



White Paper of the Westlake Forum on
Higher Education

The Role of Universities – Concepts and Approaches

Challenges and Opportunities for Higher Education

Westlake University, Hangzhou 2018

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FOREWORD BY THE PRESIDENT

I would like to thank every speaker for their valuable contributions at the first Westlake Forum on Higher Education. On October 20, 2018 in the gorgeous Crystal Ballroom at The Dragon Hotel in Hangzhou, we had the honor of hosting distinguished guests from around the world listening to the inspiring speeches of nine prominent university representatives.

Interestingly but not surprisingly, in all nine presentations, the words most mentioned were collaboration, cooperation, interdisciplinarity, globalization but also challenges. On top of these words, I would like to share with you some of my own observations on the Chinese development, both in education and in terms of the economic development.

Winding the clock back to 40 years ago, on December 26, 1978, China sent the first batch of 52 scientists and scholars to the United States. These were also the very first batch of students landing on the soil of a Western nation after the founding of the People's Republic of China. Only five days later, China restored its diplomatic relationship with the US on January 1, 1979, which was followed by a historical visit of Deng Xiaoping to the US four days later.

Deng Xiaoping's visit truly opened the door for China to the rest of the world. In 1979, we had several hundred Chinese students and scholars crossing over the border going to Western nations for advanced education, followed by a thousand in the following year. By the time I went abroad in 1990, the number went up to 20,000 students and scholars. And by now, we have over 5 million Chinese students and scholars going overseas to pursue degree programs. There are over 3 million Chinese students and scholars who have returned to China, propelling enormous changes. The degree of transformation is unheard of in the history of humankind.

I believe that openness, globalization and collaboration have been central dimensions of the Reform and Opening Up policies. Therefore, I am delighted to have had the chance at the Forum to ask all participants to consider issuing a joint statement as a summary and conclusion of our meeting and to set a sign for openness, globalization and collaboration. The Westlake Forum on Higher Education resulted in a significant step further towards international collaboration among universities. The representatives of several universities, who attended the forum, have already signed or agreed to sign the Joint Statement of the 2018 Westlake Forum on Higher Education (see Appendix).

The inaugural Westlake Forum on Higher Education has been and will hopefully continue to be a great opportunity to exchange ideas and to discuss possibilities of collaboration between universities around the world.



A handwritten signature in black ink, which appears to read 'Yigong Shi'.

Yigong Shi, President of Westlake University

I. INTRODUCTION

At the Westlake Forum on Higher Education, nine speakers expressed different thoughts about the current and future roles of universities. In two sessions, one about the role of a university in addressing global issues and another concerned with the role of a university at the frontiers of science and technology, they have inspired the audience with new perspectives and various approaches of how to tackle current and future challenges and how to grasp opportunities.

This whitepaper provides a summary and reorganization of the content of the Westlake Forum on Higher Education. First, a brief overview of highlights in the speeches are provided. Second, this whitepaper summarizes current and future challenges for higher education that were identified at the forum. Third, it recapitulates current and future opportunities that were identified by the speakers. Fourth, abstracts of different concepts and approaches regarding the role of universities, how to tackle challenges and grasp opportunities, and how to position ourselves are provided in this paper. Last but not least, major points on the role of universities are highlighted and summarized.

II. SPEECH HIGHLIGHTS

Session I: The role of a university in addressing global issues

Shigeo Katsu, President of Nazarbayev University, introduced a new term, VUCA, which is an abbreviation for Volatility, Uncertainty, Complexity and Ambiguity, to describe the challenges of the current and future world. Furthermore, he offered highly useful insights about how to establish a university in a developing country and in the context of a VUCA world. Katsu also underlined the importance of nurturing a culture and attitude for lifelong learning and the need for interdisciplinary, intersectoral, national and international cooperation.

Andrew Hamilton, President of New York University, further stressed the importance of adhering to the international development of universities during a period of anti-globalization trends and nationalistic political rhetoric. However, while fostering multi-cultural student exchanges, it is also important to take advantage of local cultural characteristics in campus building by enhancing a sense of place. Hamilton presented an interesting approach of how NYU is setting up campuses around the world to increase the internationality of NYU while simultaneously embracing local characteristics.

David Leebron, President of Rice University, brought some inspiring thoughts about the future of universities in general. He emphasized the importance of major features that distinguish universities from other social organizations and institutions. Leebron argued that these features have been and will continue to be fundamental for the survival of universities as major institutions in our societies. Moreover, he predicted two different development trends of universities and noted respective concerns as well as optimism. He

also stressed the importance of protecting academic freedom.

Mark Wrighton, Chancellor of Washington University in St. Louis, underlined the fundamental role of universities as drivers of international and interdisciplinary collaboration to solve global issues. Wrighton presented a successful example of collaboration, namely the McDonnell International Scholars Academy. He also pointed out that the most urgent global issues such as climate change and sustainable development problems can only be solved by collaboration across borders. At the Forum, he also invited more parties to join his university's collaborative projects.

