59.06%	57.22%
ECO/TOP 1000	33.60%	32.32%	29.33%	29.07%	28.27%	27.91%	27.61%	27.21%
TOTAL	**500**	**492**	**750**	**750**	**842**	**903**	**938**	**963**

Table A5.8. *Top 1000 – CWTS (Western and Continental Europe)*

	2003	2004	2005	2006	2007	2008	2009	2010
Austria	4	5	6	7	7	7	7	7
Belgium	7	7	7	7	7	7	7	7
Croatia								
Czech Republic	1	1	1	1	1	1	1	1
Denmark	6	5	5	5	4	4	4	4
Estonia								
Finland	5	5	5	5	5	6	5	6
France	22	22	21	21	23	23	23	22
Germany	42	43	40	40	41	40	40	39
Hungary	2	3	2	2	2	2	2	2
Italy	22	23	23	23	20	22	21	22
Latvia								

	2003	2004	2005	2006	2007	2008	2009	2010
Lithuania								
Luxembourg								
Netherlands	12	12	12	12	12	12	12	12
Norway	3	4	4	4	4	4	4	4
Poland	3	2	3	2	2	2	2	2
Portugal	1	1	1		2	2	2	2
Slovakia								
Slovenia	1				1	1	1	1
Spain	13	9	9	9	9	9	11	10
Sweden	10	10	11	11	11	11	11	11
Switzerland	8	8	8	8	8	8	8	7
ECO	162	160	158	157	159	161	161	159
OCC	414	422	418	420	421	412	407	406
ECO/OCC	39.13%	37.91%	37.80%	37.38%	37.77%	39.08%	39.56%	39.16%
OCC/TOP 1000	82.97%	84.06%	83.60%	84.00%	82.55%	81.91%	81.24%	81.20%
ECO/TOP 1000	32.46%	31.87%	31.60%	31.40%	31.18%	32.01%	32.14%	31.80%
TOTAL	**499**	**502**	**500**	**500**	**510**	**503**	**501**	**500**

Table A5.9. *Top 1000 – ARWU (Western and Continental Europe, 2003–2010)*

Appendix 6

Europe: 5 + 1

The following tables and graphs concern the comparative study of five Continental and Western European countries – Belgium, France, Germany, The Netherlands, Switzerland – and one Anglo-Saxon European country: the United Kingdom.

Top 200: 5 + 1

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Germany	14	12	11	10	12	20	22	20	23	23
Belgium	2	3	4	5	4	4	3	4	3	4
France	4	5	7	8	7	5	4	7	4	5
The Netherlands	10	12	12	12	11	12	13	13	12	11
Switzerland	6	7	7	7	7	7	7	7	7	7
United Kingdom	29	32	31	31	29	34	32	31	29	28
TOTAL	**198**	**198**	**199**	**200**	**201**	**200**	**201**	**203**	**200**	**202**

Table A6.1. *Top 200 – THE (Europe)*

For a color version of all figures in this book, see www.iste.co.uk/leprevost/universities.zip.

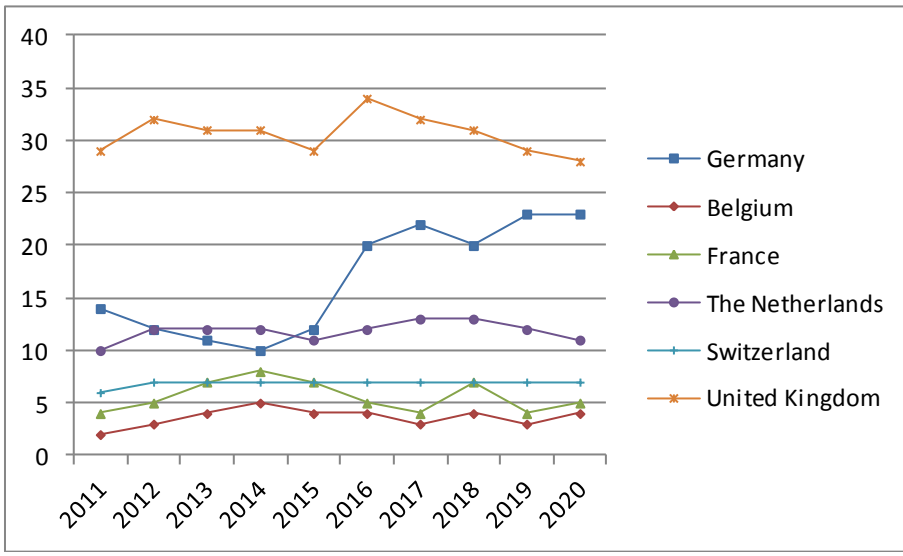

Figure A6.1. *Top 200 – THE (Europe)*

	2012	2013–2014	2014–2015	2015–2016	2016–2017	2018	2019	2020
Germany	11	13	13	11	11	12	12	12
Belgium	6	6	5	4	4	4	4	4
France	1	3	2	3	3	3	5	5
The Netherlands	11	11	11	12	12	10	9	9
Switzerland	7	7	7	7	7	7	7	7
United Kingdom	29	29	29	30	30	28	29	28
TO TAL	**196**	**198**	**199**	**198**	**197**	**196**	**201**	**202**

Table A6.2. *Top 200 – QS (Europe)*

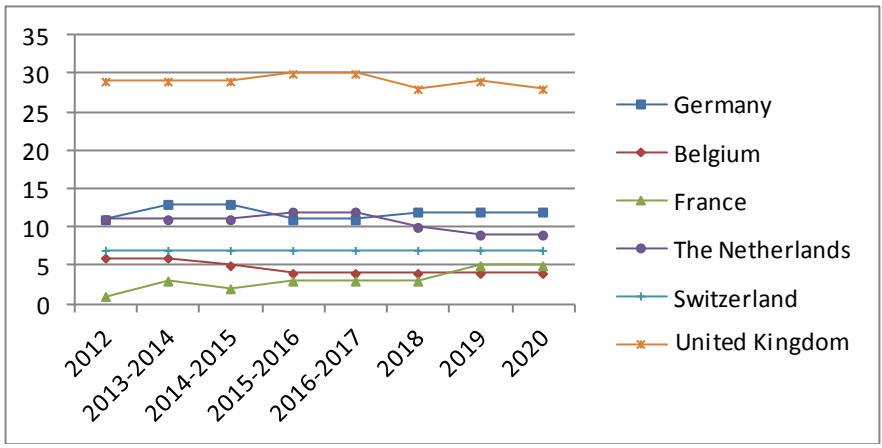

Figure A6.2. *Top 200 – QS (Europe)*

	2011–2012	2013	2014	2015	2016	2017	2018	2019
Germany	17	19	16	19	13	14	10	7
Belgium	3	4	2	4	3	4	3	3
France	10	11	13	10	12	9	11	9
The Netherlands	11	12	12	12	12	12	12	12
Switzerland	7	7	7	7	7	7	7	7
United Kingdom	27	29	33	32	34	37	36	36
TOTAL	**203**	**214**	**208**	**203**	**202**	**209**	**200**	**200**

Table A6.3. *Top 200 – Leiden (Europe)*

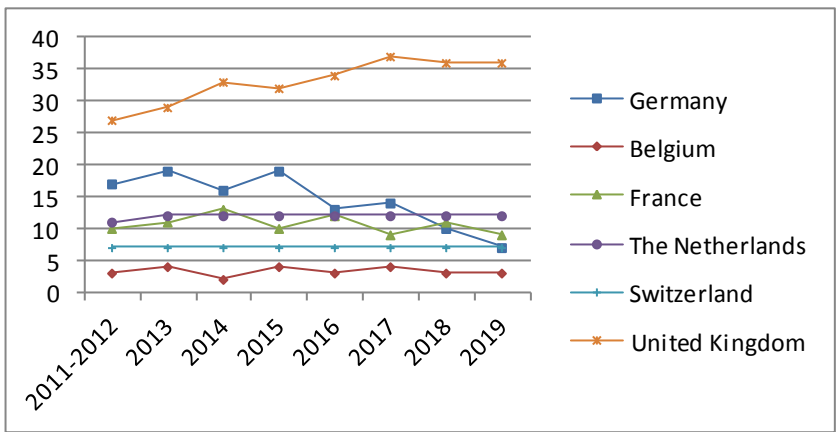

Figure A6.3. *Top 200 – Leiden (Europe)*

	2003	2004	2005	2006	2007	2008	2009	2010
Germany	16	17	16	15	14	14	14	14
Belgium	2	4	4	4	4	4	4	4
France	8	8	8	6	7	7	7	7
The Netherlands	8	7	7	7	9	9	9	9
Switzerland	6	6	6	6	6	6	6	6
United Kingdom	19	18	19	22	23	22	23	19
TOTAL	**200**	**201**	**202**	**200**	**202**	**200**	**200**	**200**

Table A6.4. *Top 200 – Shanghai (Europe, 2003–2010)*

	2011	2012	2013	2014	2015	2016	2017	2018	2019
Germany	14	14	14	13	13	14	15	14	10
Belgium	4	4	4	4	4	4	4	4	4
France	8	8	8	8	8	9	9	8	9
The Netherlands	9	8	8	8	8	9	9	9	9
Switzerland	6	6	6	7	6	6	7	7	7
United Kingdom	19	19	19	20	21	21	20	21	21
TOTAL	**200**	**200**	**200**	**200**	**200**	**200**	**200**	**200**	**200**

