



GFCC

Global Federation of
Competitiveness Councils

CONVERGENCE & CIRCULATION

A Report on the Inaugural Meeting of the
University and Research Leadership Forum
in London, November 30, 2016

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The Global Federation of Competitiveness Councils (GFCC) is an international network of leaders, non-profit organizations, government agencies, universities, and companies working collaboratively to build sustained prosperity through innovation. The GFCC develops initiatives and tools to better understand and navigate the complex competitiveness landscape and disseminates best practices.

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A MESSAGE FROM THE GFCC LEADERSHIP

The world is changing. Alongside that change, how we approach the growth of the critical industries that fuel society's evolution is developing as well. In order to meet the challenges of an interconnected, rapidly developing 21st century global ecosystem, the Global Federation of Competitiveness Councils (GFCC) is proud to launch its University and Research Leadership Forum.

Institutions of higher education and research organizations play a pivotal role in competitiveness and economic growth. They are critical components of innovation ecosystems and serve as wellsprings of new knowledge and technology that function as the building blocks for new products, services, systems, and processes. They develop the talent needed for discovery and investment and feed the pipeline of creative entrepreneurs who drive new business formation. It is not surprising, then, when one looks at a global map of industry clusters and thriving start-up zones, one sees universities and research institutions anchoring the most innovative cities and regions.

In this era of transformation, universities are embracing their new role. They are responding to rapidly changing knowledge and skill demands and supporting communities of learners who are connected across cultures and geographies. They are making greater efforts than ever before to harness their unique capabilities to stimulate regional economic growth and to build academic-industry partnerships that accelerate



technology development and commercialization. But they can do more.

Knowledge, experimentation, and experience must inform and guide the development and implementation of competitiveness policies and strategies for both companies and countries — and universities can lead the way. The academic community has much knowledge that can be brought to bear to better understand the effectiveness of competitiveness models and strategies. This includes discipline knowledge of individual factors such as investment or talent development, and the multidisciplinary fusion of this knowledge as these factors are integrated into dynamic ecosystems that create a climate for competitiveness, entrepreneurship, productivity, and investment.

The inaugural meeting of the Forum in 2016 served as a launching pad for this critical work, examining new models in higher education and



research and their contribution to innovation and competitiveness. This report operates as a reference to those initial conversations and provides a blueprint for how we move forward through discussion, collaboration, and action.

Sincerely,

A handwritten signature in blue ink that reads "Deborah L. Wince-Smith".

The Honorable Deborah L. Wince-Smith

President, Global Federation of Competitiveness Councils
President & CEO, Council on Competitiveness

A handwritten signature in black ink that reads "Charles O. Holliday, Jr.".

Mr. Charles O. Holliday, Jr.

Chairman, Global Federation of Competitiveness Councils
Chairman, Royal Dutch Shell plc

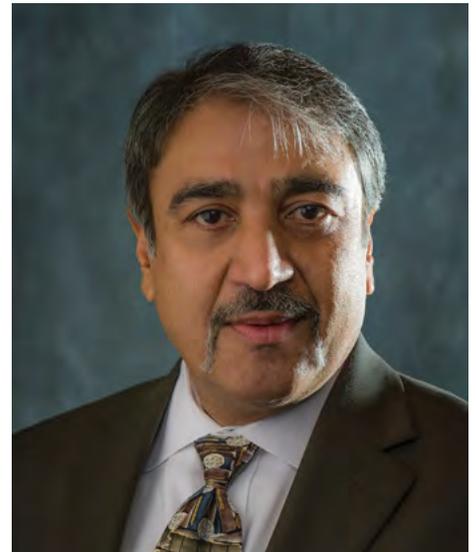
A MESSAGE FROM THE FORUM CHAIRMAN

We live in a knowledge economy that is constantly changing and evolving. Our intellect and expertise drive innovation and technology, spur economic growth, and benefit humankind and our planet. Knowledge is the ultimate source of competitive advantage, and as such, universities have an unequivocal, central role in the knowledge economy. We educate and prepare next generation leaders and global citizens; we generate and disseminate knowledge and creative works; and we engage in public service, locally and globally. The role of universities in supporting global competitiveness will continue to grow as we are poised to tackle the world's most pressing challenges. We have the breadth and depth of talent and expertise to address our increasingly complex and multi-disciplinary global issues. Universities are knowledge and action hubs for different communities to converge and work together: from students and faculty, to entrepreneurs and investors, to policymakers and business leaders.

As we continue to change and evolve at a fast pace, we must keep up with the demands for learning, adaptation, and transformation. Climate change, urbanization, the exponential growth of technologies, new demographics, and social unrest are just some of the forces reshaping the 21st century landscape. Businesses, cities, regions, nations, societies, and citizens look for new sources of inspiration and growth in this era of

transformation. Universities can and should be change agents. We can promote entrepreneurship and be entrepreneurial ourselves. We can co-invest and work in partnerships with government and business. We can explore new approaches for engagement with industry, philanthropy, and other stakeholders. Above all, we can establish global alliances. The GFCC University and Research Leadership Forum is about forming these alliances. It is a global platform for universities and research organizations to exchange best practices, collaborate, co-create, and deploy new initiatives aimed at driving competitiveness and economic transformation. It is an essential global resource for universities that want to elevate their innovation profiles and increase their impact.

It is a pleasure to engage with and share ideas and plans with colleagues from 40 universities and 20 countries. This strong contingent reflects the momentum of the Global Federation of Competitiveness Councils and the global competitiveness movement. Universities are at the core of contemporary competitiveness strategies, bringing their unique position as talent generators into the multi-faceted efforts of the GFCC. Together, through the Forum and the extended GFCC community, we will unleash the potential for learning and action on a global scale.



With kind regards,

A handwritten signature in black ink, appearing to read 'Pradeep K. Khosla', with a long horizontal flourish underneath.

Dr. Pradeep K. Khosla
Chancellor, University of California
San Diego

FOUNDING MEMBERS

Australia

Prof. Margaret Gardner AO, President and Vice-Chancellor
Monash University

Prof. Peter Høj, President and Vice-Chancellor
University of Queensland

Brazil

Prof. Dr. Joaquim Clotet, Rector
Pontifical Catholic University of Rio Grande do Sul

Canada

Prof. Santa J. Ono, President and Vice-Chancellor
University of British Columbia

Dr. Feridun Hamdullahpur, President and Vice-Chancellor
University of Waterloo

Dr. Amit Chakma, President and Vice-Chancellor
Western University

Finland

Prof. Dr. Jukka Kola, President
University of Helsinki

Germany

Prof. Dr. Bernd Huber, President
Ludwig Maximilian University Munich

Hong Kong

Prof. Peter Mathieson, President and Vice-Chancellor
University of Hong Kong

Italy

Prof. Francesco Ubertini, Rector
University of Bologna

Korea

Dr. Dong Yeon Kim, President
Ajou University

Malaysia

Tan Sri Prof. Dr. Mohd Amin Jalaludin, President
University of Malaya

Dr. Abdul Rahim Hashim, Vice-Chancellor
Universiti Teknologi PETRONAS

New Zealand

Prof. Stuart McCutcheon, Vice-Chancellor
University of Auckland

Norway

Prof. Ole Petter Ottersen, Rector
University of Oslo

Portugal

Prof. Dr. Antonio M. Cunha, Rector
University of Minho

Qatar

Dr. Hassan Al-Derham, President
Qatar University

Dr. Javaid Sheikh, President
Weill Cornell Medicine-Qatar

Saudi Arabia

Dr. Jean-Lou Chameau, President
King Abdullah University of Science and Technology

Singapore

Prof. Arnoud De Meyer, President
Singapore Management University

Switzerland

Prof. Michael Hengartner, President
University of Zurich

Taiwan

Dr. Pan-Chyr Yang, President
National Taiwan University

United Kingdom

Prof. Alice P. Gast, President
Imperial College London

Prof. Edward Byrne AC, President & Principal
King's College London

Prof. Patrick Nixon, Vice-Chancellor and President
Ulster University

Prof. Sir Christopher Snowden, President and Vice-Chancellor
University of Southampton

Prof. Stuart Croft, Vice-Chancellor and President
University of Warwick

United States of America

Dr. Michael M. Crow, President
Arizona State University

Mr. James B. Milliken, Chancellor
City University of New York

Dr. John J. DeGioia, President
Georgetown University

Dr. Lou Anna K. Simon, President
Michigan State University

Dr. Joseph E. Aoun, President
Northeastern University

Dr. Michael V. Drake, President
Ohio State University

Dr. Pradeep K. Khosla, Chancellor
University of California San Diego

Dr. Robert Zimmer, President
University of Chicago

Dr. Carol L. Folt, Chancellor
The University of North Carolina at Chapel Hill

Dr. Elizabeth J. Stroble, President
Webster University

TEMPE, AZ

Arizona State University advancements have launched nearly 100 companies and attracted more than \$600 million in external funding.