Session II: The role of a university at the frontiers of science and technology

Bundhit Eua-arporn, President of Chulalongkorn University, brought in further thoughts regarding future trends. He addressed the challenges and opportunities of artificial intelligence for humankind in general and for universities in particular. According to the predictions by Professor Yuval Noah Harari, AI and other sciences and technologies will offer endless opportunities, but will also substitute for many tasks currently performed by humans, making many present-day skills obsolete. Hence, Eua-arporn emphasized, the role of universities is to equip students with a set of skills that cannot be substituted by AI, thus enabling them to take advantage of AI and secure their future. , Eua-arporn also presented a Chulalongkorn University initiative, the SIAM Innovation District, an effort to develop entrepreneurship, education, and startup companies in Thailand.

Shiyi Chen, President of Southern University of Science and Technology, offered a helpful example of how to establish and develop a new university. He pointed out several newcomer advantages, and underlined the importance of the choice of geographic location for a science- and technology-focused university. He also highlighted concrete major skills required in the future such as critical thinking, creativity, imaginative capacities, and English language skills. Chen concluded with a recently launched program of interdisciplinary and cross-sectoral integration by SUSTech.

Hai-Sui Yu, Deputy Vice-Chancellor of University of Leeds, provided us with experiences and perspectives about collaborations between university and business. First, he listed major incentives for cooperation as well as benefits for universities. Second, he also pointed out obstacles and tensions of university-business collaborations. Third, Yu listed significant features that are needed for successful university-business collaborations and for a top performing research unit within higher education institutions. He concluded with a successful example of a nationwide university-business program that has helped universities and businesses in the UK to increase and improve collaboration.

Yonghua Song, Rector of the University of Macau, also pointed out the importance of taking advantage of the geographic location of a university but also of government support. He introduced the University of Macau as a driver and beneficiary of the integration of the Bay Area of Guangdong, Hong Kong and Macau. Moreover, he stressed the role and

responsibility of a university to support local development. Song also offered a brief overview of successful integrative strategies of the University of Macau within the Bay Area.

Lynn Cooley, Dean of the Yale Graduate School of Arts and Sciences, particularly stressed the importance of fundamental interdisciplinarity, not just the interdisciplinarity between natural sciences but also the interdisciplinarity of all sciences and arts. She argued that the effective implementation of new scientific discoveries and technological advances depend highly on social and political circumstances which also must be understood. She also presented an inspiring example of an interdisciplinary project at Yale called CEID where musicians, engineers, biologists and physicists work together to develop new instruments. Cooley concluded with some suggestions for interdisciplinary engagement at Westlake University.

III. CURRENT AND FUTURE CHALLENGES FOR HIGHER EDUCATION

i. General Challenges of University Development Trends

Advances in communication and learning technologies, in concert with accelerated human mobility and globalization, may be calling into question the need for a physical campus of a university. Furthermore, some argue that universities' functions as knowledge explorers and innovation drivers are becoming obsolete in an era when commercial enterprises and their R&D centers are developing new technologies and making new scientific discoveries that are then directly translated and implemented in products. Thus, it is argued that universities may eventually give in to this trend and evolve into business-like entities. However, this simplistic viewpoint does not recognize the human drive to simply advance understanding and knowledge; a business-oriented university would eventually evolve to be oriented around cost-reduction and profit-making rather than knowledge and discovery.

Another concern is the increased desire of governments worldwide to influence universities. Thus, universities might be turned into instruments for controlling knowledge creation and dissemination. How can universities adhere to and protect those university-specific attributes distinguishing them from other social organizations and institutions, while also being flexible and adaptive in terms of other features? How can universities protect the simple desire to advance understanding and knowledge? How can universities continue to foster an international academic community? How can universities stay independent, collaborative and competitive at the same time?

ii. Challenges of Anti-Globalization Trends

In recent years, a strong anti-globalization trend has developed which is reflected in the political rhetoric of building walls, closing borders, tightening visa controls and abrogating international communities and agreements. There are also anti-globalization and anti-migration movements within societies. On one hand, the social and political trends of

nationalism pose challenges to universities as drivers of globalization. On the other hand, many people are overwhelmed by the complex, globalized and multi-cultural world. So, how can universities better prepare students for such a contemporary and future world? How can universities cultivate international collaboration and exchange? How can universities continue to foster multiculturalism and internationality?

iii. Challenges of Intersectoral Collaboration

University collaboration with businesses, and governmental and non-governmental institutions offers many advantages. However, there are practical and legal challenges to establishing and preserving relationships, as the partnership may be uneven or have high transactional costs. Mutual trust and understanding requires time and devotion to develop. Needed financial resources and time may be lacking. Furthermore, the goals and interests of organizations and actors from different sectors of society are often divergent. For example, collaborations with enterprises in research and development projects are challenging in many ways:

- 1) Universities face difficulties in terms of intellectual property. Long negotiation processes, culminating in clearly formulated agreements are required to ensure that university innovation is not unfairly exploited.
- 2) Traditional academic culture does not put a premium on collaboration or protecting intellectual property through the patent process. Many faculty, particularly young people seeking tenure and promotion, are thus reluctant to engage in collaboration and development-oriented projects.
- 3) There is considerable tension between the academic desire to publicize new findings, and business concerns related to trade secret protection and competitive pressures.