Table A6.5. *Top 200 – Shanghai (Europe, 2011–2019)*

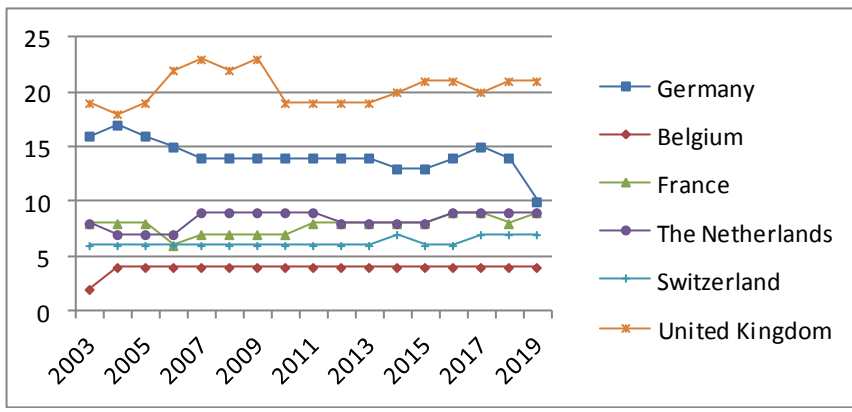

Figure A6.4. *Top 200 – Shanghai (Europe)*

Top 1000: 5 + 1

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Germany	14	21	25	26	27	37	41	44	47	48
Belgium	2	7	7	7	7	7	8	8	8	8
France	4	8	12	11	11	27	29	31	34	38
The Netherlands	10	13	13	13	13	13	13	13	13	13
Switzerland	6	7	8	8	8	10	10	10	10	11
United Kingdom	29	52	48	49	45	78	91	93	98	100
TOTAL	**198**	**393**	**393**	**395**	**397**	**800**	**981**	**1103**	**1258**	**1396**

Table A6.6. *Top 1000 – THE (Europe)*

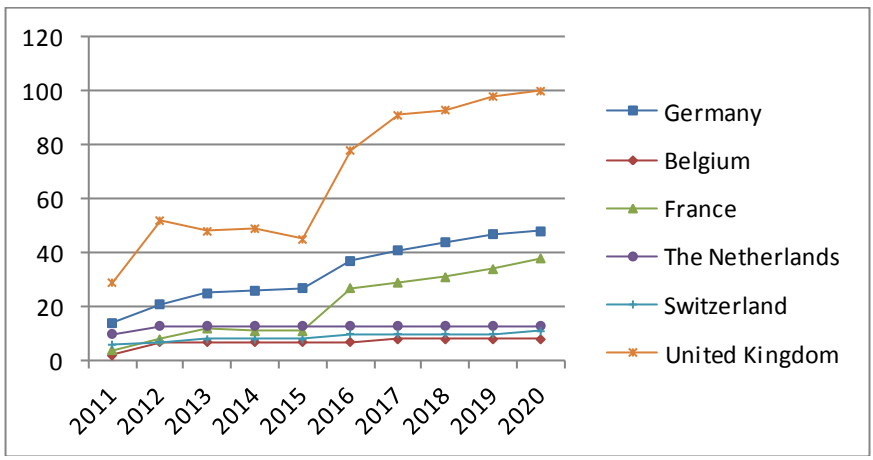

Figure A6.5. *Top 1000 – THE (Europe)*

	2012	2013–2014	2014–2015	2015–2016	2016–2017	2018	2019	2020
Germany	42	42	42	43	43	46	46	46
Belgium	7	7	7	7	8	8	8	8
France	26	26	28	31	32	37	41	31
The Netherlands	13	13	13	13	13	13	13	13
Switzerland	8	8	8	8	8	9	9	9
United Kingdom	68	69	70	71	71	78	78	84
TOTAL	**795**	**797**	**827**	**857**	**889**	**953**	**1021**	**1002**

Table A6.7. *Top 1000 – QS (Europe)*

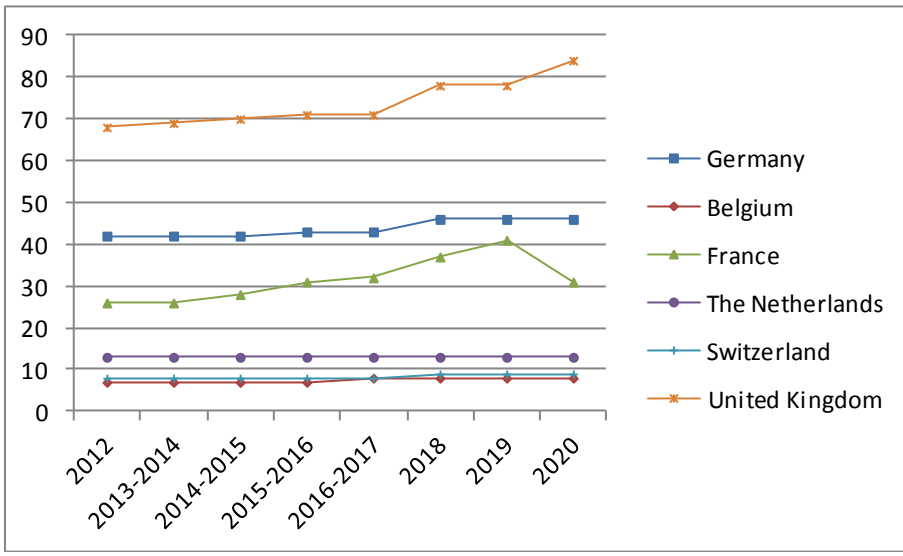

Figure A6.6. *Top 1000 – QS (Europe)*

	2011–2012	2013	2014	2015	2016	2017	2018	2019
Germany	39	40	47	47	49	50	50	50
Belgium	7	7	7	7	7	7	7	7
France	20	19	25	23	24	24	26	25
The Netherlands	12	12	13	13	13	13	13	13
Switzerland	7	7	7	7	7	7	7	7
United Kingdom	36	36	45	43	47	47	48	45
TOTAL	**500**	**492**	**750**	**750**	**842**	**903**	**938**	**963**

Table A6.8. *Top 1000 – Leiden (Europe)*

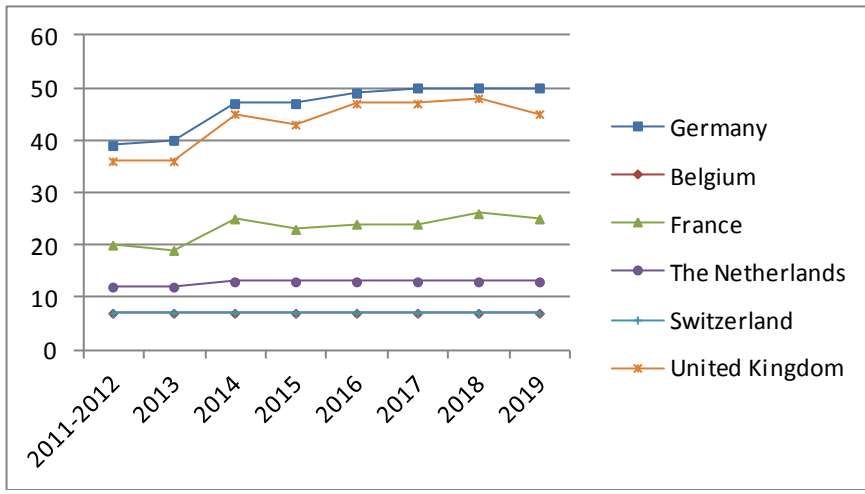

Figure A6.7. *Top 1000 – Leiden (Europe)*

	2003	2004	2005	2006	2007	2008	2009	2010
Germany	42	43	40	40	41	40	40	39
Belgium	7	7	7	7	7	7	7	7
France	22	22	21	21	23	23	23	22
The Netherlands	12	12	12	12	12	12	12	12
Switzerland	8	8	8	8	8	8	8	7
United Kingdom	42	42	40	43	42	42	40	38
TOTAL	**499**	**502**	**500**	**500**	**510**	**503**	**501**	**500**

Table A6.9. *Top 1000 – Shanghai (Europe, 2003–2010)*

	2011	2012	2013	2014	2015	2016	2017	2018	2019
Germany	39	37	38	39	39	38	46	50	51
Belgium	7	7	7	7	7	7	7	8	9
France	21	20	20	21	22	22	30	34	35
The Netherlands	13	13	12	13	12	12	13	13	13
Switzerland	7	7	7	7	7	8	10	10	10
United Kingdom	37	38	37	38	37	37	50	60	61
TOTAL	**500**	**500**	**500**	**500**	**500**	**500**	**800**	**1000**	**1000**

Table A6.10. *Top 1000 – Shanghai (Europe, 2011–2019)*

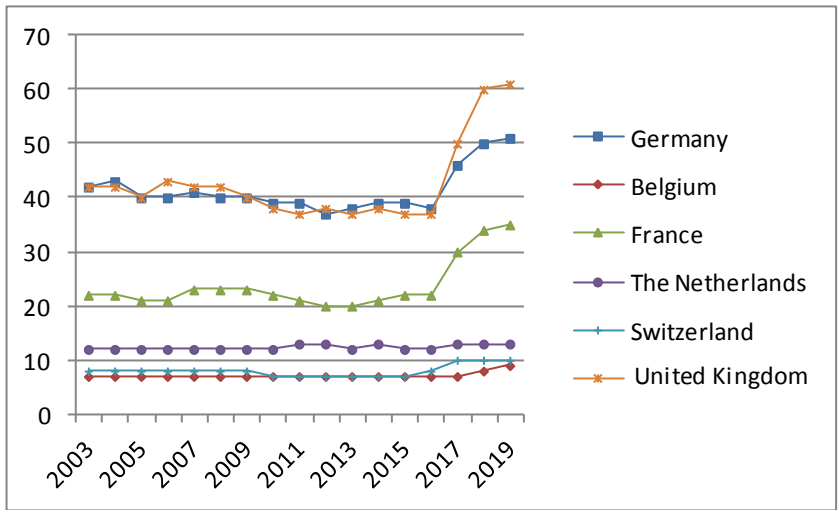

Figure A6.8. *Top 1000 – Shanghai (Europe)*

Notes, Insertions and Tangents

> Everything is on the wrong path. In those days, thank God, I acquired from my master the desire to learn and a sense of the straight way, which remains even when the path is tortuous.
>
> Umberto Eco – *The Name of the Rose*

Notes and insertions

The different chapters of this book are full of notes, which have been scattered throughout. Tradition dictates that these notes have a dual destiny: that of appearing at the bottom of the page in a font size smaller than that of the main text. As a result, they are often neglected by the reader like unlucky orphans. However, by grouping these notes together here, the author – who is no stranger to this sometimes-snobbish attitude – hopes that this disdain (this time at least) will be avoided. They are an integral part of the text, clarifying certain points or setting out leads which, perhaps for some, will one day be extended by the author, all being well.