SOUTHAMPTON, UK

SETSquared, the university commercialization partnership of Southampton, Surrey, Exeter, Bristol, and Bath, was the No. 1 university business incubator, with 1,000 start-ups and £4 billion added to the UK economy.



PORTO ALEGRE, BRAZIL

The most successful and diverse science and technology park in Latin America, PUCRS' Tecnopuc has initiated over 60 companies, generating more than 6,500 high tech jobs.

AUCKLAND, NEW ZEALAND

A student-run program focused on cultivating entrepreneurship at Auckland University has spurred the creation of 110 ventures across 35 countries, raising \$200 million in venture capital and seed funding.

INTRODUCTION

A rapidly transforming world is generating both opportunities and challenges for the entire knowledge enterprise. This is especially true for universities and research centers.

Universities and research centers lie at the heart of innovation ecosystems. They drive economic growth, foster social development, and ignite the kind of competitiveness that builds prosperity and improves living standards on a global scale. But those roles are not static. Challenges and opportunities arise when the economy becomes more complex and digital: innovation ecosystems become more sophisticated; new business models emerge; education, training and workforce development needs shift; and communities connect globally around the clock and around the world — across cultures, geographies, and even vocabularies. These transitions change the nature of innovation itself.

The GFCC University and Research Leadership Forum is a constantly evolving think-tank that analyzes the role that universities and research organizations play in innovation and value creation in this new global knowledge economy. Its goals are to capture, analyze, organize, and disseminate best practices and to serve as a platform for successful solutions that can be scaled up globally.

Through the Global University and Research Leadership Forum, the GFCC develops a better understanding of the contributions of global education/research institutions to competitiveness, facilitates new collaborations, and provides global visibility to relevant experiences, emerging models, and original thought in the field.

The inaugural meeting was hosted by Khazanah Nasional Berhad at the London Shard on November 30, 2016. Leaders from 38 universities attended and were joined by the GFCC Board members and a select group of business leaders. A full list of participants is included on pages 34-35.

DISCUSSION THEMES

- Accelerating and Optimizing the Role of Universities as Economic Growth Engines
- Leveraging the Emergence of the Entrepreneurial University for Competitiveness
- Exploring New Models for University-Industry-Government-Lab Partnerships
- Extreme Technology and Shared Infrastructure: Large-Scale Opportunities at the Nexus of Academia, Industry, and Philanthropy
- Building Next Generation Global Leadership and Partnerships for University and Research Organizations



Watch a video recap of the forum:
<http://www.thegfcc.org/university-report/>



Top: Attendees of the inaugural meeting of the University and Research Leadership Forum. Leaders from 38 universities attended and were joined by the GFCC Board members and a select group of business leaders.

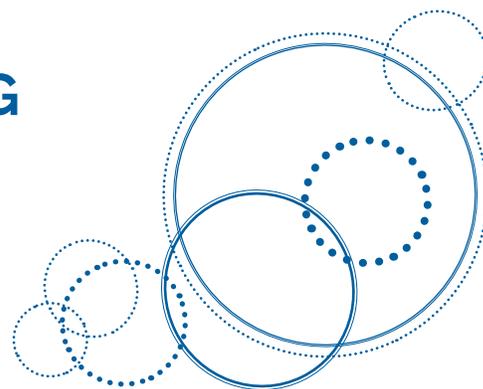
Bottom left: Mr. Javier Santiso, Head of Khazanah Europe, Khazanah Nasional Berhad.



Bottom right: Prof. Alice P. Gast, President, Imperial College London; and Prof. Zakri Abdul Hamid, Science Advisor to the Prime Minister of Malaysia.



ACCELERATING AND OPTIMIZING THE ROLE OF UNIVERSITIES AS ECONOMIC GROWTH ENGINES



● MODERATOR ●

Prof. Stuart Croft

Vice-Chancellor and President
University of Warwick

● DISCUSSANTS ●

Prof. Feridun Hamdullahpur

President and Vice-Chancellor
University of Waterloo

Prof. António M. Cunha

Rector
The University of North Carolina
at Chapel Hill

Dr. Ted Douglas Zoller

Director of the Center for
Entrepreneurial Studies at the Kenan-
Flagler Business School,
T.W. Lewis Distinguished Clinical
Scholar; Prof. of Strategy and
Entrepreneurship
The University of North Carolina
at Chapel Hill

Dr. Hassan Al-Derham

President
Qatar University

Dr. June Pierce Youatt

Provost and Executive Vice President
for Academic Affairs
Michigan State University

BACKGROUND

Innovation has become an increasingly important factor in competitiveness. It is the differentiator in economies, creating high-growth, high-margin activities that drive productivity, employment, and prosperity. Universities and research organizations are key components of these 'innovation ecosystems.' Reading local economic and social needs, these institutions invest in the tools, skills, and culture needed to spark new technologies, products, and companies — sometimes entire industries. Fortunately, the ways universities approach these opportunities are evolving to meet the needs of a 21st century world.

DISCUSSION QUESTIONS

- What cultural, regulatory, or financial barriers hinder universities the most from serving as engines of innovation? How do the barriers differ across countries?
- For students to master technical and entrepreneurial subjects, universities must offer world-class content and teaching talent. How are universities working to keep faculty current and tapping into expertise from the private sector?
- How does your institution align what it teaches with emerging skill needs in the local and national economy? How do your approaches differ between traditional students and mid-career workers seeking new skills?
- Cutting-edge research and innovation often require access to strategic tools and technologies such as high performance computing systems, electron microscopes, DNA sequencers, or 3D printers. Which technology tools are essential? How are research institutions partnering to share critical resources?



CHALLENGES

Myriad obstacles prevent universities from fully realizing their potential to innovate and drive economic growth. Universities need to establish seamless connections and partnerships with industry, the public sector, and society, but differences in vocabulary, approaches, legal frameworks, and expectations are hindering progress.

Universities have to balance research, education, innovation, and economic development. In reaching for that balance, they should support local, regional, and national development. For that, they need to engage with a variety of stakeholders and create new models of partnership.

In general, a key challenge for universities in today's world is keeping up with the pace of change in the private sector and society. This will require universities to embrace a paradigm shift in their mindsets, values, and long-established behaviors, which at times have fallen prey to confined interactions within the academic domain. Internally, performance and compensation systems must be adjusted; externally, the expectations about the roles of universities need to be aligned with legal frameworks and their enforcement.

Lastly, universities must find new ways to prepare students and make sure they have the knowledge, tools, and skill sets necessary to become thought-leaders who can make creative contributions to the growth of regional and global economies.



Top left: Dr. Hassan Al-Derham, President, Qatar University; and Dr. Ted Douglas Zoller, Director of the Center for Entrepreneurial Studies and T.W. Lewis Distinguished Professor of Strategy and Entrepreneurship, University of North Carolina at Chapel Hill.

Top right: Dr. Feridun Hamdullahpur, President and Vice-Chancellor, University of Waterloo.

Center: Dr. June Pierce Youatt, Provost and Executive Vice President for Academic Affairs, Michigan State University.



SOLUTIONS

1. Connect education with industry experience.

Include industry, government, and civil society experience as part of academic curriculums. For example, at Waterloo University, the world's largest co-operative education university, students alternate between work terms and academic terms. According to President Feridun Hamdullahpur, in 2015 alone, the University placed over 19,000 co-op students in 65 different countries, and its students have collectively earned more than \$250 million in salaries.