Thus, how should a university position itself towards different actors, organizations and institutions? How can universities gain from intersectoral collaboration while avoiding inequitable exploitation? How can universities best establish and foster intersectoral collaboration?

iv. New Sets of Required *Soft Skills*

The acronym VUCA summarizes major challenges specific to both our present and future worlds, for every person. **V**olatility requires us to become more flexible and adaptive. **U**ncertainty requires us to imagine and be prepared for different possibilities and outcomes. The fast-changing job market forces us to be prepared for different tasks and to adapt a philosophy of lifelong learning. **C**omplexity requires us to look at subjects from different perspectives, and **A**mbiguity forces us to reflect on and evaluate available information and its sources. In today's world, there are manifold sources of information and misinformation (e.g., "fake news") which is likewise often volatile, uncertain, complex and ambiguous. Which sources of information can be trusted, and what perspectives should we take in seeking knowledge and truth? A properly chosen path is critical in

maintaining the long-term viability and relevance of universities.

The skills of retrieving, selecting, combining and inferring appropriate information are indispensable, and the ability to disseminate information is fundamental in successfully capitalizing on advancements in knowledge. Scientific and technological advances can remain mere academic curiosities until they solve real problems in the real world. Problems cannot be solved in isolation; it is imperative to study the social and political contexts underlying related social issues impacted by information flows, group social dynamics, and the like. As an example, there are a considerable number of parents who refuse to vaccinate their children because of misinformation. Although science has solved the technical problem of preventing infection through vaccines, the real human problem of controlling preventable diseases is considerably more complicated.

In spreading information, capable communicators are indispensable. English has become the *de facto* medium of international communication, but skills in other languages are also fundamental and will remain so into the future. Thence, how can universities best equip students with adaptive and flexible capabilities, creative and imaginative skills, critical, reflective and interdisciplinary thinking, and proper communication and language skills?

v. **New Sets of Required *Hard Skills***

According to the works by Prof. Yuval Noah Harari, humankind will have two possible evolutionary trends, towards either Homo Deus or Homo Useless¹. Artificial intelligence and biotechnologies may provide humans with godlike powers and abilities. Those able to use such technologies to their advantage may become Homo Deus. However, these technologies may also substitute for human tasks in many areas. Many if not most currently existing occupations will be performed by computers and robots, making much human labor obsolete. Already, many semi-skilled occupations (taxi drivers, building maintenance, food preparation) are being replaced by AI, and even highly skilled analytic work (mathematics, economic trend analysis, computer programming, enterprise management) is partially automated. In the near future, AI will acquire inventive expertise, and begin to substitute for creative human labor (musicians, artists, poets). Furthermore, AI and biotechnologies enable the analysis and prediction of human behavior and decision-making. Thence, even providers of social services such as teachers and caretakers could be replaced. People unable to take advantage of these technologies, and those replaced by AI enabled robots, could end up as Homo Useless. Thus, the future portends a division into two classes of humans: Homo Deus and Homo Useless.

To avoid being categorized as a Homo Useless, humans need to develop applicable knowledge and acquire pertinent skill sets. The so-called disruptive technologies and sciences need to be (made) accessible to everyone. People must learn how to properly use technologies to the best advantage of their environment, their society, and their own

¹ Harari, Yuval Noah (2017). *Homo Deus: A Brief History of Tomorrow*. London: Vintage.

selves. To this end, education focused on both hard skills (such as information technology, artificial intelligence and biotechnology) and soft skills (e.g. ethics, empathy, critical thinking) that will continue to distinguish humans from computer programs will play an essential role in empowering humans to become Homo Deus. Universities capable of imparting these skill sets to humans may be called University Deus, whereas universities that cannot accomplish this mission may end up as University Useless. So, what exactly constitutes a University Deus? Which specific technologies and sciences should be the focus of a university? What developmental strategies can a university adopt to ensure they evolve to a University Deus and not a University Useless?

vi. **Specific Challenges of Different Universities**

Long-established universities can struggle with historical baggage and rigid institutional burdens, but newly established universities face different challenges, including: 1) effective and efficient planning, strategic development, and coordination; 2) establishing a reputation and 3) accessing and acquiring financial, human, social, political and other resources. They must also identify the expectations of the various institutional stakeholders and adopt strategies that balance those expectations, including those relevant to the geographic context of the university. How can a university satisfy local, national, regional and international needs? And how can a university simultaneously satisfy the expectations of students (and their families), faculty, staff, benefactors, and the various levels of government?