Notes from the Preface – Elements of Genesis

1 We hope that it will also broadly generate interest in the community of French-speaking universities.

2 Student debt, for example in the United Kingdom, averages around £50,000 for a bachelor's graduate in 2019, according to the Institute of Fiscal Studies cited in (Ellet 2019). Curiously, the cumulative amount of student debt is not included in the Bank of England's estimates of debt at risk, at least in 2019/2020. It would be

Universities and Civilizations: Worldwide Academic Competition and Geopolitics,
First Edition. Franck Leprévost.

useful, however, to compare the current average amount of debt per household by including this student debt with the average debt (all other things being equal) of households during the particularly severe financial crisis of 2008. This should be extended beyond the United Kingdom alone, in order to get the full picture. After all, a feverish securitization of real estate debt, hardly questioned by the majority of the global financial intelligentsia at the time, had prevailed in the United States until payment defaults led to the 2008 crisis. We are not convinced that the lessons of that crisis have been universally learned more than a decade later, and that any "systemic" risk has thus been ruled out.

3 And not just on individual universities or on small groups of universities in a given country.

Notes from Chapter 1 – The Origin of a Triptych

1 Donald Trump will take office on January 20, 2017, a few months after the Berkeley Congress.

2 These American public universities are "public" in name alone, since it was pointed out at the World Universities Summit (WUS) of Times Higher Education in Berkeley, that public sources of funding have become their fourth source of funding, after tuition fees, donations and third-party funding of research projects. Tuition fees at American universities grew by more than 33% between 2008 and 2016, while the state endowment declined by 18% during the same period. Robert Reich, Chancellor's professor of Public Policy at UC Berkeley, had a heartfelt moment during his speech at the WUS in Berkeley: "Public higher education is dying in the United States of America." He also said at his conference that "the US is leading the world in terms of inequalities and access to higher education". This testimony speaks volumes about the US public university model. Even more so when one considers that, for example, corporations can donate to universities with the same tax breaks, whether those universities are private or public. In other words, public money supports private universities through this mechanism.

3 As Jamil Salmi pointed out to the author, the notions of "elite" and "leading-edge" may not coincide. Elite can mean very selective, but not necessarily leading-edge. In the present work, however, these two terms are used interchangeably, and in a manner equivalent to the term "performing university". The underlying notion is understood, albeit simplistically, in the sense of belonging to a good position or even in the upper part of international rankings.

4 Let us go back two years earlier, to the evening of November 9, 1989. Günter Schabowski, a member of the political bureau of the central committee of the SED, the communist party in power in the German Democratic Republic (GDR in

English, the DDR or Deutsche Demokratische Republik in German), intervenes as government spokesman (Pressekonferenz DDR-Reiseregelung 1989). He read this text during a press conference: "Personal travel abroad can be undertaken without conditions (reason for travel and family ties). […] It is possible to leave the country at all crossing points from the GDR to the FRG, as well as to West Berlin. These words caused a stir among the journalists present in the anonymous, dull press conference room.

'When does this take effect?' asks Peter Brinkmann, a journalist from the Bild-Zeitung. 'As far as I know, it comes into force…'. After a hesitation, Günter Schabowski continues, 'now, immediately'."

(Let us repeat this exchange in German: "Privatreisen nach dem Ausland können ohne Vorliegen von Voraussetzungen (Reiseanlässe und Verwandschaftensverhältnisse) beantragt werden […] Ständige Ausreisen können über alle Grenzübergangsstellen der DDR zur BRD bzw. Zu West-Berlin erfolgen". Question from P. Brinkmann: 'Wann tritt das in Kraft?', to which G. Schabowski replied 'Das tritt nach meiner Kenntnis… ist das sofort, unverzüglich.'").

The surreal exchange between Günter Schabowski and Peter Brinkmann, which was broadcast live from Berlin's Mohrenstrasse on the GDR television channel, led the citizens of the GDR to flee the country. The images of families running across the border in Berlin were seen around the world. Separated families were able to come together and let their tears flow as those who had enjoyed the painful privilege of separating in the so aptly named Tränenpalast after a few days' visit and under close surveillance on the other side of the Wall. It should be remembered that during the Cold War, little of "The Lives of Others" escaped STASI, as described with a scalpel in the eponymous film by Florian Henckel von Donnersmarck (Henckel von Donnersmarck 2006).

History was accelerating. November 1989 in Berlin foreshadowed Christmas 1991 in Moscow.

The resignation of Boris Yeltsin from the Communist Party in June 1990, the coup of August 1991 instigated by the opponents of Gorbachev's reforms, the failure of this coup with the now famous image of Boris Yeltsin standing on a tank, the successive declarations of autonomy of the republics making up the USSR during the autumn of 1991, the ban by Russian President Boris Yeltsin in November of that same year on activities of the Communist Party in Russian Federation territory: these events foretold the declaration of the Minsk Accords. On December 8, the presidents of Russia, Ukraine and Belarus proclaimed the dissolution of the Soviet Union in favor of the Commonwealth of Independent States. Glasnost, Perestroika and Gorbachev's general policy covered a reality that was perceived very differently from one side of the Iron Curtain to the other. Sylvain Tesson illustrates one aspect of this reality (still very

much alive in the population of present-day Russia, as I can testify) in the following dialogue, taken from his novel *The Hermit*:

– "When Aliona died, he resigned from the urban transport company. This was during Gorbachev's Perestroika (the captain spat in the water). He sold his apartment and disappeared. Six months later, his trace was found: he had built the hut you saw, a cube that was three by four meters with a stove, two windows and a canopy for logs.

– Why did you spit in the water?

– Gorbachev liquidated our Union. He's less than a dick."

(Tesson 2014, p. 66)

Praised in the West, in December 1991, Gorbachev was the last emperor of an empire that had disappeared. He resigned as president of the Soviet Union. The bracket that opened in 1917 was closing. Vladimir Putin summed up the perception of this event in Russia with these words: "He who does not regret the USSR has no heart; he who wishes for its restoration has no head."

5 In the context of Francis Fukuyama's famous remark, the work of Alexander Kojeve, a French philosopher of Russian origin (and incidentally Kandinsky's nephew), on the concept of the "end of history", deserves to be consulted.

6 We do not expect that much with this essay.

7 This intellectual substance is of such density that one wonders how a major contemporary political decision-maker, with an interest in international relations, can afford to ignore the contents of this book, without flirting with professional misconduct. In a broader context on these questions, we invite the reader to consult Régis Debray's book (2017) and to follow his references towards Fernand Braudel, Oswald Spengler, Arnold Toynbee or Paul Valéry.

8 The person guilty of such a confusion "perhaps" has the consolation of being in the company of Hegel, if Debray is to be believed. "Perhaps", in quotation marks, because Schopenhauer warns us to be careful about the quality of this companionship, since he considered Hegel as a "charlatan", a "smearer of insanity" and the creator of "hegelei". In spite of this anecdote, let us stop this digression. Our purpose is not to debate the enmities between German philosophers of the 18th and 19th centuries. Even if the 20th and 21st Centuries are still producing the "hegelei", including outside of Germany.

9 The word "share" is to be interpreted in two ways. Firstly, in the sense of sharing with the reader Debray's analysis; and secondly, in the sense that we adhere to this analysis.

10 We have some remorse in summarizing this nuance from Debray under the equation "civilization equals culture plus army". However, this formula has the merit of giving a rough approximation.

11 A notable scientific output is measured by more than 200 annual publications, over five years, in peer-reviewed journals that are referenced in appropriate databases such as Scopus, and operated by Clarivate Analytics, for example. This is at least one of the criteria used by some international ranking organizations (see the section on "the big four and their methodologies" in Chapter 3). This numerical criterion seems reasonable, at least for the time being.

12 For example, the Europe 2020 strategy sets the target of raising the average percentage of people aged 30–34 with such a degree or level, to at least 40%. China sets similar targets. As Zhu Xiaoyu, Minister Counsellor of Education in 2010 (Xiaoyu, 2010) states, the enrolment rate of one age group must increase to 40% by 2020, and 195 million workers must have received higher education by that date.

13 Let us first give some very brief aspects concerning the differences in the approaches of international students according to the models, and the economic and ethical questions they raise. Western universities benefit greatly from these student inputs. However, this is done in a differentiated manner depending on the model chosen. Tuition fees in many universities in continental Europe are the same regardless of the nationality of the student, and are generally modest due to strong state support. This is generally not the case in the USA, the UK or Australia. The latter country is symptomatic of the commodification of higher education, since this sector of activity has become the third largest source of income from foreign trade. These disparities in systems and student fees raise different questions. Among them is that of "value for money" from the student's point of view, while the volume of student debt, particularly in the USA and the UK, is becoming a macroeconomic concern, especially as the rate of growth of this accumulated debt varies from one country to another. This question could lead the universities of continental Europe, which would decide to continue on the current model of uniform and low tuition fees, to play this card intelligently, by selecting the best students worldwide. Such a strategy will, however, have to be accompanied by a reflection on the contribution in return from these graduates to the benefit of the countries that will have trained them. On the other hand, some of these universities could decide to increase their tuition fees. After all, the taxpayer, in a European country, may legitimately ask why he or she should pay for the studies of third-country nationals. Decisions on these issues may be a matter for the autonomy of the universities, but also for the government policy of the countries concerned.

