



GFCC

Global Federation of
Competitiveness Councils

2016–2017 Accelerating

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A MESSAGE FROM THE GFCC LEADERSHIP

On behalf of the board of directors and members of the Global Federation of Competitiveness Councils (GFCC), we are pleased to present the Annual Report highlighting the GFCC's accomplishments in 2016.

It was a year marked by increasing momentum, global expansion, new collaborations and rich knowledge exchange. The GFCC enlarged its community in scale and scope, welcoming four-dozen new members, adding countries, competitiveness and economic organizations, private companies and universities spanning five continents. These new members will enrich the GFCC with geographic, cultural and socio-economic diversity, new experiences and unique perspectives.

We expanded our intellectual and analytical capacity dramatically with the launch and inaugural meeting of the GFCC University and Research Leadership Forum, comprised of 40 universities from 21 countries. The Forum is already bringing tremendous insight and expertise to undergird our understanding of the global competitiveness landscape, competitiveness strategies, and new models of higher education and research around the world. In addition, we built up our ranks of world-renowned advisors, champions, global ambassadors and thought leaders



The Honorable Deborah L. Wince-Smith, President, Global Federation of Competitiveness Councils.

serving as GFCC fellows. Our cadre of fellows from around the world grew from 2 to 25 in 2016 and now number 38. They are injecting new vigor and insight into our work, and we are helping them disseminate their ideas, amplify their voices and extend the impact of their work.

In November, our members convened in spectacular venues in London for the 2016 GFCC Annual Meeting and flagship Global Innovation Summit, co-hosted by Imperial College London, under the leadership of President Alice P. Gast. The Summit offered a unique and creative framework for our discussions, which spurred an exciting exploration and



Mr. Charles O. Holliday, Jr., Chairman, Global Federation of Competitiveness Councils; and Chairman, Royal Dutch Shell plc.

innovative thinking on how to develop cities that are smart, sustainable, creative, competitive, healthy, inclusive and resilient.

At the Summit's Gala Dinner, held in London's historic and majestic Guildhall, the inaugural GFCC Global Competitiveness Award was presented to His Excellency Amr Al-Dabbagh, Chairman and CEO of the Al-Dabbagh Group, philanthropist and author. The Award recognizes leaders who have advanced the competitiveness agenda, and made significant contributions to their nations, regions, cities and globally. We can think of no more deserving recipient than Amr, recognized globally for

his vast achievements in business, government, global engagement, philanthropy and education; in promoting entrepreneurship; and for his leadership and support in the creation and growth of the GFCC.

The GFCC should be proud of its 2016 record of achievements. It is exhilarating to measure just how far the GFCC has come since its founding less than a decade ago, with the notion that countries striving to strengthen their economies and build their capacity for innovation could come together in a mutually beneficial partnership, learn from each other and promote the prosperity of all of our nations. We continue living up to that vision. We have already begun implementing new initiatives announced at the 2016 GFCC Annual Meeting, including the first "Innovation Learning Lab" held in São Paulo, Brazil in June 2017. The learning lab focused on the Sustainable Future of Production, Consumption and Work, a theme the GFCC will continue to explore at the 2017 Global Innovation Summit, convening November 29-December 1, 2017 in Kuala Lumpur, Malaysia.

Looking to the future, with our diverse membership, and representative countries encountering different challenges and opportunities, and generating diverse solutions, the GFCC

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The GFCC should be proud of its 2016 record of achievements and its early success in 2017. It is exhilarating to measure just how far the GFCC has come since its founding less than a decade ago, with the notion that countries striving to strengthen their economies and build their capacity for innovation could come together in a mutually beneficial partnership, learn from each other and promote the prosperity of all of our nations.

is positioned to lead in a competitive environment that is constantly shifting, in which new issues are ever on the horizon and new technologies rewriting our world at astonishing speed. In the years ahead, we will advance our role as global advocates for actions that advance economic growth and the standard of living; as global learners who explore emerging challenges, and co-create solutions and new pathways for progress; and as global educators, sharing what we learn through networking, collaboration and our signature publications such as *Best Practices in Competitiveness Strategy* and the *Global Competitiveness Principles*. Through these endeavors, we will create even greater momentum for our Global Competitiveness Movement.