IV. **CURRENT AND FUTURE OPPORTUNITIES FOR HIGHER EDUCATION**

i. **An Era of Globalization, Relative Academic Freedom and Empowerment**

Globalization has multiple facets. The significant increase in exchange and cooperation across borders in the last few decades, facilitated by increased human mobility and improved transportation and communication technologies, has resulted in considerable wealth creation, which has in turn fostered even more international trade. Reforms in the USSR and China since the end of World War II have significantly boosted interactions with the rest of the world. As a result, global average living standards as measured by the human development index (HDI) and other benchmarks have skyrocketed, and poverty is being alleviated at rates unprecedented in world history.

Today's world offers unparalleled opportunities to universities willing to exchange ideas, people, and programs across borders. In an era of relative peace, with academic freedom and expanding possibilities, universities can reach out and compete for the best students, faculty and staff from around the world. In developing international collaborations, they can cultivate the best talents, pursue new knowledge and technologies, make new discoveries, investigate academic questions, and solve pressing global issues.

ii. Opportunities of Intersectoral Collaboration

Today's world offers more opportunities than ever to collaborate, not only across borders but also across sectors. Collaboration with enterprises, and cooperation with other organizations and institutions, is facilitated by continuously improving local, national and international legal and infrastructural frameworks.

Universities in particular should grasp opportunities to build collaborations with businesses. First, joint programs enable more effective and efficient application and translation of research results. Second, they provide opportunities to test theories and laboratory results in the crucible of the outside world, providing valuable insights. Third, collaboration accelerates commercial uptake and distribution, allowing enterprises to use university-based research to improve products and services. Fourth, it helps diversify university income streams, augmenting traditional government and foundation sources. Fifth, university-business collaboration further enhances general business partnerships driving innovation and growth. Sixth, intersectoral collaborations with businesses provide feedback to assist universities in keeping their curricula up-to-date and relevant. Seventh, universities can access data, equipment, expertise and networks not generally available to academic organizations.

iii. New Technologies – New Possibilities

Fundamental technology shifts epitomized by terms including the Industrial Revolution 4.0 and 5.0, Big Data, artificial intelligence, biogenetics, etc., reflect endless opportunities for universities to engage in the future development of humankind. These technologies and trends will also enable more effective and efficient research. Research universities in particular should take advantage of new technologies that can transform scientific research and innovation (e.g., large-scale and automated data analysis methods, combinatorial chemistry, etc.).

iv. Specific Opportunities of Different Universities

Long-established universities, by virtue of their maturity and prowess, have accumulated significant financial, human, social, and political resources, through which they have developed solid academic structures and reputations for excellence. Newly-established universities lack the history of these venerable institutions. However, they have significant newcomer advantages in also lacking the baggage that can develop in institutions over the decades. New universities can use the experiences of other institutions, by adopting successful models and shunning those that have failed. By making use of global information resources, including people from around the world, a new university in the modern era can tap into a wealth of knowledge and experience in establishing a new institution.

At the forum, it was also pointed out that a university should take full advantage of its geographic location; by doing so it can create competitive advantages not available to institutions situated elsewhere. For example, universities co-located with a significant bay or seashore can cooperate with local businesses dependent on this natural resource. Many universities have used this strategy in building programs and reputations in such areas as semiconductors, medical devices, etc. by establishing networks with concentrations of companies in these fields.

V. CONCEPTS & APPROACHES ON THE ROLE OF UNIVERSITIES

i. Thoughts on the Role of Universities in the Next Century

David Leebron, President of Rice University

Universities in their modern form have been in existence for 930 years since the founding of the University of Bologna in the year 1088. Indeed, universities constitute most of the institutions which have survived for more than 500 years. Universities have been the site of significant social changes, political upheaval and revolutionary discoveries. For the continuity of the existence of universities, adherence to the specific features of universities that, when combined, distinguishes them from any other social organizations and institutions (e.g. government, media, businesses etc.) has been crucial for its survival. However, it has also been crucial to adopt new possibilities and adapt to the changing world. At the forum, it was argued, by briefly looking back at the history of universities and by predicting two possible development trends of universities in the next hundred years, that the following combination of characteristics is central for an institution to be categorized as a university:

- 1) Universities embrace the simple desire to advance understanding and knowledge.
- 2) Universities breed and foster an academic community across borders.
- 3) Universities are collaborative and competitive at the same time.

Even though, in a hundred years, universities will be very different from today, the characteristics above are crucial for universities to stay relevant as a major sector of society. If universities become like businesses or instruments of government, universities will no longer be as significant. By adhering to the university-specific characteristics and by protecting a relative administrative independence from economic and political actors, universities will continue to play a major role serving the development progress of humankind.

ii. Meet and Balance Different Expectations and a Culture of Lifelong Learning

Shigeo Katsu, President of Nazarbayev University

To stay relevant in a VUCA world, universities should enable students to develop both soft and hard skills. Therefore, Nazarbayev University has introduced a core curriculum that

equally weights hard and soft skills. On one side, deep understanding of key disciplines but also interdisciplinarity is enhanced; on the other side, critical thinking, creativity, communication among other soft skills are cultivated. Particularly, critical thinking is central to acquiring knowledge in a world where different information sources compete with each other and more fake news and misinformation tend to govern public opinion.