14 We return to this later in the introduction, but also in the conclusion, to related aspects of the demographic issue.

15 In the logic that currently prevails, graduates are "*naturally*" led to join such a productive middle class. In the last part of this book, we question this logic, which has been challenged by the emergence of new technologies, demography and nomadism, both of technologies and of people.

16 The political issue of the employability of graduates, which was touched upon in this insertion from a limited angle, is taken up again in the conclusion in a global context. Let us say that a challenge for countries will be to combat youth unemployment in general, and graduate unemployment in particular. Training young people without providing a favorable framework for the use of their skills is a source of frustration that can lead to social instability. The scale of this instability can go very far if, in addition, other factors are present, as shown by the "Arab Springs".

17 The chapter (Tierney & Lanford 2017) addresses this issue.

18 This guilty conscience is doubly justified. Indeed, these institutions, whose almost unique mission is to train students, also stem from geopolitics of higher education and research, with a center of gravity placed more on higher education and less on research. For the moment, our approach favors one center of gravity over the other, that of research.

19 See (Usher 2017) for a very interesting history of international rankings. It shows that their seniority predates 2003 and the launch of the Shanghai ranking.

20 The palette is wide, ranging from infatuation to repulsion.

21 However, we focus on the contemporary period with a hindsight of up to 15 years, depending on the rankings considered.

22 This is not always the case according to Huntington, at least at the time of the publication of his book. To this day, his analysis does not seem to be questioned.

23 The United Kingdom is more Anglo-Saxon than European: "Whenever we have to choose between Europe and the open sea, we will always choose the open sea," Churchill said. Has it been denied since then?

24 This linguistic diversity is consubstantial with Europe's charm.

25 The term "memory" is not, to us, in any way pejorative. On the contrary. Especially if it is accompanied by nostalgia.

26 Facing reality does not mean adherence, nor a fortiori enthusiasm.

27 *Mutatis mutandis*, the previous footnote concerning the center of gravity of the Berlin-Paris axis. The author makes an assessment.

28 There is a vast literature. Here, we merely encourage reading and re-reading Clark Kerr's book (Kerr 2001), all the more remarkable as his lessons go beyond the American system, of which he is one of the main architects. In a very different (in fact almost orthogonal) approach, Labaree (2017) gives an unorthodox vision of the construction (without a plan, according to its author) of the American system.

29 Here, too, there is a vast literature. For a historical introduction, we suggest (Ping 2013).

30 To put it another way, for Japan, civilization equals country. This arithmetic simplicity does not, however, obscure the difficulty of predicting what trajectory its academic landscape will take. We discuss this difficulty again in the conclusion of this book.

31 Let us allow ourselves a few brief biographical details. Russia is particularly close to our hearts because we decided to live there for a while (one of the reasons for this choice was to reconnect with the emotions we felt as teenagers when we read Dostoyevsky). At university level, we had already studied elsewhere (Leprévost 2018) in another country that is close to our hearts, namely Luxembourg, where we live now. When the time comes, we will make a more specific study of the situation in our native country, France.

32 Gregorian or Julian, it does not matter.

33 And linguistic, cultural, etc.

34 We would have liked to write "as much as" rather than "as well as", but that would have been excessive (unfortunately).

35 The Latin "*disputare*" is understood here in the sense of "to examine" and "to debate".

Notes from Chapter 2 – Why?

1 The first will be taken up again in a different and complementary context in the "Conclusion: Analysis and Perspectives" chapter.

2 However, we do not believe that everything that matters can be measured. Nor the other way around.

3 Sometimes with effects that may seem paradoxical: unless a professor has an outstanding CV, they may be offered lower pay at an extremely high-ranked university, whereas they may be able to negotiate better conditions at a less prestigious university. Indeed, elite universities attract and can choose: they know that going through them increases the quality of the CV. Those that are less well located have less leeway. The above remarks are, of course, only valid when national systems allow for the existence of a market. What is true in Anglo-Saxon countries, Asia and some European countries does not apply in practice to others such as France, for example– unfortunately.

4 This aspect, the importance of which we shall continue to stress, is partly addressed in Leprévost (2018), as well as in the first chapter of this book, and the insertions relating to it, in connection with universities that transmit knowledge without creating it (90% of universities). An example is the Franklin W. Olin College of Technology, where students receive engineering education that is particularly innovative in the international context. That being said, this institution, however efficient and useful it may be, does not appear in the rankings since it does not carry out research and the emphasis is on undergraduate training.

5 This chapter should, of course, be read in its entirety to get a perspective on many aspects of the Russian situation, the importance of the rankings and their perception by the Russian academic community.

6 The possible excesses of a correlation between the salaries of university presidents and the international rankings of their institutions are, in fact, not so different from those found in companies that link the salaries of their executives with the stock market scores of their firms. Strategies are likely to be dependent on these aspects, and thus to be successful in the short term, socially questionable, and not very inclined to take scientific or pedagogical risks. While it is understood that metrics such as international rankings are useful, it should be reiterated once again that universities' strategies must be guided by different objectives and criteria, with rankings as a by-product. In particular, we recommend caution in establishing a direct relationship between top management compensation and university performance as measured by international rankings.

7 Even if they claim not to be.

8 Even if the ranking organizations supplement the presentation of scores with a lot of information, specify how to use different criteria to rank according to this or that aspect, or specify the margins of error, in the end, everyone is only looking at one thing: the position in a ranking. The rest is often ignored.

9 This estimate of 20,000 universities is probably a low estimate, as the number tends to increase. In reality, no one knows exactly how many there are. However, about 19,400 universities accredited by their countries were listed in the World Higher Education Database in 2019 (International Association of Universities 2019). This corroborates the above estimate, since both universities that are too young to be accredited and "private for profit" universities are excluded from this database, but not from our estimate.

10 See Note 11 from Chapter 1 for what is meant by this.

11 Thematic rankings have the following trend: international ranking bodies are cutting disciplines into increasingly narrow sub-disciplines. For example, THE had 6 scientific fields in 2015, 8 in 2016, 11 in 2017, and plans to increase the number in the coming years. The argument for this is that students (and/or their parents) need to know which the best universities in these famous sub-disciplines are. This is certainly a valid argument. However, one may wonder about the limits to this multiplication of thematic rankings, not because of the logical multiplication of specific (and expensive) lectures, but because this over-specialization is obviously orthogonal to another phenomenon, the inter-disciplinarity phenomenon. These new thematic rankings do not measure this aspect at all. Their multiplication also makes it difficult for universities to respond to the questionnaires of the ranking bodies. We propose a solution to these difficulties in Note 5 from Chapter 4.

12 Education remains a poorly assessed aspect in international university ranking criteria.

13 See Note 3 from Chapter 1 for the notion of leading university, adopted here.

14 The concluding chapter will develop a concrete example of a mission to be carried out in the coming years.

15 This ideological approach, moreover, reinforces the inequalities that these reforms claim to combat.

16 To be distinguished from religious faith.

17 Karl Popper's work fortunately relativizes this term in the context of the humanities.

18 In a way, the engineering and computer science sectors produce prototypes that are self-feeding, self-substituting, self-transforming all the time and are forgetting their earlier versions at an ever-increasing rate. If they rely on "hard" science, design error correction continuously creates prototypes with almost no genealogical

memory. The new prototype replaces the previous one with no regrets. Once the 43rd version is considered to be developed, it sends the 42nd version into a historical black hole. Thus, once overtaken, the old prototype joins these dungeons of technological history with the previous versions of itself. Its only consolation is to patiently wait for its executioner: one day or another, the 43rd version will inevitably disappear from the radar once an even more innovative 44th version is developed. Seen from this angle, and with a small hint of sadness, we believe that technological progress and ingratitude go hand in hand. Of course, far be it from us to ignore the benefits that technological advances provide. That goes without saying, but even better when we say it, to use Talleyrand's words. This paragraph on technological development also reflects a more fundamental related concern, which is developed in the concluding chapter.

19 Sometimes with quantum jumps of greater or lesser extent: discovery of DNA, relativity theory, quantum physics, resolution of Fermat's theorem, discovery of the Higgs boson, discovery of public-key cryptography, etc.

20 Nuclear deterrence is part of the diplomatic arsenal of a number of countries.

21 There are abundant examples of the harmful consequences of the intrusion of ideology into science. Anticipating our journey in Chapter 4 to the land of Bulgakov and Kandinsky, it is not surprising that the Soviet Union has historically had an excellent school in the so-called hard sciences: by concentrating on these fields, the best students and researchers escaped as much as possible from communist ideology and its wrath. As much as possible, but not totally. Indeed, Lyssenko (1898–1976) and his "Mitchurinian genetics" cut the Soviet Union off from all scientific advances in genetics during the Stalinist era (closure of laboratories, dismissal of researchers, ban on teaching the chromosomal theory of heredity and the work of Mendel and Morgan, etc.). Russian genetic research has not yet fully recovered.