2. Leverage the alumni network and outside social capital.

Enlist investors, business leaders, and entrepreneurs to engage with students in a systematic way, as mentors, professors of practice, and project leaders. According to Dr. Ted Douglas Zoller, the University of North Carolina at Chapel Hill (UNCCH) provides a good illustration of how such initiatives can function: "We built a wonderful collaboration with the Blackstone Foundation called the Blackstone Entrepreneurs Network, where we engaged 30 serial entrepreneurs in the research triangle ecosystem, gave them a badge and a job, and literally dropped the barriers to them coming on campus. Then, those 30 turned into 300, which turned into 3,000, which established linkages to major markets for our innovators and our students."

3. Implement open-ended joint research agreements.

Establish flexible agreements between universities and businesses that allow resources to move across organizational boundaries and scale up as needed on a continuous basis. For example, the University of Minho has established a multi-year research project with Bosch Car Multimedia, whose largest factory is located near the school and was transformed into a global manufacturing and global development center. There is not a cap in relation to the number of researchers involved, and they can circulate between the University and the company, which is a completely new model for Portugal.

4. Redesign funding and reward systems.

Public universities should explore new funding mechanisms and compensation systems to support innovation activities. Michigan State University has found that establishing the MSU Foundation has been useful both with respect to raising funds and in providing the non-traditional kinds of support and incentives that can be difficult to organize within the academy. As well, Qatar University has partnered with Qatar Development Bank to create the Qatar University Knowledge Group, which enables students to found start-up companies through the school.

5. Orient education towards local, regional, and national needs.

Universities should, in collaboration with area stakeholders, identify local and domestic needs and align their programs' missions to address them. As the national university, for example, Qatar University considers that its primary mandate is to provide the community with qualified graduates who can contribute to the country's growth. Likewise, the University of Minho believes that establishing trusting relationships with local industries can transform a region economically, as the case with Bosch Car Multimedia illustrates; the successful engagement with the University played a key role in the decision to double the number of jobs in less than four years.

6. Embed entrepreneurship in all aspects of university life.

The concept of entrepreneurship should be incorporated into all university projects and departments, as opposed to existing as merely a monopoly of the business school or select formal programs. At Michigan State University (MSU), Dr. June Pierce Youatt says: "The entrepreneurship academic program is not owned by the business school, it's held at the university level, and students may engage in any part of it. Students can actually earn a credential, or they can come in and out of it along a series of progressively more sophisticated types of experiences."

ACCELERATING AND OPTIMIZING THE ROLE OF UNIVERSITIES AS ECONOMIC GROWTH ENGINES



7. Adopt streetwise pedagogies.

Universities should incorporate industry best practices and methods into their programs and initiatives. For instance, according to Dr. Ted Douglas Zoller, UNCCH: “We are bringing in entrepreneurs in residence who work hand-in-hand in a very pragmatic way with new ventures at Lux Chapel Hill, our business accelerator. We are finding that the outcomes are much higher than what you would otherwise have in a traditional incubation or transfer framework.” Bringing in experts from the field to share proven methods increases the chance of success for university programs.

8. Connect local ecosystems with global projects. Universities should not miss opportunities to engage in global science projects and subsequently make critical global connections and assets available to local stakeholders. As an example, the University of Minho was initially awarded a European grant of €15 million for a new Center in Regenerative and Precision Medicine in partnership with University College London. The total investment is expected to reach €100 million.

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“We should think about four things in the context of industrial and economic growth strategies: relations with significant industries, innovation, positioning skills at the heart of education, and the role for universities in the economic evolution of regions.”

Prof. Stuart Croft
Vice-Chancellor and President, University of Warwick

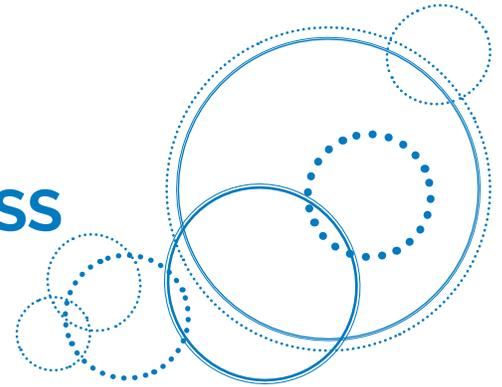


Left: Dr. Amit Chakma, President and Vice-Chancellor, Western University; Prof. Stuart Croft, Vice-Chancellor and President, University of Warwick; and Michiharu Nakamura, Counselor to the President, Japan Science and Technology Agency.

Right: Dr. Hassan Al-Derham, President, Qatar University.



LEVERAGING THE EMERGENCE OF THE ENTREPRENEURIAL UNIVERSITY FOR COMPETITIVENESS



● MODERATOR ●

Prof. Sethuraman Panchanathan
Executive Vice President,
Knowledge Enterprise
Chief Research and Innovation Officer
Arizona State University

● DISCUSSANTS ●

Dr. Elizabeth Stroble
President
Webster University

Prof. Ching-Ray Chang
Executive Vice President for
Administrative Affairs
National Taiwan University

Prof. James McElroy
Pro-Vice-Chancellor, Research,
Enterprise and Postgraduate Affairs
Queen's University Belfast

Dr. Amit Chakma
President and Vice-Chancellor
Western University

Dr Abdul Rahim Hashim
Vice-Chancellor
Universiti Teknologi PETRONAS

Prof. James Metson
Deputy Vice-Chancellor
University of Auckland

Dr. Mohammad Zaidi
Strategic Advisory Board Member
Braemar Energy Ventures
Former Executive Vice President and
CTO, Alcoa, Inc.

BACKGROUND

Universities and research institutions can do more than just partner with existing firms. They can also offer a fertile ground to launch start-ups. Many universities are putting a renewed focus on teaching entrepreneurship to students and faculty, launching incubators and accelerators, hiring professors of practice, working to break silos across disciplines, and encouraging a culture of innovation and entrepreneurship.

DISCUSSION QUESTIONS

- What strategies are effective in bringing disparate parts of a university (e.g., researchers, technology transfer, engineering, business school, academic affairs, and public affairs) together to encourage entrepreneurship? What are the primary barriers?
- What institutional frameworks build a culture and practice of entrepreneurship? Are new models needed to incentivize and compensate faculty and students who pursue entrepreneurial ventures?
- How can universities achieve government and business community support to build entrepreneurial cultures, rules, and structures? How does this process differ between nations?
- In what ways should universities and research institutions measure success? What time frames might be expected between a push to become entrepreneurial and tangible outcomes? What are the key milestones?
- What kinds of curriculum changes are needed? For example, how can business majors become more technologically literate and how can engineers become more business-savvy?



CHALLENGES

Universities have to be relevant for the regions in which they operate in order to serve as catalysts for economic transformation. To accomplish this, universities need to transform and reinvent themselves. Any institution failing to continuously grow and innovate will not survive in the modern global economy. Universities in particular are learning that in order to remain relevant, they must develop a forward-thinking, global, and entrepreneurial mindset that creates value through the leveraging and optimization of global assets.

A deep inward look is needed for universities. Interdisciplinarity is critical in today's complex world, and universities have a challenge in breaking internal silos. Coping with the transformation the world is going through, universities should increasingly prepare students to be job creators instead of job seekers. A caveat is that, all too often, professors do not have industry experience and were not trained to be entrepreneurs.

Language and the vocabulary of innovation is another internal challenge faced uniquely by universities. The development of technology cannot easily be translated into compelling value propositions. In order to make impact, in addition to preparing themselves to communicate the value of the things they create, universities also need new mechanisms and funding models for translational research and venturing. Universities must construct more flexible and adaptable structures, for only by embracing change in its many forms can they respond to the needs of an evolving society.

Left: Dr. Elizabeth Stroble, President, Webster University; and Dr. Mohammad Zaidi, Strategic Advisory Board Member, Braemar Energy Ventures, Former Executive Vice President and CTO, Alcoa, Inc., speaking into the microphone.