As the fast-changing job market requires continuous adaptation, the traditional utilitarian role of universities as a provider of qualified labor to specific sectors should be reconsidered. Furthermore, so-called disruptive technologies ignite revolutionary changes and tremendously impact not just the job market but also any other aspect of life. The solution to those challenges may be the adoption of a lifelong learning attitude. Thus, university faculty should internalize and promote the concept of lifelong learning. This should solve the question of how to face a fast-changing, uncertain and volatile world. Universities could learn lessons from Singapore and the US in terms of length of graduate programs lasting 4 or 5 years. However, even more important is the construction of an identity of lifelong learning so that students keep studying and acquiring new skills even after they have graduated and many years later. To nurture such a culture is the responsibility of the faculty and the university.

Nazarbayev University has been created to meet those challenges and it is especially designed to meet the needs of a developing country. The President of Kazakhstan has challenged the nation to join the top 30 countries in 2050, not just in terms of per capita income but also in terms of living standards. To achieve this goal, Kazakhstan has to compete for top international talent. Furthermore, the United Nations 2030 objective is to realize global sustainability. Nazarbayev University aims to meet the national government's expectations as well as international requirements. With an appropriate legal framework and value sets, its programs are merit-based and oriented at cultivating hard and soft skills. Academic integrity and transparency are emphasized. Teaching and research are integrated, strategic partnerships with universities and other organizations are established, and English is set as the language of instruction and research in every program. The university's faculty comprises talented people from 55 countries.

As a result, students of Nazarbayev University do very well in international student competitions, and graduates of NU are accepted at top universities and excel in the international job market. They are entrepreneurial leaders, inclusive decision-makers, excellent communicators, global citizens, experts in their field, intellectually agile and flexible. Graduates of a university are the best ambassadors and promoters of a university.

iii. **Internationality of the Campus**

Andrew Hamilton, President of New York University

New York University implemented a strategy of setting up campuses around the world to foster multi-culture and internationality of the university, while at the same time embracing

the local culture. There are three major campuses and 11 miniature campuses. Mini campuses have been set up in Washington, D.C., London, Florence, Paris, Madrid, Prague, Berlin, Accra, Buenos Aires, Tel Aviv and Sydney. Besides the campus in New York, there are two other major campuses: one in Shanghai and the other in Abu Dhabi. Each campus has been created by integrating cultural elements of the respective local environment to enhance a sense of place and a unique campus identity. The architecture of the Abu Dhabi campus is deliberately designed to reflect the Arab culture. For example, there is an oasis of palm trees that becomes a key spot for the gathering of students. The campus of NYU Shanghai is located in the Financial District of Pudong and deliberately accommodates one Chinese student and one international student in the same room to maximize the intercultural experience. Furthermore, each Chinese student has to take English courses, whereas Chinese courses are compulsory for every international student. These two campuses now have about 1,500 students, whereas it is planned to increase the number to 2,500 in the next few years.

The NYU strategy aims to offer opportunities for people from different cultural backgrounds to interact and connect. Every student, staff and faculty have the opportunity to study, teach or research at one of the other NYU campuses. For this to work, the critical dimension is a fully integrated system. Students can travel to London and continue to take freshmen chemistry or sophomore organic chemistry there. They can be sure that they can continue the sequence of their curriculum for completion of their major in a normal four-year degree in the US. To assure that courses are given and delivered at these different sites, considerable vertical and horizontal organization is required. Furthermore, departments must keep an oversight and faculty advisory committees must ensure the quality of courses.

iv. International and Interdisciplinary Collaboration

Mark Wrighton, Chancellor of Washington University in St. Louis

In 2005, Washington University in St. Louis launched the McDonnell International Scholars Academy bringing students from 35 collaborating universities from around the world together. There is at least one partner university from each populated continent. The heart of the academy's mission consists of the McDonnell Scholars who are mostly graduates of one of the partner universities and who are masters or doctoral degree candidates in any program offered by Washington University. The scholars are diverse in terms of their intellectual interests and their backgrounds. Each scholar is fully supported with tuition and a living stipend and receives a travel award to come to St. Louis and to return home once a year. The scholars are selected on the basis of their academic excellence and their commitment to become a global leader. Each scholar takes at least two cohort trips: one to New York City to learn about the culture and the financial system in the United States, and another to Washington DC to learn about the government and the politics of the United States. Each Scholar also participates in a leadership education program preparing them for careers in diverse sectors.