22 The evolution and possible influence of the King Abdullah University of Science & Technology (KAUST) in Saudi Arabia will be observed in the coming years, in light of these remarks. It is interesting to note at this point that KAUST, founded in 2006 and inaugurated in 2009, enjoyed a kind of extraterritorial status, in that the campus had cinemas, and women could drive cars, at a time when the rest of the country denied them. Women have officially been allowed to drive cars in Saudi Arabia since June 2018.

23 Reality calls for caution. Indeed, scientific and technological porosity does not necessarily mean porosity between civilizations. As Huntington aptly points out, believing this is a matter of an essentially Western worldview, and a claim of the universality of the Western system of "values" (the quotation marks are ours). Such an approach is intellectually satisfying to many, either as a belief or as an argument,

but is naive and potentially dangerous in the end. It should not be ruled out, however, that the question may be posed in different terms, if the homeopathic changes in question emanate from *within* a country. Such a development, if it occurs, is likely to be slow. It may just be like the ephemeral "Kemalist" bracket of history, which Turkey is distancing itself from.

24 The "Big Data" era we have recently entered further reinforces the need for interdisciplinary dialogue, since both the origin and processing of such data depend on multiple factors. The challenge of the Big Data era is to extract chunks of knowledge from an ocean of information.

25 These dual tensions between mobility and sedentariness, between globalization and national interests are obviously not the prerogative of universities. They are global phenomena and can be found in many industrial and tertiary sectors of activity.

26 We return to this subject in the Russian context, in the last part of Chapter 4, indicating some of the risks associated with such behavior, which moreover has a scope that concerns all elite universities, and not just those in Russia.

27 In our present work, Holland is synonymous with "the Netherlands", despite the "rebranding" of this country (Boffey 2019).

28 During a discussion at a conference in Hangzhou (China) in 2015, we expressed our doubts about the viability of the model of this campus to the then-current Rector of the University of Groningen, the project's initiator, whose benefits he praised. Both our doubts and the reasons for them were not only greeted without warmth, as one might expect, but also with contempt and disdain, to say the least. However, at a conference in Toulouse, France, in June 2019, which we were also invited to, the Director of Services of the University of Groningen confessed with sadness and anxiety that his university had been trying to close this campus for two years, which had been left as a painful legacy by the aforementioned management team. And here we are.

29 It should be noted, however, that David Willetts, former Minister for Universities in the British government, calls in his book (Willetts 2017, p. 365, see also p. 318) for the creation of "profit-making multinational corporations whose product is higher education". Such multinationals would then be accompanied by geographically distributed campuses. We remain skeptical about the feasibility of this type of construction for the elite universities that are the subject of this book. If we look, for example, at the automobile industry, it is true that Toyota, Renault and Volkswagen are consortia present on all (inhabited) continents and produce and sell their cars there. World production of cars has increased very strongly over the long

term (whether this will continue to be the case will have to be seen in view of the changing patterns of vehicle use, such as car sharing or car pooling, but that is another question). Over time, these major brands have absorbed sub-structures through mergers and acquisitions. At this stage, it seems unlikely to us that the same phenomenon could occur in the world of higher education and research. Having said that, however, we think it is important to keep an eye on current thinking of this kind. We will return to another idea by David Willetts (2017, pp. 248–252), relating to the management of student debt, in the concluding chapter (Note 9 from the Conclusion). We invite the reader to meditate on these Anglo-Saxon and liberal ideas in relation to the part devoted to Europe and the anticipation of Paul Valéry in the same concluding chapter.

30 Not everywhere, however: universities in France are not responding to this challenge in practice.

31 In this respect and although in different forms, both public and private universities are involved. In fact, it does not matter which model is chosen: all universities depend, at least for the present period, on their geographical environment.

32 The German Exzellenzinitiative preceded its French equivalent. One wonders whether the French excellence initiative would have come into being if Germany had not set an example. For a more general review of excellence initiatives, see Salmi (2017). For a study focusing on the French excellence initiative, see Le Prestre *et al*. (2018).

33 BRIC: Brazil, Russia, India and China.

34 The term is a bit misleading: it is not so much the countries as their successive leaders who have defined them in this way, at least to a large extent. This is the case, even if their people do not necessarily see themselves as such, and are beginning to express it in elections and referendums.

35 The reasons given by countries for wanting to obtain alternative energy sources are varied. General de Gaulle's France made energy independence one of its priorities. France has thus equipped itself with a network of nuclear power plants and reduced its dependence on other countries, particularly Algeria, for its gas supplies. Angela Merkel's Germany has taken the opposite path. Under pressure from environmentalists and the emotion caused by the explosion of the Fukushima power plant in Japan, it decided to gradually close its nuclear power plants. The consequence was an increase in Germany's energy dependence on Russia on the one hand, and the reopening of coal-fired power stations on the other, even though they had been shut down because they polluted too much. The roofs of European houses

are fitted with solar panels that are subsidized by European tax benefits, even though they are bought in China. Wind turbines now "decorate" Europe's land and maritime landscapes, without the question of visual and noise pollution having been raised.

36 However adventurous it may seem given the economic stakes, this hypothesis cannot be excluded with the stroke of a pen.

37 In the case of Hong Kong, it is of course necessary to qualify, given its connection with China.

38 We will return to these notions in the concluding chapter.

39 The hero of the eponymous film, see Faiman (1986).

40 It is likely that a great deal of potential is at least under-exploited, if not lost, and that these countries could generally do better. However, compared to the situation in Venezuela at the beginning of the 21st Century, these countries shine by comparison.

41 Uzbekistan has mandated the "Network of Universities from the Capitals of Europe" (UNICA n.d.) to accompany it in its reform of doctoral education (UZDOC Project 2016). It is too early to know whether the country will adopt a more flexible and less centralized system than at present. As an illustration of this centralized governmental university policy, it should be recalled that for the time being, the subjects of theses in this country are introduced by the various universities to a central body within the Ministry of Higher Education and Research. This body then decides on the relevance of these subjects. If a subject is selected, it can then be approved and, if necessary, defended. However, it is possible that the ministry may eventually assign the topic to a university other than the one that introduced it. In other words, an institution is interested in a research project, works on its elaboration and coordination, submits it to the ministry and the ministry sometimes entrusts the task of carrying out the project to an institution that has not thought about it, or that is not interested nor necessarily has the skills, or at least the expected skills, to mobilize on this subject. However, it is rare that such a project is refused by the institution to which it is proposed for a variety of reasons. Notably, the total number of PhD students in this country of 31 million inhabitants is around 700, and therefore the institutions take pride in each new PhD student. For comparison, the small university of Luxembourg (6,300 students for a country of half a million inhabitants) has about 650 PhD students per year on its own. This general approach to research, which prevails in Uzbekistan as in other Central Asian countries, is therefore far removed from the practices and spirit prevailing at the best international level.

Notes from Chapter 3 – Where?

1 There is also a ranking that is not a ranking on the minds of European universities. It is U-Multirank, about which we will say nothing more beyond pointing out its existence (U-Multirank n.d.).

2 However, we will include them in our analysis of academic Russia in Chapter 4.

3 A systematic analysis of the thematic rankings from the perspective of the present book may be useful. One could also imagine looking more closely at phenomena of intensification around thematic domains. For example, consider which geographical areas have a particularly strong emphasis on artificial intelligence in relation to Big Data.

4 Namely, the USA for Western civilization, China for Chinese civilization, India for Hindu civilization, Japan for Japanese civilization, and Russia for Orthodox civilization.

5 Refer to Appendix 1 for the assignment of geographical areas and countries to civilizations, including countries that have been come across by more than one civilization.

6 Traceability is easy when a year is set. The major difficulties we have encountered with the Leiden ranking concern the inconsistency in the names of institutions from one year to the next.

7 Let us add a nuance (which is particularly valid for France). When national university landscapes are redefined, governments or "re-constructed" universities (after mergers, for example) may report this to the ranking bodies so that these new structures are not forgotten. This can be a concern when these reorganizations are difficult to explain, for example, when a country creates a "superstructure" of several organizations and approaches ARWU in the hope that both the superstructure and the organizations within it will be ranked. France is encountering this type of difficulty.

8 The increase in the number of ranked universities (to which we will return later in Chapter 3) reflects the enthusiasm of institutions and their desire or need to gain legitimacy through the rankings.

9 By this, we mean that the better known a university is, the better known it will be. Reputation feeds itself.

10 However, THE, like QS, publishes a ranking of young universities (those under 50 years old) in which the indicators remain the same, but their weighting changes. We do not deal with the subject of young universities here, despite its importance, and refer to the collective work of Altbach *et al*. (2018) for a more targeted study of these start-ups, including the University of Luxembourg (Leprévost 2018).

11 With the negative impact that one can imagine in the fields of computer science, engineering, and the social and human sciences. As a result, the French edition of this book will fall outside the radar of the Leiden ranking.

12 Therefore, brilliant publications in Chinese, Spanish, French or Russian are ignored by this ranking.

13 This does not mean that it is totally impossible. For example, the University of Luxembourg, founded in 2003, appears in the 2017, 2018 and 2019 Shanghai rankings (in other words, since the increase from 500 to 1,000 institutions ranked by ARWU).

14 Or 11, if we count Rockefeller University, which appears in first position in 2014, 2016, 2017 and 2018, but does not appear at all in the other years. Until we start to understand this rather curious sporadic phenomenon, we do not take this university into account in the statistics, which is perhaps an injustice.

15 See, in particular, Appendix 3, “Top 200 Rankings”, especially the paragraph on “all countries”.

16 Let us note that the representation of China drops for THE from 2011 to 2012 as 3 institutions disappear. China fluctuates a little until 2016, then progresses within this ranking.

17 The reason for this is that the total is not always 200 universities throughout this period.

18 These developments are logical, since they reflect what is happening to Japan, which is both a flagship country and a civilization.