Right: Dr. Sethuraman Panchanathan, Executive Vice President, Knowledge Enterprise and Chief Research and Innovation Officer, Arizona State University.

.....
"We need to broaden this entrepreneurial thinking to not only what we do for our faculty and students, but also what we do for the ecosystems, the community, the region that we are embedded in."

Prof. Sethuraman Panchanathan
Chief Research and Innovation Officer, Arizona State University



SOLUTIONS

1. Implement global mobility programs.

Universities should establish global mobility programs to prepare faculty and students to operate at an international level. For example, Webster University has multiple campuses, and its degree programs are portable among them. According to University President Dr. Elizabeth Stroble, this allows the school to be purposeful and strategic about encouraging students to move from campus to campus when completing their degrees. National Taiwan University also rewards and incentivizes faculty and staff to do the same.

2. Provide leaves for professors to work with industry.

Universities should allow professors to have business and entrepreneurial experiences without jeopardizing their careers. Dr. Amit Chakma, President and Vice-Chancellor of Western University, says: "Imagine a fellowship program supported by all parties that encourages professors to work with an innovative company, and learn from that company, and bring those skills back." As another example, at the National Taiwan University, professors can take sabbaticals of more than five years to work in industry.

3. Develop integrated entrepreneurship programs.

Entrepreneurship programs should bundle different components — industry mentoring, seed funding, leaves for students to run start-ups, business support, and international experience — in order to effectively create the conditions for students to

build new global ventures. Dr. Ching-Ray Chang explains the process at National Taiwan University: "First, we set up a new entrepreneurship course run not only by business school professors, but also industry experts and venture capital experts. Students join a team to initiate a potential project after the course, with funding from alumni and venture capitalists. If the project is good, we give students a certain budget, and we allow them to take up to five years of leave to implement the business before they graduate. We think all startups should go to the Bay Area to be qualified as a success."

4. Place university offices in global innovation hotspots. By setting up offices in global innovation hotspots, universities can connect with industry and allow students to experience technology business environments. National Taiwan University has embraced this idea by opening an office in the Bay Area, which provides students with connections to the most competitive technology businesses in the world.

5. Establish university knowledge companies. Universities should build companies whose mission is to strategize about how to best (i) develop and fund new ventures, and (ii) allocate any resulting intellectual property (IP) commercialization rights. For instance, University of Auckland has a stand-alone company called Auckland Uniservices Limited, which serves as the commercialization company of the University. It has a turnover of between \$100 and \$120

million a year and handles all of the IP for the University. In addition, it acts as an investor by providing pre-seed funding. The same is true of Queen's University Belfast, which has spun out 47 companies and divides the IP 50/50 between the school and investors.

6. Create initiatives/centers related to global grand challenges.

University centers, departments, and programs can connect more closely to social and economic realities by organizing themselves according to specific global challenges, instead of by academic discipline. Prof. Alice P. Gast, President of Imperial College London, elaborates: "People now see the world in terms of huge problems, and they are trying to figure out how they can contribute to them. We are taking the opportunity here to redefine our chemistry research as we move it to the wider city campus. Instead of having organic and inorganic chemistry, we have sections on energy, medical-related chemistry, and materials-related chemistry."

7. Establish innovation platforms. It is crucial that universities combine research/technology capabilities and business expertise into their entrepreneurship platforms that link students, academic mentors, and industry mentors in new ventures. As an example, the University of Auckland has a program called Velocity, wherein students meet, develop an idea, and then connect with a researcher or academic mentor, as well as a business mentor

LEVERAGING THE EMERGENCE OF THE ENTREPRENEURIAL UNIVERSITY FOR COMPETITIVENESS

from outside of the University. Prof. James Metson estimates that the University has launched more than 110 ventures across 35 countries from its collaboration process, raising about \$200 million in venture and seed capital. The Universti Teknologi PETRONAS is working with 400 companies to create opportunities for students to gain business experience before their final undergraduate year. They combine that experience with university support and then incubate new technologies and ventures that address business problems.

8. Establish joint institutes. Joint institutes with other universities and research organizations can be effective in promoting cultural change and creating a new spirit of collaboration and risk-taking. At Western University, President and Vice-Chancellor Dr. Amit Chakma has prioritized this goal, saying: "Promoting strategic partnerships between institutions is good for all sorts of reasons, one of which is structural. When you bring two institutions together, you have to break the culture of both places to make them work together."



Top: Prof. W. John Kao, Vice-President and Pro-Vice-Chancellor (Global), University of Hong Kong; Dr. Keoki Jackson, Vice President and Chief Technology Officer, Lockheed Martin; and Prof. James Metson BSc/Ph.D., Deputy Vice-Chancellor (Research), University of Auckland.

Center: Prof. Noor Azlan Ghazali, Vice Chancellor, Universiti Kebangsaan Malaysia; and Dr. Amit Chakma, President and Vice-Chancellor, Western University.

Bottom: Dr. Abdul Rahim Hashim, Vice Chancellor, Universiti Teknologi PETRONAS; and Dr. Antonio Cunha, Rector, University of Minho.

"In general, universities appear to find it difficult to translate technology developments into relevant value propositions. That is needed."

Dr. Mohammad Zaidi

Strategic Advisory Board Member, Braemar Energy Ventures;
former Executive Vice President and CTO, Alcoa, Inc.



Dr. Spiros Dimolitsas, Senior Vice President for Research & Chief Technology Officer, Georgetown University; and Prof. Joaquim Clotet, President, Pontificia Universidade Catolica do Rio Grande do Sul.



Mr. Adham Nadim, Chairman and Managing Director, NADIM; Dr. Roberto Alvarez, Executive Director, Global Federation of Competitiveness Councils; Brigadier General Simon "Pete" Worden, USAF, Ret., Ph.D., Chairman, Breakthrough Prize Foundation; and Prof. Alice P. Gast, President, Imperial College London.



Dr. Elizabeth (Beth) J. Stroble, President, Webster University; Dr. Sethuraman (Panch) Panchanathan, Executive Vice President and Chief Research and Innovation Officer, Arizona State University; and Mr. Chad Evans, Executive Vice President, Council on Competitiveness.

Dr. Keoki Jackson, Vice President and Chief Technology Officer, Lockheed Martin; and Mr. Charles O. Holliday, Jr., Chairman, Global Federation of Competitiveness Councils.



Prof. Ching-Ray Chang, Executive Vice President for Administrative Affairs, National Taiwan University; and Dr. David B. Williams, Executive Dean of the Professional Colleges, The Ohio State University.

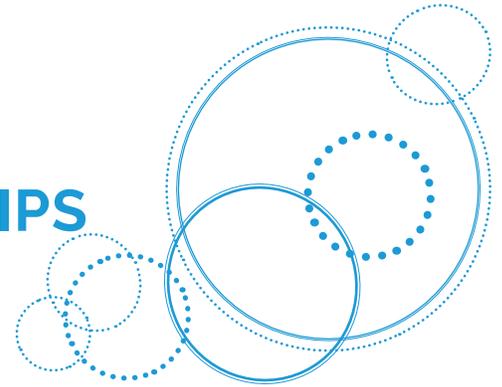


Prof. Zakri Abdul Hamid, Science Advisor to the Prime Minister of Malaysia; Dr. Roberto Alvarez, Executive Director, Global Federation of Competitiveness Councils; and the Hon. Deborah L. Wince-Smith, President, Global Federation of Competitiveness Councils.





EXPLORING NEW MODELS FOR UNIVERSITY-INDUSTRY- GOVERNMENT-LAB PARTNERSHIPS



● MODERATOR ●

Prof. Alice P. Gast
President
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● DISCUSSANTS ●

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Vice President and Chief Technology
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Prof. J A Ian Montgomery
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Ulster University

Prof. Mirko Degli Esposti
Deputy Rector
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Ms. Lucy L. Okumu
Chief of Staff and Director of
Operations
King Abdullah University of Science
and Technology (KAUST)

Prof. David B. Williams
Executive Dean of the Professional
Colleges
Ohio State University (OSU)

BACKGROUND

Working in partnership with government and industry, universities can pursue strategic research topics that support local economies and development objectives. Such partnerships also help align skills taught with those in demand and enable students to work on real world challenges faced by governments and industry. Partnerships take many forms, and research organizations across the globe operate in different economic, institutional, and business realities.