Leading faculty members of Washington University serve as ambassadors to the Academy partners. Each partner is served by one ambassador who is responsible for developing faculty and student exchange programs as well as collaborative education and research programs. Ambassadors also serve as mentors to the McDonnell Scholars from the respective partner university. Every two years, the McDonnell Academy partners convene at an international symposium to discuss progress and opportunities for collaborative education and research focused on addressing global challenges. At the most recent symposium, leaders from McDonnell Academy partners have discussed issues of public health, aging, agriculture, energy and environment revealing the interrelation of these global issues. Thus, solving global problems requires talented people with deep expertise from many disciplines and from many parts of the world working together. The McDonnell International Scholars Academy provides the infrastructure to work collaboratively with teams around the world. An example of a successful initiative is the McDonnell Academy Global Energy and Environment Partnership which has resulted in the collaboration in areas related to reducing pollution and emissions of greenhouse gases. The vast majority of McDonnell Academy partners have agreed to embrace a commitment to improve university campus sustainability. The University Campus Sustainability Declaration is accompanied by specific commitments from McDonnell Academy partners to reduce greenhouse gas emissions. Washington University's goal is to reduce carbon dioxide emissions down to 1990 levels, despite having built more than 50 new buildings in the last 28 years.

v. Fundamental Interdisciplinarity – Liberal Arts Education

Lynn Cooley, Dean of the Yale Graduate School of Arts and Sciences

While focusing on science, technology, engineering and math, the so-called STEM subjects, universities should not enforce attachment to different disciplines. Instead, it is crucial to foster interdisciplinarity among and across STEM disciplines. STEM advancement does not benefit the world if those advancements are not spread, communicated and fairly distributed to people, or if people refuse to utilize it because of misinformation (e.g. vaccines). Furthermore, advancements may be exploited in the wrong way because of vested interests (e.g. weapons). Therefore, universities should equip students with the ability to imagine problems, consequences and possibilities, and to expect complexity and ambiguity of problems. Furthermore, the world needs communicators who understand the cultural, social, economic and political circumstances and the psychology of groups and individuals.

Yale University emphasizes Liberal Arts education and interdisciplinarity. The Liberal Arts education, which equally values creativity and knowledge accumulation, enables students to view objects and issues from multiple perspectives and become excellent communicators. As a very large university, Yale has established interdisciplinary laboratories to cultivate overall talents. The Yale Center for Engineering, Innovation & Design (CEID) brings together, for example, musicians, engineers, biologists and physicist to develop new instruments. They explore the acoustic sciences and engineering,

using 3D-printers, laser cutters and computer programs to create instruments that can be played together by two people. A film composer from Yale composed a new song requested by Hollywood composers using the newly developed instrument. The project has been very motivating and inspiring for the students.

Whereas Yale as a large and well-established university has access to many resources and experience, it is sometimes difficult to create completely new, flexible and collaborative spaces. New universities, such as Westlake University, should use the opportunity of building a campus based on its own culture without historical baggage. Furthermore, as food in China comprises a significant cultural element, it is possible to engage cuisine arts in interdisciplinary student projects. Moreover, the Chinese culture offers fascinating poetry, writings, paintings and other arts which could also be involved in extra-curricular projects. These can inspire students and also increase creativity and imaginative power for their respective STEM discipline research.

vi. Focus on Cutting-Edge Science and Technologies

Bundhit Eua-arporn, President of Chulalongkorn University

Universities should focus on skill sets and knowledge development that will prevent people from falling into the Homo Useless class. Along with specific soft skills, information technology and biotechnology are key disciplines. Universities must collaborate internationally and across different social sectors to enhance the development of these technologies and the understanding of students of these technologies.

To prepare students for the future where creativity and innovative spirits are crucial soft skills and deep expertise of key technologies are indispensable, Chulalongkorn University has created the Siam Innovation District which is located next to Siam square, the most affluent area of Bangkok. Siam Innovation District aims to fulfill the mission of the university to become a University Deus. It serves four functions: 1) gathering and cultivating talents through mentorship, incubators, accelerators, workshops and competitions, 2) providing a marketplace and a space for matchmaking between investors and innovators, 3) featuring future labs to develop and demonstrate cutting-edge technologies and innovations, and 4) offering a platform for industries and investors, startups, government, university, citizens and international actors to communicate.

vii. Collaboration of Universities with Businesses

Hai-Sui Yu, Deputy Vice-Chancellor of University of Leeds

Only very few super innovative universities are able to develop big partnerships with big businesses. A university needs research units such as institutes, report centers and research groups. The most important ingredient for this units to function effectively are talented people. Furthermore, it requires good leadership, motivating culture and values, sound institutional and departmental practices, a clear overall strategy of the university, collaborations and networks. To become a super innovative university, it is important to

foster three kinds of collaboration: 1) interdisciplinary collaboration, 2) international collaborations and 3) university-business collaboration.

At University of Leeds, the criteria for academic promotion include 1) world-changing research (e.g. high-quality publications, research grants etc.), 2) teaching and learning (e.g. excellence in teaching and innovative course development), 3) administrative university engagement (e.g. management, university community services) and 4) engagement with businesses (e.g. collaborative research with businesses). This reflects Leeds's emphasis on business collaboration.