19 However, the development of Nazarbayev University should be monitored for reasons clarified in (Katsu & Saniyazova 2018).

20 We will look at this country in Chapter 4 with ways to (we think) improve things.

Notes from Chapter 4 – How? From Russia with 5-100

1 Here is the original version (Пастернак 2012, с. 279). “Как хотелось бы наряду со службой, сельским трудом или врачебной практикой вынашивать

что-нибудь остающееся, капитальное, писать какую-нибудь научную работу или что-нибудь художественное.

Каждый родится Фаустом, чтобы все обнять, все испытать, все выразить. О том, чтобы Фаусту быть ученым, позаботились ошибки предшественников и современников. Шаг вперед в науке делается по закону отталкивания, с опровержения царящих заблуждений и ложных теорий.

О том, чтобы Фаусту быть художником, позаботились заразительные примеры учителей. Шаг вперед в искусстве делается по закону притяжения, с подражания, следования и поклонения любимым предтечам."

"Доктор Живаго", часть девятая, Варыкино, VII. Борис Пастернак

2 The difference between the annual budget allocated to the program and the sum of the amounts distributed to the universities, corresponds to the operating budget of the "Central Project Office" in charge of managing the program.

3 It should be noted that other rankings are appearing, although they are not currently taken into account by the Russian government in the context of the 5-100 program. Thus, THE has created the "University Impact Rankings", in which 30 Russian universities appear in 2019, including for example SUSU.

4 Let us provide some methodological details and explanations concerning the weights assigned to the different indicators. First of all, it should be noted that the methodology has become more transparent and has evolved over the years. With regard to transparency – until 2017, the formulas for calculating the points were unknown to the candidate universities. The formulas were also revealed and applied in 2018. The impact of the first indicator is measured by points to universities according to their position in the overall or thematic rankings of THE, QS and ARWU. An overall ranking earns 1, 5, 10, 15, 30 or 50 points, depending on the position, and a thematic ranking earns five times less (1, 2, 3, 6, 10 points, depending on the position). The agglomeration of the results was done by a formula roughly summarized by an average between two quantities: the rankings and indicators on one hand, and the points of the international council on the other hand. As far as its evolution is concerned, these formulas have changed. Firstly, the points assigned to each of the three indicators now range from 1 to 10. Secondly, the weighting of the three indicators is now equal. The sum of these points is then divided by three. The relative weight of the international council has therefore decreased from 50% to 33%.

5 In this respect, each ranking organization groups the domains in a different way and with varying degrees of granularity. These differences, between which activity

is put into which field between the ranking organizations on one hand, and the fact that the same organizations tend to reorganize or subdivide these fields from one year to the next on the other, makes life at universities complex. The way we solved this problem at the University of Luxembourg, was to assign the most relevant ISCED standard (International Standard Classification of Education 2011) to each course, researcher and professor, to each laboratory, and to each budget line dedicated to research or teaching activities. In this way, we were able to make groupings according to the fields in the different rankings, in which we participated. Without being perfect, this way of doing things made it possible to respond to the ranking bodies, even in the event of reorganizations or division of disciplines.

6 This could lead the Russian government to reassess the criteria for entry into a future program, which would take over from the 5-100/2020 program.

7 The following two comments are generic and are therefore not specific to the Russian case. On one hand, ranking organizations frequently use the notion of standardized impacts assigned to scientific journals and the articles published in them. These standardized impacts vary greatly depending on the scientific fields and their subfields. For example, journals in certain subfields may receive a very large standardized impact, intended to compensate for low initial visibility, due to what is perceived as the emergence of an innovative and, as yet, unexplored field of research. Some researchers may be tempted to specifically target these areas because of the high standardized impact that the ranking agencies (or the databases they rely on) give them. However, doing so can be a double-edged sword for these researchers and their universities if, for example, some of these journals become negatively "flagged". In this case, they are likely to be removed from the database used by the ranking agencies, retroactively. Thus, a good ranking in a given year may be offset by bad rankings in subsequent years, if the good rankings observed were due to a significant proportion of publications in such journals, having reached a grey or black zone and becoming de facto non grata. Universities must therefore remain vigilant on these issues. On the other hand, and relative (but not entirely independent) to the above, many universities encourage a high level of publication. This may lead researchers to publish a mosaic of partial results in several journals, instead of publishing less but with a much better density of results per paper. This general trend is, moreover, very damaging to science as a whole.

8 In the case of Russia, the following phenomenon should be taken into account: until recently, the list of scientific journals approved by the ministry differed significantly from that used by organizations such as Scopus. Specifically, many journals approved by the ministry, and used for its own performance evaluations, were outside the Scopus databases. As a result, a very large number of articles, many of them with high scientific merit, were published under the international "radar". However, the situation has changed significantly. In recent years, and under

the pressure of the 5-100/2020 project, the ministry has mainly taken into account the journals used by Scopus or Thomson Reuters for its evaluations. In addition, Scopus databases, for example, also tend to include more journals as they become available. It should be noted, however, that although databases such as Scopus and Thomson Reuters tend to include more journals where English is not necessarily the vehicular language, the fact remains that English remains the vehicular language of the majority of scientific publications, and probably will for a long time. This obviously has an impact on Russia (but not Russia alone).

9 These bridges in France could be further optimized, not to mention the relations with the *Grandes Écoles*.

10 See the book (Altbach *et al*. 2012), and more specifically the chapter (Androushchak & Yudkevich 2012).

11 Without falling into the trap of believing that a leader who has successfully led an institution in location A on the planet will, for this reason alone, be able to successfully lead another institution in location B. It is, of course, more complex than this, as the sections devoted to leadership in the book "Thinking, Fast and Slow" by Nobel Prize winner Daniel Kahneman (Kahneman 2011, especially Chapter 3, pp. 199–268) invite us to reflect upon. This salutary work allows us to gain perspective on the impact of leadership on the destinies of the structures they lead, even if it means cutting off a few egos.

12 They are not the only ones. Some French universities have a similar tendency.

13 Original text from the chapter entitled "Hiring practices" from Androushchak & Yudkevich (2012): "Formally, all the positions are filled on a competitive basis […]. In practice, however, heads of chairs, responsible for the employment decisions, tend to offer the posts of teaching assistants and full professors to their acquaintances, both in the academe and outside, who meet the formal requirements […]. Such practice leads to widespread inbreeding" (Androushchak & Yudkevich 2012, p. 269).

14 While the opening to humanities for universities dominated by Science & Technology is possible and desirable, it seems much more complex to have the opposite movement, in other words, a university whose center of gravity is dominated by the humanities will happily equip itself with "Science & Technology" departments. "Culture shock" seems much more difficult in this sense. This is why (but perhaps wrongly) this hypothesis is approached with more caution.

15 The average is going down. However, this phenomenon is less pronounced for rankings that favor absolute numbers, such as ARWU.

16 Russia does not have a monopoly on this type of complexity. France, for example, is not spared of this either.

17 Of course, the details are not yet known, and things will be more elaborate than that. Nevertheless…

18 The Dutch national system is remarkable in that practically all of its universities are very well placed in the world rankings, even if one or another strategic decision proves to be wrong (see Note 28 from Chapter 2, which we never tire of).

19 We emphasize the term "recent". Indeed, the scientific level of the country was, put in its temporal context, much better in the Soviet Era. To avoid any ambiguity, we do not think, and therefore do not say, that life in general in the USSR was enviable, nor that the communist system was or is the model to follow. We are simply and solely limited to the scientific achievements and the educational system of that country in those bygone days. Period.

20 It is indeed crucial to avoid the pitfalls mentioned in the article (Altbach 2013): its eloquent subtitle "Right concept, wrong place" says it all.

21 These recommendations mainly concern the Government and its policy on higher education and research. The consequences of choices made at a "meta" level do not take possible local personal initiatives into account. This presentation of things is, of course, reductive: the success of universities is obviously highly dependent on the capacity of individuals within these institutions to initiate reforms and take action. It should not be excluded that, here and there, an inspired and willing university president may decide to give impetus to the research activities of his or her university and manage to navigate through the various pitfalls we have mentioned, making the most of the 5-100 program. This will require, among other things, the ability to extract 4 to 5% of the *normal envelope* of the university's budget and direct it to research activities, and not to something else. To be clear, we think that Russian universities would be well advised to do this now, regardless of the sustainability of the government's 5-100 program, by defining what does not depend on this program by the *normal envelope*. Universities capable of doing this will have a good chance of achieving research results if these 4 to 5% are strategically allocated. If they are unable to do so, then their relatively good current results have only been obtained under perfusion and have low intrinsic density. They will not hold up in a gust of wind. And one knows that Russia is a windy country.

22 Everyone knows them.

23 The original quote is “When people ask me what my job is as president of Caltech, I say it’s to maintain a culture where people dream; that they want to come to Caltech; that they believe it’s the place where they can realize their dreams; and we have the resources – physical, financial, intellectual – to make those dreams come true.”

24 “Step by step” in English.

Notes from Chapter 5 – Conclusion: Analysis and Perspectives

1 That does not mean for a second that they are not going to play a role. The most demographically dynamic will, of course, play an important role in the world. That is already the case. This phenomenon, however, is distinct from what we are dealing with in this book.

2 Until a certain age, the evolution of maturity of a university is comparable to the one of a human being. Who could deny that you are still a young shoot at 28 years of age in 2019?

3 The vagueness of the definition is symptomatic of a deep malaise. Indeed, on the one hand, most leaders of the countries of the European Union themselves persist in not wanting to combine history and geography; on the other hand, the substantial vacuity, which the European Commission sometimes has the secret of, does not encourage us to seek salvation on that side either. To give an example of this, we need only recall the statement made on May 8, 2016 by Pierre Moscovici, then European Commissioner for Economy, in which he said that he “did not believe in the Christian origins of Europe”. In this case, of course, it is not a question of belief, but of historical knowledge. The words, spoken at the level of a European Commissioner, carry weight. One wonders about their origin or motivation: ignorance or historical denial?