DISCUSSION QUESTIONS

- Which kinds of partnership have proven to have the greatest impact on regional or national competitiveness? How is that impact measured?
- How can universities best serve as hubs for strategic technologies or sectors in partnership with industry and government? How should universities balance their roles in basic and translational research?
- What type of partnership might your institution like to enter that is blocked or unworkable? Are the primary barriers government regulations, university culture, business hesitancy, or something else?
- How do university intellectual property policies differ across institutions and nations? How might they be improved?
- Do cross-border collaborations play an important role in driving innovation and competitiveness? What are the characteristics of successful global partnerships?



CHALLENGES

Establishing partnerships among universities, industry, and the public sector can yield significant synergies. However, differences in perspectives, language, expectations, goals, and approaches can lead to operational conflicts and failed time, money, and energy. IP ownership is particularly sensitive in this context.

In addition to adjusting reports and expectations, it is necessary to create and/or adapt institutional frameworks — such as national legislation — to facilitate and promote IP commercialization and partnerships in general. Learning is necessary; universities need to benchmark practices and also develop their understanding of industry’s perspective.

Changes in technology, society, and the global economy are accelerating. Universities need to do more than cope with the change, they must adapt to a paradigm in which acceleration is the norm. In order to do that, universities must — among other things — innovate in finance and create/generate resources that can allow for new ventures and university-led transformational projects.

In building partnerships with industry, government, and labs, universities should consider the local economic reality and explore the ways in which they could fill existing gaps, attracting investment and enabling economic growth. It is important to value the diverse resources and approaches each stakeholder contributes to such endeavors and develop new models for partnerships that account for, and are designed to benefit from, these differences.

Top left: Associate Prof. Dr. Sumiani Yusoff, Dean, Sustainability Science Research Cluster, University of Malaya.

Top right: Prof. David B. Williams, Executive Dean of the Professional Colleges, Ohio State University.

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“Universities get to know the reality of industry. Expectations on IP sharing can be calibrated, and templates built on common understanding can speed up the process.”

Dr. Keoki Jackson
Vice President and Chief Technology Officer,
Lockheed Martin



SOLUTIONS

1. Set up IP agreements that are short and simple. Universities should create templates for simple IP agreements (pursuant to which faculty would have to agree to certain pre-conditions, but could otherwise adjust on the go) in order to speed up projects. The University of Chicago, for example, recently created a short form IP agreement that any faculty member may use. While faculty members must consent to the embedded pre-conditions, including the speed of transfer and the speed of idea exchange, the University is hoping that this experiment, called UCGO, will accelerate successful projects.

2. Establish offices to manage relationships with industry.

Universities should create offices that are responsible for building relationships and channels with industry, preferably outside of technology transfer offices (TTOs), which can be more transaction-oriented. UNCCH has had success by creating a new vice chancellorship in economic development and entrepreneurship, with an industrial relations function. The TTO is no longer involved with industry relations, which is now the focus of more outbound marketing.

3. Create new types of ventures.

Universities can set up market-oriented centers and establish new joint-ventures with industry, sharing investment and IP and employing personnel with double assignments. UNCCH has just created a center for the cure for HIV and AIDS. It is a new partnership with GlaxoSmithKline,

wherein faculty are appointed both at the University and the Institute, and any intellectual property that flows from the innovation center is shared by both parties. There is also evidence of this approach at Ohio State University (OSU), according to Prof. David B. Williams: "In partnering with industry, we believe that we have to move into development and prototyping and even into experimental manufacturing on the campus. So, we are building design and manufacturing centers. Our first center is also the first one ever directed by a non-faculty member — a former student who built and then sold his own company. We now expect him to make the Center a \$100 million business."

4. Secure joint initiatives with government agencies. Universities can build programs around local and national economic priorities, leveraging resources and creating unique linkages with industry, government, and society. Prof. J. A. Ian Montgomery describes the Ulster University model: "In Northern Ireland, the government decided to set up some tax breaks for the film industry, but we realized that we didn't have any post-production facilities. So we attracted talent back from Silicon Valley. We set up the BDes Honors Animation Program in 2012 with support from the government. We thought we'd be graduating 30 students last year, but actually we didn't because all 30 students received one year of fully paid placements in an industry that didn't exist three or four years ago." Belfast is not the only success

story. Per government request, the University of Bologna now serves as a hub for industry and government officials working on earthquake warnings and emergency safety protocols.

5. Develop innovative funding mechanisms. Universities can develop new opportunities for investment in their own programs and projects via innovation in finance and mechanisms such as bonds, concessions, and funds. In one case, OSU issued \$500 million of century bonds and agreed to a 50-year lease of its parking garage to an Austrian infrastructure company in exchange for \$483 million. The new funds have been added to the school's endowment, enabling it to hire 300 additional professors over the next decade. King Abdullah University of Science and Technology (KAUST) has also sought new funding streams, so that its faculty now has not only baseline funding but also access to venture capital funding via the Beacon Fund as well. As a result, in the past eight years, KAUST has enabled the development of 31 start-up companies.

6. Focus on future economy technologies and businesses.

Universities should attract investments in future-looking facilities and build on-campus centers and research facilities relevant for future industries. OSU has done just that, overseeing the nation's largest independent automotive proving ground, where the National Highway Traffic Safety Administration (NHTSA)

EXPLORING NEW MODELS FOR UNIVERSITY-INDUSTRY-GOVERNMENT-LAB PARTNERSHIPS



runs its vehicle research and testing center. All policies for autonomous vehicles on the ground in the United States are set at this kind of facility, to the benefit of both the University and the local business economy. It is also one of the few universities to own and operate an airport — the only one in the United States where drones can be flown in civilian airspace under the control of the Federal Aviation Administration.

7. Offer industry residences for professors. Industry and universities can create programs in which professors have the opportunity to spend time outside of the university and work on specific industry projects. According to Dr. Keoki Jackson of Lockheed Martin: “[Having professors in residence is something we are actually trying to systematize in areas around our technology strategy. We are looking at a mix of incoming new faculty \(before their tenure clock starts\) and faculty who have been in place for a while and are looking for sabbaticals.](#)”

8. Set up innovation competitions. Industry, university, and government should hold competitions where teams work to solve concrete problems and can obtain funds to implement their solutions. By way of example, Lockheed Martin set up The India Innovation Growth Program and worked collaboratively not only with the Department of Science and Technology and the Government of India, but also with universities such as UT Austin, IC2 Institute, and Stanford University Graduate School of Business. They boast over 350 commercial agreements and another \$900 million in revenues from ideas that developed into start-ups.



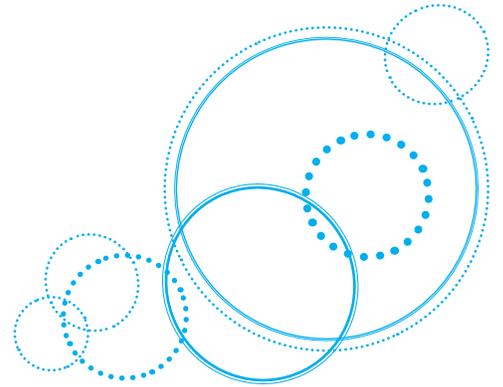
Top left: Prof. Alice P. Gast, President, Imperial College London.

Top right: Ms. Lucy Okumu, Chief of Staff, King Abdullah University of Science and Technology; and Prof. Colin Grant, Vice President, International University of Southampton.

Center: Prof. Ian Montgomery, Pro Vice-Chancellor for Global Engagement, Ulster University.