The UK has initiated a nationwide association, the Knowledge Transfer Partnerships (KTO), which has been successfully running for 40 years and provides a scheme for partnerships between businesses and institutions to engage in innovative projects. KTP associates deliver knowledge transfers, whereas the cost is shared between the partners. The projects can last between 6 months and 3 years. Under the KTP scheme, Leeds works with several blue-chip companies such as ARUP, Goldman Sachs, Rolls-Royce, SINOCHEM, P&G etc. Leeds runs over 200 collaborative research projects worth £27 million and has signed 160 research contracts from business funders worth £49 million. Furthermore, Leeds has a strong track record in commercializing technologies and innovation. Since 1995, over 110 companies have been set up based on contributions of the University of Leeds. Moreover, Leeds has bred 6 market listed companies, more than any other university, with market capitalization in excess of £550 million. The university also has 30 active spin-outs employing over 850 staff and more than 80 technology licenses. The University of Leeds works with a range of investors and established key partnerships with the IP Group etc. Furthermore, the university initiated a £40 million innovation and enterprise center called Nexus. Opening in 2018, it will serve as a gateway for business and university collaboration. High growth businesses and corporate R&D teams will enjoy seamless access to Leeds's world class research, student and graduate talents and professional development services. Nexus will embrace the interdisciplinary and innovative strength at Leeds by integrating three disciplinary areas of engineering, environment and health. These overlap in medical technologies, energy and infrastructure technologies and food security and nutrition sciences, whereas every area overlaps with data science. Nexus shall provide new opportunities for innovation, productivity gains and growth as well as international research collaborations.

viii. Taking Advantage of the Specific Geographic Location and Government Support

Yonghua Song, Rector of the University of Macau

The University of Macao is located in one of the four most significant bay areas of the world. As a university located on the west bank of Pearl River, the University of Macau also aims to further integrate itself into the innovation-driven development of the Guangdong-Hong Kong-Macao Greater Bay Area. The University of Macau has established a Chinese-Portuguese Bilingual Teaching and Training Center in 2017 to

enhance language competencies fostering the integration of Macao and Mainland China.

Furthermore, it is supported by the local Macao government as well as the national government. Thus, it has access to many resources and offers students and faculty the opportunity to research in state key laboratories which include the State Key Laboratory of Analog and Mixed Signal VLSI, the State Key Laboratory of Quality Research in Chinese Medicine and the State Key Laboratory of Internet of Things for Smart City. It also provides opportunities to engage in cutting-edge research of Precision Medical Treatment, Brain Science and Artificial Intelligence as well as Advanced Material Sciences in the key laboratory of the Ministry of Education.

Whereas taking advantage of government support, the University of Macao embraces local strategic policies of the integration of the Greater Bay Area and actively engages in the improvement of the local development and its sustainability. Moreover, it grasps opportunities arising from the agglomeration effect of the area by establishing a Bay area cooperation platform serving as a gateway to different research institutions, universities and businesses of the Pearl River Delta and beyond. The university collaborates in several research projects with Zhuhai UM Science and Technology Research Institute (ZUMRI) and established collaborative relations with the Pearl River Hydraulic Research Institute of Pearl River Water Resources Commission. Furthermore, it has set up joint training programs, research projects and laboratories with Shenzhen University and a joint key laboratory of the Ministry of Education with Sun Yat-sen University. In 2016, University of Macao launched the *Guangdong-Hong Kong-Macao University Alliance* with Sun Yat-sen University and The Chinese University of Hong Kong which comprises the *Guangdong-Hong Kong-Macao University Library Union* and the *Guangdong-Hong Kong-Macao University Innovation and Entrepreneurship Alliance* as well as a *Super Computing Alliance* to strengthen cooperation among three places in research and application of supercomputing on the basis of the National Supercomputing at Sun Yat-sen University.

It also engages in VLSI chip design research in cooperation with bay area businesses such as Huawei. Cooperation with Guangzhou Xiangxue Pharmaceutical Company to promote quality research in Chinese Medicine has also been established by the university. With the aim to foster the Greater Bay Area integration, it cooperates with the Hong Kong-Zhuhai-Macao Bridge Authority and the China Railway Engineering Consulting Group Company. Furthermore, it cooperates with 15 businesses and participates in the *Guangzhou Science Technology and Innovation Commission - Guangzhou Science and Technology Innovation and Development of Special Funds for Foreign R & D*.

ix. Approaches of a New University in China

Shiyi Chen, President of Southern University of Science and Technology

As a new university, it is important to look around and learn from experiences from other universities. As a new university in China, it is important to distinguish ourselves by

focusing on the needs of higher education in China. The 4th industrial revolution requires talents with critical thinking, creativity and imagination as well as expertise in cutting-edge technologies such as artificial intelligence, robotics, nanotechnology, fintech, quantum computing, energy storage, biotechnology, materials science etc. Furthermore, the internationalization of the university is crucial. English skills are of utmost importance.

Southern University of Science and Technology (SUSTech) is a new university in China and the second youngest science and technology focused university. As SUSTech is located in Shenzhen, the university explores the advantages of the local agglomeration of innovative businesses. Huawei, Tencent, BYD, Mindray, dji, TP-LINK and many more are located in Shenzhen providing the perfect opportunity for university-business collaboration.