4 Which would be the antipodes of the “beliefs” of the French European Commissioner cited in the previous insertion.

5 Anticipating what follows, let us note that, in spite of the excellence initiatives, the inferiority compared to the United Kingdom should question the governance models, keeping in mind the contrasting effects of these initiatives in France and Germany. For France, it is likely that an assumed autonomy (which goes hand in hand with incentive remuneration); an Anglo-Saxon-style “search committee” method of leadership recruitment; greater mobility of academic talent (academic staff and leaders) within the French system; student selection and/or a substantial increase in tuition fees for non-European students would be promising ways to

produce world champions. On this last point, a decision of the Constitutional Council, published October 11, 2019 (Constitutional Council 2019) establishes the principle of almost free university tuition, regardless of the nationality of the applicants, thus *a fortiori* outside the EU. French universities are not very selective but in addition, the registration fees for foreign students are very modest. This Constitutional Council decision is highly regrettable for France, inconsistent with the desire to have elite universities and draws a landscape (to which we wish to return one day) largely anticipated a century ago by Paul Valéry, where France gives its knowledge and, in a way, strips itself of it. Let us continue this long insertion.

Comparative study on six European countries. Drawing on the data in the "Europe 5 + 1" section of the appendices, let us look at the relative contributions of Belgium, France, Germany, The Netherlands and Switzerland in the Top 200 and Top 1000 (and which represent between two-thirds and three-quarters of the CWE in these rankings over the length of the reference periods), while comparing them to the United Kingdom, a country that follows a different university model from the one predominantly used in Continental Europe. Of course, such an analysis should be carried out while considering (over time):

– budgets of individual universities in the countries;

– the origin of the funding and the public share of it;

– the total number of universities in a given country (which is often more complex to count than it first appears; we return to this aspect a little later in the case of France).

In this insertion, we give some macroeconomic elements of comparison between these countries:

The first row of the following table gives the number of inhabitants (in millions, see populationData.net (2019)) of the six countries concerned. The second line gives the GDP per capita in purchasing power parity, as established in 2017 by the International Monetary Fund (2017), in thousands of US dollars. The World Bank (2017) and the CIA (CIA World Factbook 2017) give statistics of the same order, which may differ, however, from one country to another depending on the methodology adopted. The third line gives the share of R&D (public and private) as a percentage of GDP (and in purchasing power parity, see UNESCO – Institute for Statistics (2019)). The following lines of the table show the number of universities present in the Top 200 and the Top 1000 in the last year of the reference period of the four rankings; in other words, in 2019 or 2020 at the time these lines are written.

	Germany	Belgium	France	The Netherlands	Switzerland	UK
Population	83.04	11.37	66,99	17,18	8,54	66,46
GDP/capita – 2017	50,206	46,301	43,620	53,582	61,360	43,620
R&D in % of GDP	2.9%	2.4%	2.3%	2%	3.2%	1.7%
THE – Top 200	23	4	5	11	7	28
THE – Top 1000	48	8	38	13	11	100
QS – Top 200	12	4	5	9	7	28
QS – Top 1000	46	8	31	13	9	84
CWTS – Top 200	7	3	9	12	7	36
CWTS – Top 1000	50	7	25	13	7	45
ARWU – Top 200	10	4	9	9	7	21
ARWU – Top 1000	51	9	35	13	10	61

Table N.1. *Comparison between EU countries*

The observation is quite clear: in terms of rankings, despite their disparities, each of the countries are below the United Kingdom in absolute and often also relative terms, except Switzerland for this second point. Apart from Switzerland, the Netherlands and Belgium have remarkable scores for countries of their size. Germany and France are two countries comparable to one other, with France performing less well than Germany. The German excellence initiative seems to be bearing fruit for the rankings of THE and ARWU, but seems less notable for QS and CWTS. For the Top 1000, France is on the rise for ARWU, while maintaining a deficit of 16 ranked institutions, compared to Germany. A similar phenomenon occurs for the CWTS top 1000 between these two countries. In the Top 200, France is playing in the Belgian league for THE and QS and can hope to play in the Dutch league for CWTS and ARWU.

As far as the top of the ranking is concerned, it should be remembered that Switzerland and the United Kingdom appear in the top 20 of all the rankings at the end of the reference period, while France appears in the top 20 of the CWTS ranking, but not in the others.

The European University: in a speech delivered at the Sorbonne in September 2017, the President of the French Republic, Emmanuel Macron, launched the idea of creating at least 20 European universities by 2024, each made up of a network of four to six institutions in at least three EU member countries. These groupings

should jointly develop integrated curricula in several countries and languages, with learners changing countries each year.

The vision is ambitious. However, it poses a set of difficult practical challenges: financing, transfer of skills, accreditation, governance, statutes, entry fees, student and staff mobility, tensions between elitism and sustainability, continuity, wage differentials, easy portability of pension systems, etc. We will come back to this subject, all being well.

Even if we are not very optimistic about what will be achieved beyond the effects of the announcement, and even if we believe more in the implementation of tools for pooling European resources, combined with in-depth national initiatives, the project launched by President Macron does have the advantage of placing France in a central position for university initiatives in Europe, as several speakers at the HCERES (*Haut Conseil de l'Evaluation de la Recherche et de l'Enseignement Supérieur* – High Council for the Evaluation of Research and Higher Education) colloquium, held in Paris in September 2019, pointed out. At the same colloquium, the positions of presidents of French universities selected in consortia for such European university projects were very varied. They ranged from one project among others, to the desire to make it a structuring axis of the institution's development.

Insertion with in the insertion – France: among these five CWE countries, France has the most disappointing trajectory, at least for the time being, despite its excellence initiative and the presidential speech of September 2017, as recalled above.

However, over the past 10–15 years, according to national stakeholders, France has made significant changes to its university landscape. When the time comes, we will give our view on this evolution, comparing it to that of other countries and identifying national factors of intrinsic and extrinsic blockades, among which we will undoubtedly find: the complexity of the French system; the lack of multi-annual university budgeting; the weakness, not to say indigence, of the salaries of teacher-researchers; "fear" on the part of the universities to take full advantage of autonomy; the composition and number of members of the boards of governors; absence of high tuition fees for foreign students; absence of selection committees for the recruitment of presidents, vice-presidents, deans; lack of mobility of these university leaders; weak use of the leverage of the French-speaking world compared to that of the English-speaking world in Anglo-Saxon countries; etc.

As far as the rankings are concerned, the extent of the most recent wishes of the French academic world could be summed up by the tensions between the Delphic precept ("Gnothi seaton": know thyself) and Heisenberg's uncertainty principle.

Let us be more specific. It is difficult to understand how things are structured in France without an in-depth knowledge of the succession of different reforms, and an understanding of such a stratified historical perspective. France thus offers COMUEs, alliances, groupings, experimental establishments, etc., where, within the same structure (the General de Gaulle would perhaps have spoken of a "what-do-you-call-it"), some lose their standalone legal autonomy, but not others, where some coexist with their sub-structures while claiming to be placed on the same level, and where distinct universities (and/or COMUEs, alliances, groupings, experimental establishments, etc.) claim the same "brand".

The French wish to see both the individual components and the groupings included in the international rankings makes the French system more complex to understand. The reasons for this are understandable to a certain extent; a certain vagueness is conceivable for the limited time of a transition to a different structuring.

However, a quantum state of ubiquity is only possible as long as it escapes observation. This obviously ends when serious international rankings come into play and look at things. It is only natural that Shanghai should ask Paris to put an end to the ambiguities of the quantum state, for university-France to get to know itself, and thus for the ministry to provide a list of institutions that could be ranked.

Here, France has the opportunity to use these requests for clarification from the ranking bodies, as a chance and an opportunity, to promote some promising restructuring, and to strengthen the rise of some of its universities in the world rankings. France has the privilege of having world-class researchers and is certainly in a position to propel some of its universities into the top 30 or even the top 20 in the main world rankings. In order to retain its most eminent academics and attract others (some of them from other countries, but also those from the French diaspora), to federate intellectual, financial and technological capacities around large-scale scientific projects and to enable certain French institutions to join the Top 30 and even the Top 20, it will require greater budgetary and statutory flexibility, and to review governance and recruitment methods throughout the university chain, from scientific, administrative and technical staff to top management of universities with this kind of ambition. Many of these ideas are not new. Many of them were already present in Aghion *et al*. (2008) and some are found in the more recent Musselin (2019).

These aspects require a development that will have to be made in due course, without naivety: France is a complex country where things evolve slowly. However, ignorance of the dynamics of international reality, particularly outside Europe, and

not just in the Anglo-Saxon world but also in Asia (particularly China), does not in any way prevent its impact.