EXTREME TECHNOLOGY AND SHARED INFRASTRUCTURE: LARGE-SCALE OPPORTUNITIES AT THE NEXUS OF ACADEMIA, INDUSTRY, AND PHILANTHROPY



● MODERATORS ●

Dr. Pradeep K. Khosla
Chancellor, Presenter
University of California, San Diego

Brigadier General Simon "Pete" Worden, USAF, Ret., Ph.D.
Chairman, Breakthrough Prize Foundation
Former Director, NASA Ames Research Center

● DISCUSSANTS ●

Prof. Eric D. Isaacs
Executive Vice President for Research, Innovation and National Laboratories
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Prof. Chris Mottershead
Vice Principal (Research & Innovation)
King's College London

Prof. Dr. Christoph Hock
Vice-President for Medicine and Science
University of Zurich

BACKGROUND

Universities play an essential role in the design, deployment, and operation of large and advanced research facilities, from particle accelerators to oceanography ships, from radio telescopes to research hospitals. Some of the most important research facilities for big science and exploration on earth, sea, and space are found in university campuses around the world. These are key assets for the expansion of human knowledge and transformational research with tectonic impacts on life, business, and society. Government agencies are the primary funders for many of these big science and exploration efforts, but new funding models and sources are emerging.

Big donations, grants, endowments, and private sector-backed prizes (Xprize, Breakthrough Prize, and others) serve as examples of new funding sources for extreme, groundbreaking ideas. They create new opportunities for transformational projects in areas such as climate, high-performance computing, the human brain, energy and matter, deep sea, materials, health, nanoelectronics, and outer space, as well as engagement between academia, industry, and philanthropy. They also come with challenges, including culture change and the need for new ways to engage new stakeholders in building the next generation of global shared innovation infrastructure. The exponential growth and democratization of technologies have an impact on the costs of big science projects. They also unleash capital allocation to new areas — such as the recent surge in venture investment in areas like space — and open the door for a growing number of entrepreneurs and innovators to undertake extreme technology projects and engage in science at a once undreamed-of scale.

DISCUSSION QUESTIONS

- From your perspective, in which frontier areas and types of extreme projects is the private sector more active with you and your research teams? What is the rationale for that? What are the emerging opportunities for universities?
- What is needed for universities to leverage their existing assets and better connect with extreme endeavors, projects, and prizes? What capabilities — in finance, project management, communications, and research — are needed for that?
- Can big science be connected with the creation of new ventures in cutting-edge technology areas? Which tools can be used to promote extreme entrepreneurship?
- In general, how is the exponential growth and democratization of technologies impacting big science? What about on your campus? How can opportunities for connections with industry be accessed and leveraged over the different stages of project lifecycles? What are the frameworks for that?
- How can universities connect with extreme tech entrepreneurs and innovators outside of the academic world? What are the models for that? What are some relevant cases?

CHALLENGES

Big science and technology projects are transformational, as they expand the limits of human knowledge and generate essential technology and business spillovers. However, connecting such initiatives with industry is challenging, as is funding them outside of government sources.

In a time of shrinking government budgets, the world faces the challenge of determining how to sustain investment in basic sciences, particularly physical sciences. Such investments should be used to transform, inspire, and drive societal change. Private sector sources can be important, but they bring to universities the challenges of changing without losing a purely scientific perspective.

Transformational science and technology projects can and should also be related to global grand challenges, such as energy and health. These are global issues by definition and require global engagement, but also create opportunities for universities to leverage local assets and catalyze local development.

Big projects require deep, long-term, and complex partnerships. In addition to engineering and governing such partnerships, universities face the challenge of building teams that can work together cohesively. Overall, universities are confronted with the challenge of breaking the elitism that often exists in scientific circles, so as to engage more people and involve more institutions around the globe in transformational projects.



Top: Dr. Pradeep Khosla, Chancellor, University of California San Diego.

Center: Prof. Dr. Christoph Hock, Vice-President for Medicine and Science, University of Zurich.

Bottom: Prof. Raduan Che Rose, CEO, Majlis Profesor Negara (MPN).



SOLUTIONS

1. Incentivize and promote

professional mobility. The impact of science can be amplified through the circulation of professionals between academia, policy, and business. Prof. Chris Mottershead of King's College agrees: "In October 2002, BP decided that it no longer wanted to be an oil company, and it made an active decision to go beyond petroleum. Two academics arrived at the Board with a wealth of information from the Intergovernmental Panel on Climate Change, and they persuaded a \$400 billion company to change its business. That's what universities should do. But you can't do that without big science behind it or academics not having a voice alongside industry."

2. Adopt the "hipster-hacker-hustler" model in science projects.

Implement programs that bundle science, business, and entrepreneurship skills in order to increase the economic impact of science. In that mold, the University of Zurich has copied the hipster-hacker-hustler model, actively fostering the interaction of basic scientists with clinical scientists, engineers, and molecular biologists, hiring the right people with the entrepreneurial spirit needed to have better access to capital, according to Prof. Christopher Hock of the University of Zurich.

3. Use state-of-the-art facilities as leverage for industry partnerships and talent attraction.

Unique facilities can be used as catalyzers for big projects with industry. By way of example, there is a \$125 million program at the Argonne National Laboratory (linked to the University of Chicago), which involves 14 institutions, four universities, and four industrial partners working together under one roof. One of the companies, Johnson Controls, is one of the largest battery makers in the world. Prof. Eric D. Isaacs from the University of Chicago explains that solving the battery problem is "one big science challenge that, if solved, will lead to serious technological changes."

4. Leverage private capital investment in big facilities.

Work with third party investors to build new facilities to be shared by universities, companies, and research centers. Investors can make money by building and leasing or operating major facilities. In places such as Kendall Square in Cambridge, Massachusetts, or Cortex in St. Louis, Missouri, large spaces have an anchor talent provider — a university — which can draw other start-ups and companies to the area.

5. Attract flagship research centers.

Universities can maximize opportunities for faculty and students by co-locating flagship research organizations on campus. For example, the J. Craig Venter Institute was established at UC

San Diego (UCSD) on prime land overlooking the ocean for \$1 a year. Dr. Venter built his Institute on that land, then hired faculty and students to work there. The faculty at the Salk Institute became faculty at UC San Diego, facilitating the exchange of talent. These institutes — and others — share facilities and complex equipment with the University, which also profits from the relationship, explains Dr. Khosla, Chancellor of UC San Diego. A new model for collaboration is emerging.

6. Map priorities and engage with philanthropies in a systematic way.

There exist several emerging possibilities for philanthropic funding for big research projects, and universities should systematically access those opportunities and engage with key stakeholders. The Breakthrough Prize, for example, was started by Yuri Milner, a Russian investor, who was joined by Mark Zuckerberg (founder of Facebook), Sergey Brin (co-founder of Google), and Anne Wojcicki (founder of 23andMe). They award millions of dollars in prizes annually in areas such as physics, mathematics, and biological sciences and have launched ground-breaking initiatives (for which a minimum of \$200 million was already committed) that involve universities in project execution. UC Berkeley has the major contract for the Starshot Initiative, for example. There are also increasing philanthropic and private efforts in space and space science. Paul Allen of Microsoft, also founder of

EXTREME TECHNOLOGY AND SHARED INFRASTRUCTURE: LARGE-SCALE OPPORTUNITIES AT THE NEXUS OF ACADEMIA, INDUSTRY, AND PHILANTHROPY



Left: Mr. Chris Mottershead, Senior Vice President, King's College London.

Right: Dr. Eric Isaacs, Executive Vice President for Research, Innovation, University of Chicago.

a space launch company, provides one of the earliest examples. Elon Musk, through SpaceX, and Jeff Bezos, through the Amazon.com Foundation, have launched similar efforts.

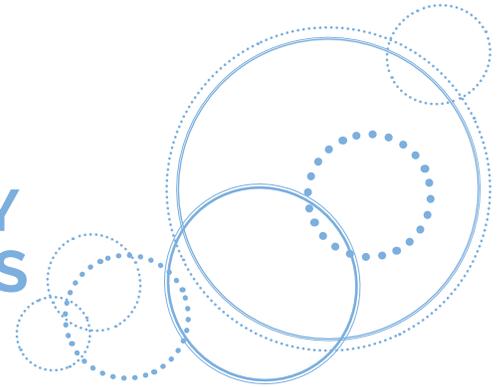
7. Establish new governance frameworks. Capital-intensive ventures with industry require new governance solutions. This is why, for example, the Imperial College London is working with the City of London on its new campus to bring in corporate partners and incubators and establish a mixed campus, to be governed according to a new multi-stakeholder model.