The role of a modern university is to nurture global citizens, discovering new knowledge and making a societal impact. Therefore, it adopted a learning-by-doing educational approach and engages students already in their undergraduate years in frontier research projects. To nurture a global mindset of students, SUSTech set a decentralized international affairs operation, offers bilingual campus services, Western catering, integrated education of domestic and international students and supports frequent international travels of non-Chinese students and scholars. SUSTech established 8 schools and has about 350 faculty members. Over 60% of the faculty are younger than 40 creating a dynamic and enthusiastic environment. SUSTech recently initiated the System Design & Intelligent Manufacturing Program which focuses on interdisciplinarity and disciplinary integration. It is led by two advisory committees: the academic advisory committee and the business advisory committee. The program is set on a 3,720 m² area with studios, labs and different corners. It provides students with the opportunity to work on real industrial designs with scholars, professors and businesses in several areas. The project areas include smart internet of things, smart manufacturing, smart health, smart community, smart materials and smart finance. Herewith, SUSTech actively takes up the role of making an impact for the local economy.

VI. CONCLUSIVE SUMMARY

The contributions of every speaker are inspiring. This forum has revealed that speakers and other university representatives are in substantial agreement regarding the role of a university. Many speakers expressed similar concerns about current difficulties, future challenges, and emerging opportunities in higher education. There also exists significant overlap in strategic thinking in developing new universities with a global outlook.

In conclusion, the following roles of a university are affirmed:

1) Educational role:

- a) Cultivating top leaders, entrepreneurs, communicators and creative innovators with social responsibility

- b) Preparing people for a globalized VUCA world in terms of adaptivity, flexibility and important hard skills (e.g. interdisciplinary knowledge, info- and biotechnologies, English etc.) and soft skills (critical thinking, communication, imagination, creativity and social awareness)
- 2) Avant-gardist role:**
- a) Experimenting with new concepts and ideas
 - b) Making scientific discoveries and advancing knowledge
 - c) Developing and translating new technologies
 - d) Communicating and disseminating new knowledge
 - e) Fostering positive social changes
- 3) Local and global developmental role:**
- a) Improving living standards
 - b) Enhancing local development (e.g. local integration policies)
 - c) Fostering international development (e.g. sustainability goals)
- 4) Competitive-collaborative-communicative role across borders:**
- a) Increasing international communication, exchange and collaboration
 - b) Competing for the best faculty, staff and students to increase overall incentives
 - c) Fostering overall globalized mindsets and people

By embracing these roles, universities are now and will continue to lead in sustainable development and human welfare within the local, national and international communities.

VII. APPENDIX

JOINT STATEMENT OF THE 2018 WESTLAKE FORUM ON HIGHER EDUCATION
2018 西湖高等教育论坛联合宣言

We, the participants of the inaugural Westlake Forum on Higher Education, jointly issue the following statements on 20 October 2018 in Hangzhou, China.

2018年10月20日，我们齐聚中国杭州，参与首届西湖高等教育论坛，共同发布如下宣言：

Humankind faces daunting global challenges on economic development, education, energy, environment, food, climate change, and healthcare. As an indispensable pillar of any modern society, universities transform the world through education and research. Education and research transcend national borders and benefit greatly from international collaboration and cooperation.

人类在经济发展、教育、能源、环境、食品、气候变化和医疗保健等方面，都面临着全球挑战。作为现代社会不可或缺的支柱，大学通过教育和研究改变世界。教育和研究超越国界，并且极大地受益于国际合作。

To address the global challenges and to respond to calls of our community and the world, we believe the universities should play a more active role through improved collaboration and cooperation. In particular, we should

为积极应对全球挑战，反哺社会和全世界，我们认为大学应加强合作，积极做出贡献，我们尤其应该：

- | encourage exchange of students;
| 鼓励学生交换
- | facilitate regular visits by faculty and staff;
| 促进教职员工定期互访
- | promote joint interdisciplinary research;
| 推动跨学科联合研究
- | strengthen collaborations in research and academic affairs;
| 加强科研和学术合作
- | protect academic freedom within the legal framework of each nation.
| 在各国法律框架内，鼓励学术自由

The international spirit of collaboration among universities is particularly important today. The general trend of cooperation among major powers of the world in the past decades has faced new obstacles, creating challenges for universities as well as for students and scholars.

当今时代，大学之间的国际合作更加重要，世界主要大国之间过去几十年合作的总体趋势遭遇了新的阻碍，给大学以及学生和学者带来了挑战。

We believe in a shared future for people of all nations. The world will be made safer and better through mutual understanding, productive engagement, responsive dialogue, and meaningful cooperation.

我们相信，世界的未来属于人类共同体，各国人民同呼吸、共命运。通过相互理解、有效参与、积极对话以及精诚合作，我们将构建一个更安全、更美好的世界。

Issued by (in alphabetical order of university names):

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