6 Regrettably; but perhaps only temporarily.

7 Note that the ideas of Willetts (2017) for this current insertion and Note 29 from Chapter 2 are anticipated by Valéry in his 1919 text. Indeed, Note 29 from Chapter 2 recalled an idea of David Willetts, former British Minister of Higher Education and Research, to advocate the emergence of multinational corporations, present on all continents, selling knowledge. Another of his ideas concerns the issue of student debt. He advocates that universities should guarantee these debts (Willetts 2017, pp. 248–252). The argument is that if they have confidence in the training they offer, then they should guarantee the debts of the students who attend them, since they will be confident that they will repay these debts on the basis of the employability of their graduates, and could even act as an incentive to prepare their graduates, as well as possible, to find jobs. This idea is interesting in more than one way and opens the discussion on funding models for knowledge transfer. Paul Valéry's letter anticipates it perfectly. One should not be naive, both in terms of the motivation for Willetts' idea and its short-term consequences. First of all, it amounts to a transfer of the default risk of student debt from the state to the universities. From the government's point of view, this amounts to a reduction of risk. It thus strengthens, for example, its ability to borrow on the markets at a more favorable rate, or to stay in line with the Maastricht convergence criteria. The latter point has become less relevant, however. Indeed, if, in accordance with the popular will expressed in a vote, Brexit becomes a reality (after the transition period that runs until the end of 2020 at least), the United Kingdom will *a priori* no longer be subject to these convergence criteria once it leaves the European Union. But for the time being, more precisely in the summer of 2019, Brexit has not yet taken place. Nor was Brexit on the agenda when Willetts launched his idea. It is also clear that universities that would accept the risk of default would be putting themselves in a dangerous situation. It is likely that they would seek to limit these risks in a different way from that advocated by Willetts, namely by raising tuition fees if only to pay for insurance on the new risks they would be committing themselves to. In one way or another, a transfer of debt does not mean a cancellation or a relief of the debt. At some point in time, everything has to be paid for. And in order to pay, you need money. This money is tied up in future salaries. This brings us directly to the subject of the penultimate part of the concluding chapter, which we consider to be of major importance.

8 See, for example, the third part of Chapter 2, where several are cited in the interdisciplinary context.

9 This insertion is connected to a related subject, but of lesser importance than that of the text from which it is taken. We are speaking of MOOCs (Massive Open

Online Courses), which cannot be ignored in this book, all the more so as they originate from one of the elite universities. Thus, in Chapter 5 of his book Ford (2015), recalls the development of MOOCs since the launch of introductory courses on artificial intelligence on the Internet in 2011 by Sebastian Thrun and Peter Norvig of Stanford University, and the enthusiasm that MOOCs brought about in their early days. Since then, there has been a strong development of these online courses and the formation of consortia such as Coursera (with partners including Stanford, Princeton, John Hopkins and CalTech) and EdX (MIT and, *mutatis mutandis*, Harvard). The underlying ambition was to provide world-class education for all at a paltry cost. In other words, the most obvious purpose was (and remains) to provide knowledge to learners everywhere on Earth, at least as long as they have access to cyberspace. It was therefore conceivable that the democratization of knowledge on such a scale could have such a leveraging effect that millions of brains around the world would begin to think in symbiosis about the major problems of our time, and thus solve them. Moreover, such a tool could potentially affect the operational mode of one of the fundamental functions of universities, namely teaching itself.

In this respect, neither all the disciplines nor the level of their teaching are under the same roof. While most doctoral programs – especially in the hard sciences – must incorporate the latest research findings, this is different for bachelor's and master's programs. One can, of course, keep in mind the research discoveries being made in most cases, but it is unlikely that a linear algebra course in the first, second and third year (at least) at university will have any reason to fundamentally change. The theory is stable, the examples may differ from year to year, but not much more. As for the disciplines, it is just as likely that the history of ancient Greece, for example, is a more stable field than particle physics, and therefore its teaching is less likely to be subject to major revisions.

That said, it was nevertheless questionable to what extent introductory courses, that were offered by a small group of the world's top specialists in their fields, would leave the teachers of these courses unemployed in most of the world's universities. Indeed, what need is there for teachers if the words of the coryphaeus are directly accessible in cyberspace?

The reality has been different. First of all, several problems have arisen. The first is precisely the economic viability of the model. How does one explain to students who pay high fees that they will be taking the same courses as students who pay nothing? How does one ensure that quality does not diminish and that the degree obtained justifies the high fees? The second problem relates to the quality of training and examinations. How does one verify the identity of students who register online? How does one ensure on such a scale that students behave in an ethically appropriate manner and do not cheat? The most important problem, however, lies elsewhere:

studies have indicated that a very small proportion (around 4%) complete the courses in which they are enrolled. Of course, an even smaller proportion pass the exams. Lastly, 80% of the students enrolled in these courses already had a university degree and were therefore not the initial target population.

Should we throw the baby out with the bath water? Nothing is less certain. First of all, any new product requires a certain period of maturation before it reaches cruising speed and develops more serenely. Secondly, MOOCs are a tool that can be particularly appropriate for the acquisition of targeted skills, as long as the target audience is motivated. This is typically the case for ongoing education. It would be very risky to believe that MOOCs (or any other similar education system) will always be limited to continuing education. It is very possible that the field will be extended to that of struggle – to paraphrase Michel Houellebecq's 1994 book, *Extension du domaine de la lutte [Whatever]* – and that effectiveness will extend beyond the field of ongoing education alone.

10 Let us illustrate the acceleration of the learning capacity of machines with an example. The article of Silver *et al*. (2017) shows the performance of AlphaGo Zero. The authors, members of the DeepMind team (owned by Google since 2014), have incorporated artificial intelligence methods (deep neural networks) to build a machine capable of improving itself at the game of "Go" without human help. The only premise is to have instilled the rules of the game. AlphaGo Zero trained for three days and then beat AlphaGo, the previous version of the software that beat all human champions (and which had a dual system of learning by playing alone and learning games played by humans). That was the situation in April 2017, although the article in *Nature* came out a few months later. In December 2017, the DeepMind team reported having developed AlphaZero. The word "Go" had disappeared from its name and for good reason: AlphaZero is a self-taught pioneer capable of learning to play Go, Chess and Shogi on its own, once it learns the movements of the pieces. After four hours of training, AlphaZero beat the Stockfish software in chess. After two hours, it beat the Elmo software in Shogi. After eight hours of training, it beat AlphaGo Lee, the first software to beat a human champion. Within a few hours, AlphaZero was able to learn complex games independently and become the best at them. This example illustrates two things: on the one hand, the rapid progress in the direction of versatile and autonomous artificial intelligence; on the other, the emergence of an intelligence of superhuman capacity (see Bostrom (2014)). Human intervention could become superfluous. Machines might be able to improve themselves in general and with increasing speed.

11 Anticipated by Paul Valéry as early as 1919.

12 Contemporary liberal worldview gives primacy to flow over sedentariness. This ideology, which prevails among the dominant forces (although dominant is not

synonymous with majority), both within governments and media in many Western countries, believes in the interchangeability of beings and encourages such mobility and flow. It often ignores the fact that people do not come from nowhere, but that everyone has a cultural background that they carry with them. This disdain for history and sedentariness, this enthusiasm for mobility without borders, today leads to some of the tensions that Huntington spoke of, or that others speak of, such as Georges Bensoussan (see the collective work (Brenner 2002)), (Clair 2019), (Finkielkraut 2020, Chapter 5, notably pp. 100–102), (Guilluy 2014), to cite some in the French context. It should be noted that these authors expose themselves to attacks of all kinds, including attempts to disqualify them morally and ban them from the right to express themselves in the name of political correctness, which Mathieu Bock-Côté dissects in his essay (Bock-Côté 2019). The mobility of technologies had already been anticipated by Paul Valéry. Examples illustrating this technological mobility are abundant and are obviously often made to the detriment of technological sovereignty.

13 Martin Ford goes further, indicating that the impact of machinery on the US labor market is a precursor to global change (Ford 2015, Chapter 4). The relocation of factories and jobs to countries where labor is cheaper is, in his view, just a first step before the automation of these tasks, even if total or partial relocation is carried out as soon there is economic interest to do so. His argument is as follows.

Globalization has led to the relocation of factories and plants to countries where labor was *a priori* cheaper, at least initially. Then, wages also increased in these countries as the tasks thus relocated became increasingly automated, thanks to technological progress. So much so that the initial interest in offshoring – cheaper labor – became obsolete: machines worked more efficiently, without unions and without wages. The costs of buying and maintaining these machines quickly pay for themselves. A number of factories then relocated to countries that were either perceived as more politically stable or were located in such a way as to minimize the distance between the final product and the customer (with the caveat that the final product in question may be the result of assemblies of partial products manufactured in several places across the world). These relocations, which sometimes took place in the country of "departure", were not, however, accompanied by job creation in proportion to the number of jobs that had been destroyed.

In other words, even countriesthat are "beneficiaries of relocation" (in the sense that low cost and low social protection of labor attract factories) will also be affected by automation one day or another, and by its impact on their labor market. No economy is immune, even an emerging one, even a dynamic one at the present time. China, for example, could find itself with a massive employability problem for its graduates.

14 On the one hand, the meaning of these terms is clarified in a moment in the body of the text, on the other hand, these notions were used implicitly during the Berkeley conference recalled in the first chapter.

15 This is particularly the case in China. The phenomenon is naturally occuring and, in a different form, where family prestige is perhaps even more acute, in Japan, with all the societal problems that this implies, especially for the portion of out-of-school and reclusive adolescents counted in the Hikikomori. See (Nippon.com 2019).

16 In the original and noble sense of the term, “politiké”, in other words, the science of city affairs.

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Il ne reste qu'un mot
Comme un grand territoire
Un mot simple et cruel
Qui fait vivre et saigner
Un mot que l'on trouve
Endormi sous chaque pierre
Un mot simple et cruel
Noir comme la terre.
Ce mot je te l'apporterai
Dans le creux d'une nuit
Dans la chaleur d'une source.

Excerpt from "*Il ne reste qu'un mot…*" by Simon-Gabriel Bonnot (Bonnot 2017, p. 36).

Translation:
There is only one word
Like a large territory
A word, simple and cruel,
Which lives and bleeds
A word that we find
Asleep under each stone
A word, simple and cruel,
Dark as the earth.
I will bring this word to you
In the middle of the night
In the heat of a spring.

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