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"Mark Zuckerberg, Yuri Milner, and Stephen Hawking are board members, and I am the executive director of the program. Our idea is within about 30 years to send a probe to Alpha Centauri and Proxima Centauri. We will need to use a huge laser that's a kilometer in diameter."

Brigadier General Simon "Pete" Worden, USAF, Ret., Ph.D.
Chairman
Breakthrough Prize Foundation



BUILDING NEXT GENERATION GLOBAL LEADERSHIP AND PARTNERSHIPS FOR UNIVERSITY AND RESEARCH ORGANIZATIONS



• MODERATOR •

Prof. Santa J. Ono
President and Vice-Chancellor
University of British Columbia

• DISCUSSANTS •

Prof. Joaquim Clotet
Rector
Pontifical Catholic University of Rio
Grande do Sul

Dr. Spiros Dimolitsas
Senior Vice President for Research &
Chief Technology Officer
Georgetown University

Prof. W. John Kao
Vice-President and Pro-Vice-
Chancellor (Global)
University of Hong Kong

Dr. Khaled Machaca
Associate Dean for Research
Weill Cornell Medicine Qatar

Prof. Colin Grant
Vice-President International
University of Southampton

Prof. Richard (Ric) Parker
Former Director of Research &
Technology
Rolls-Royce Group
GFCC Distinguished Fellow

BACKGROUND

Universities are beginning to work together to define the elements of entrepreneurial institutions by establishing management frameworks, creating global alliances and joint initiatives, and revising the financial models at hand. Positioning universities in the global landscape requires making choices. Universities face the need of comparing their competitive positions with others, identifying complementarities and global opportunities, and engineering funding solutions that will allow them to explore new ventures, grow, and make an impact on the world at large.

DISCUSSION QUESTIONS

- What models exist to benchmark a modern entrepreneurial university? What are the fundamental elements of such models?
- What are the investment priorities to build a university capable of driving competitiveness? From which sources might funding come and how might the funding model of an institution need to change?
- What incentives or conditions are necessary to convince businesses to finance university investment in competitive activities?
- How can institutions partner with government, industry, and each other to share resources and facilities rather than duplicating them? What are examples of this being done well?
- How can global partnerships be engineered and implemented in order to allow universities to complement their portfolios and tap into global opportunities? What models for global alliances and partnerships can better position universities to work with industry and foster entrepreneurship?



CHALLENGES

Universities face the challenge of building local and global innovation ecosystems. In the latter sphere, this challenge is particularly difficult for big science and technology projects. In both scenarios, partnership development is a key capability to be addressed.

As the pace of change accelerates around the globe, it becomes critical to speed up the development of local innovation ecosystems, especially in countries that are coming from behind. To their advantage, they have the possibility of learning from others, but they also lack some important resources and capabilities.

Global centers and education initiatives have growing importance in today's reality. Universities need to engage globally, beyond just research collaborations. A key concern for universities should be preparing the future generations of global leaders who will actually craft the agendas in policy, business, and technology.

Global coalitions should involve a variety of stakeholders, including manufacturing, social enterprises, business, and other players. The more representative of different societal segments coalitions are, the higher the odds of them properly addressing social and global issues. Partnering with well-established players already in the global space can also help universities to quickly and efficiently scale-up new industry research and implement bold solutions to the world's most pressing problems.



Top left: Dr. Spiros Dimolitsas, Senior Vice President for Research & Chief Technology Officer, Georgetown University.

Top right: Dr. Abdul Rahim Hashim, Vice Chancellor, Universiti Teknologi PETRONAS; and Prof. Richard (Ric) Parker, Director of Research & Technology, Rolls-Royce Group.

Center: Prof. Colin Grant, Vice-President International, University of Southampton.

Bottom: Dr. Mirko Degli Esposti, Deputy Rector, University of Bologna.



SOLUTIONS

1. Build business and university leadership alliances.

Universities and business leaders should create alliances to develop and implement long-term, multi-layered public-private plans. Prof. Santa J. Ono of the University of British Columbia (UBC) highlighted the cases of the Georgia Eminent Scholars Program and Ohio Third Frontier Mechanism as key examples. In Georgia, Fortune 500 CEOs sat around the table with university presidents to strategize and take action. It was their joint influence that convinced successive state governments to invest significant amounts of money in hiring new faculty to focus on creating game-changing solutions to economic and social issues.

2. Craft multi-regional public-private alliances.

Universities can leverage regional and international connections via partnerships involving industry and government and aiming at boosting innovation and building competitive advantage. A recent example includes two countries, two states, a major global corporation (Microsoft), and two major research universities (UBC and University of Washington) — all uniting forces. Prof. Santa J. Ono, UBC, explains: "Bill Gates said he wants to invest in building the bridge between UBC and University of Washington because, frankly, Microsoft needs us to partner so that we can maintain our competitive advantage as a region."

3. Establish a global benchmarking routine.

Universities should systematically benchmark practices for innovation promotion across the globe. Prof. Joaquim Clotet of Pontifical Catholic University of Rio Grande do Sul has been committed to this for years. After being appointed principal of the University, he went to Warwick University, Oxford University, Hebrew University of Jerusalem, and numerous others to identify best practices and learn about their models. He returned to Brazil and implemented the lessons learned at the Pontifical Catholic University of Rio Grande do Sul, which has now become a benchmark for universities in Brazil and across South America on the subject of innovation. The benchmarking process was incorporated as a default practice in university strategy and management.

4. Ignite faculty acceleration.

Universities should implement initiatives and create spaces that accelerate the development of faculty entrepreneurial skills and capabilities, such as the space established at the University of British Columbia. Prof. Santa J. Ono explains: "Culture change needs to occur within the University. The idea of the institute was to create a physical structure, a cocoon, where faculty could be brought out of teaching and their other responsibilities for 1-2 years and instead focus just on being entrepreneurs."

5. Embed internationalization in education.

Universities should implement programs that allow students to have global experiences and develop soft skills. The University of Hong Kong has set a target: by the year 2022, 100 percent of their undergraduates will have experienced one opportunity in Mainland China and another opportunity elsewhere in the world. According to Prof. W. John Kao: "Those who currently go abroad return completely transformed in terms of getting out of their comfort zones, working with people of different cultures, and understanding how to be a team member and how to communicate effectively — all the soft skills that we find difficult to train in the conventional classroom setting."

6. Leverage global campuses.

Universities can scale up operations and leverage core capabilities via operations and joint initiatives with partners across geographies. Georgetown University, for example, has global operations in partnership with other institutions in China, Qatar, and the UK, doing research, educating students, and providing executive education to senior government officials and senior executives in business. Likewise, the Cornell Campus in Doha has served as an established partnership between Cornell University and the Qatar Foundation for the past 16 years.

BUILDING NEXT GENERATION GLOBAL LEADERSHIP AND PARTNERSHIPS FOR UNIVERSITY AND RESEARCH ORGANIZATIONS

7. Set up university knowledge companies. Universities should set up knowledge enterprises to drive entrepreneurship and unleash value creation from knowledge assets. Prof. Colin Grant of the University of Southampton states: "Perhaps the most telling illustration of commitment to enterprise comes in the form of what is known as SETSquared, the university commercialization partnership of Southampton, Surrey, Exeter, Bristol, and Bath, which prioritizes hi-tech startups through acceleration and incubation, research commercialization, [and] student enterprise. According to UBI Global, SETSquared was the No. 1 university business incubator, with 1,000 startups and £4 billion added to the UK economy."

8. Create industry technology centers at universities. Universities can craft long-term partnerships with industry and develop protocols to absorb some of the research & development functions from industry. Such partnerships have been successfully built in the UK and globally by corporations such as Rolls-Royce, according to Prof. Richard J. Parker. Rolls-Royce's first university technology center was at Imperial College, swiftly followed by Oxford University. "I inherited this network when I became CTO of Rolls Royce in 2001. By the time I left in 2015, we had 31 university technology centers, including 9 outside of the UK."



Top: Prof. Joaquim Clotet, President, Pontificia Universidade Católica do Rio Grande do Sul; and Prof. Santa Ono, President, University of British Columbia.



Center: Prof. W John Kao, Vice-President and Prof-Vice-Chancellor, The University of Hong Kong.



Bottom: Prof. Khaled Machaca, Associate Dean for Research and Prof. of Physiology, Weill Cornell Medicine — Qatar.

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"Rolls-Royce has proven that universities can successfully host industry-cofunded and oriented Technology Centers and still publish results from research. The key is doing things in the right order: submitting the patent application first, and only publishing when that is done."

Prof. Richard (Ric) Parker
Former Director of Research & Technology,
Rolls-Royce Group
GFCC Distinguished Fellow

CONVERGENCE AND CIRCULATION: UNIVERSITIES, INDUSTRY, AND SOCIETY INTERTWINE TO UNLEASH INNOVATION

The key takeaway from the inaugural forum is simple: if universities are going to take a place in the heart of the movement for innovation, growth, and prosperity, they must engage in an ambitious and kinetic mixing with the outside world — with investors, global businesses, entrepreneurs, government initiatives, and industry. It is more than just an exchange; it is a swapping of DNA, a permanent mingling and interweaving of ideas, workers, students, finances, productivity, and ideals — all in the pursuit of competitiveness.

Engagement with industry lies at the heart of entrepreneurial universities. For example, a practice now commonly found across the globe is the establishment of university-owned "knowledge enterprises" — that is, university-affiliated companies that do business on behalf of the university and leverage university knowledge assets via tech transfer, venturing, and investment. Such relationships with industry need to be developed and nurtured over time in a strategic fashion, not just at the transactional level.

As universities are more fully engaging with the broader world, they must leverage opportunities for outside social capital — alumni, local business, and policy communities — which can bring to universities professors of practice, entrepreneurs, and more. Such programs, platforms, and initiatives are of the utmost importance — particularly when bundled with funding, training, and global exposure.

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As universities are more fully engaging with the broader world, they must leverage opportunities for outside social capital — alumni, local business, and policy communities — which can bring to universities professors of practice, entrepreneurs, and more.

Professors at these institutions also need to venture outside of their universities' domains. Faculty mobility is essential for universities to craft new alliances with industry and become more entrepreneurial and innovative. Faculty should be supported by their home institutions in efforts to engage with industry and even take leaves to experience industry firsthand. At the same time, universities should implement new evaluation and compensation systems that allow faculty to be recognized for their work outside of the university as they engage in outside business and innovation projects.

Faculty are not the only ones who need to push their boundaries; students, also, need to expand their horizons and engage with the outer world. Such exposure is an essential part of education for future entrepreneurs, professionals, doers, and thinkers. Universities are investing in global mobility and global campuses to allow for just that. To complement their home campuses, leading universities are designating outposts and offices in global innovation hotspots. They connect with top

innovators and industry, create opportunities for students and potential entrepreneurs, and serve as platforms for start-ups.

Another practice explored during the Forum was the establishment of flagship research institutes and centers. The employment of unique assets from such centers is instrumental for talent attraction and the establishment of new connections with industry. Private sector developers and investors can be attracted to such projects, investing in infrastructure and facilities that will then be leased to corporate partners. Joint research centers that involve different academic partners can also serve as a tool for supporting culture change and transformation. In fact, some universities are considering this as a way of transforming their own cultures and re-inventing themselves from the inside-out.

Universities are increasingly approaching global grand challenges as an organizing principle for different initiatives. They allow universities to better connect with social and economic realities, become solutions-oriented, and,



View of London Bridge Station from the Shard.

at the organizational level, break knowledge silos and promote multi-disciplinarity. A focus on global grand challenges also serves to guide efforts related to the establishment of globally relevant research centers and institutes funded by government agencies or, increasingly, private sector and philanthropy.

An essential component of university-driven economic growth strategies is the alignment of investments — in capacity building, talent attraction, facilities, global projects, and more — with national and regional/local realities and priorities. Public-private coalitions and alliances are fundamental to achieving relevance and building links with the local economy. Universities must create and participate in forums and dialogue processes involving industry at the national and local levels. Top

leadership (C-level) involvement is required from both industry and university, and participation in growth-oriented discussions should be committed to results.

While pursuing goals related to economic growth and innovation, universities should not neglect their educational mission — that is, to educate future generations of professionals, innovators, doers, thinkers, and makers. To some extent, universities should embed business experience and entrepreneurship development in all educational programs, as well as align such efforts with national and regional needs.

On display during the Forum was indisputable evidence that boundaries between universities, industry, and society are becoming blurred with each passing day.

In order to stake their claims as engines of economic growth and innovation powerhouses, universities must increasingly leverage external resources and capital, mixing and mingling with the work being done in the greater world. In this new age of development, growth, and prosperity, there is no choice but to move full steam ahead. With a commitment to both collaboration and competitiveness, universities and research centers can help drive global prosperity and serve as a key ingredient in the fuel powering humanity's greatest future achievements.

A CALL TO ACTION FROM THE GFCC EXECUTIVE DIRECTOR: LOOKING TO THE FUTURE

The London meeting of the GFCC University and Research Leadership Forum was an initial step on a journey to catalyze learning and inspire action. In addition to helping GFCC university members and the global university and research community identify and understand trends, we want the Forum to serve as a platform through which best practices can be scaled-up and new solutions designed. That is our mission.

What was crystallized during the London meeting was that boundaries between universities and the outside world are — and should be — coming down. Universities should converge in action with other sectors of society. Perspectives, languages, legal frameworks, policies, strategies, performance metrics, and initiatives should serve as a foundation and base of support.

A variety of solutions that materialized from the London meeting are included in this report. It is now time to go deep into the vortex of this convergence. We must develop a broad understanding of best practices and create mechanisms for them to be replicated and expanded at

the international level. To do that, the GFCC is launching in June 2017 two pioneer task forces, each co-chaired by two founding members of the GFCC University and Research Leadership Forum.

The work of the task forces will be presented in Kuala Lumpur, Malaysia, on November 30, 2017, when the Forum meets again. During the months to come, GFCC university members will actively engage with industry and policy leaders and collaboratively work to create a unique global body of knowledge. Building upon our current membership of more than 40 universities coming from 20 countries, we are confident in the reach and impact the GFCC University and Research Leadership Forum will have.

Pradeep Khosla wrote when introducing this report that “...the role of universities in supporting global competitiveness will continue to grow as we are poised to tackle the world’s most pressing challenges.” We deeply believe in this potential at the GFCC — that universities are the key for humanity in overcoming global grand challenges and building prosperity. Working together with



industry, philanthropy, policy and civil society organizations, tech startups, government, and society at large, universities can fulfill that promise and turbocharge economic growth across the planet.

Sincerely,

Dr. Roberto Alvarez
Executive Director, Global Federation
of Competitiveness Councils

JOIN US FOR THE GLOBAL INNOVATION SUMMIT 2017!

November 29 – December 1
Kuala Lumpur, Malaysia
<http://gis2017.thegfcc.org/>



TASK FORCES

OPTIMIZING INNOVATION ALLIANCES

This task force will review different models that universities use to engage and work with industry, government, and other key stakeholders in innovation ecosystems. It will cover issues such as research agreements, joint ventures, IP licensing, venturing, consortiums, and more. It will conceptualize and decode the elements (legal framework, stakeholders and their roles, organizational and operational structures, funding and revenue model, performance metrics, etc.) of different types of alliances.

This task force will develop an operational model to enable Forum members to scale-up proven solutions identified within the group.

Co-chairs

Prof. Michael Hengartner
President, University of Zurich

Dr. Hassan Rashid Al-Derham
President, Qatar University

LEVERAGING EXTREME INNOVATION

This task force will identify, analyze, and decode new and emerging models for big science and technology projects, leading global initiatives and their stakeholders — in philanthropy, industry, government, and research. It will highlight how universities are or could be engaging in extreme innovation, identifying the key structures, capabilities, and functions needed.

This task force will also develop suggestions and guidelines for Forum members and universities in general to leverage their participation in extreme innovation projects.

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