Sincerely,



The Honorable Deborah L. Wince-Smith
President, Global Federation of Competitiveness Councils
President & CEO, Council on Competitiveness



Mr. Charles O. Holliday, Jr.
Chairman, Global Federation of Competitiveness Councils
Chairman, Royal Dutch Shell plc

INTRODUCTION

We approached the year with enthusiasm, embracing new opportunities for expansion and innovation that would propel the GFCC forward and continue through 2017 and beyond. **We welcomed 46 new members from 23 countries**, issued new publications, organized forums and launched new initiatives — all aimed at sparking innovation and value creation, accelerating competitiveness, and driving prosperity.

The GFCC is focused on the future. We envision a world that utilizes creativity, human ingenuity and competition to build strong economies — but also one that has plenty of space for collaboration. To that end, we must consider how the GFCC can best help our diverse membership harness the many transformations occurring around us to achieve these goals. How can the GFCC serve as an incubator for new projects to be designed or accelerated globally? Further, how can we create a new narrative for competitiveness rooted in a foundation of cross-pollination and interconnectedness? Lastly, how can we foster the integration of competitiveness with the goals of sustainability, equity and inclusion — all geared towards improving worldwide living standards? These were the bold questions we explored during 2016 and the initial months of 2017.

Looking back, we are proud of the success we have achieved in laying the groundwork for the GFCC to play a pivotal role in the competitiveness arena, with an agenda particularly geared toward innovation and value creation. Our new members reflect this vision: the Department of Industry, Innovation and Science (DIIS) of Australia bridges business and the knowledge enterprise to enable growth and productivity;

Japan Science and Technology Agency (JST) works to enable knowledge creation and return to society; the Quito Competitiveness Council endeavors to improve the business environment and also boost innovation; the National Council of Professors (NPM) in Malaysia provides expert advice to enhance national competitiveness; the Delphi Economic Forum catalyzes the convergence of leading Greek stakeholders toward a future-looking agenda; the Argentinean Business Foundation for Quality and Excellence (FUNDECE) connects business innovation agendas with national frameworks; the Federation of Industries of Northern Greece (FING) drives regional competitiveness and innovation; the Malaysian Industry-Government Group for High Technology (MIGHT) develops strategies for Malaysia's future growth and technology; and corporate members such as IBM, Nadim Industries, Gramatidis, Xnova AT Kearney, Bluespace and others engage in a variety of public-private partnerships to drive innovation and prosperity around the globe. Our new university members from more than 20 countries have been working with industry, startup communities, governments, labs and society to build innovation alliances and drive value creation.

The 2016 editions of our flagship publications amplified our vision, setting forth strategies to strengthen cities' abilities to innovate, nurture talent, attract investments and compete globally, as well as highlighting outstanding examples of city competitiveness initiatives in six countries: Brazil, Canada, Ecuador, Korea, Saudi Arabia and the United States.

Beyond our publications, the launch of the University and Research Leadership Forum, chaired by Dr. Pradeep Khosla (Chancellor, University of California San Diego), provided a crucial opportunity for evolving discussions regarding the role of universities as economic growth engines in the knowledge economy. Out of the Forum grew two new task forces dedicated to optimizing innovation alliances and leveraging extreme innovation, implemented in 2017. We now continue the work of the task forces and look forward to having the preliminary findings discussed in Kuala Lumpur on November 30, 2017.

In 2016, we honored H.E. Amr Al-Dabbagh, a global philanthropist, business, policy and sustainability leader, as the first recipient of the GFCC Global Competitiveness Award.

This report celebrates the achievements of 2016 and the early days of 2017. We now look forward to new accomplishments in the months and years to come and invite you all to join us in Malaysia for the 7th GFCC Annual Meeting and Global Innovation Summit — please check the agenda at <http://gis2017.thegfcc.org>.

SHARING THE COMPETITIVENESS STORY

GFCC releases 2016 editions of flagship publications

The Global Innovation Summit marked the launch of the 2016 editions of GFCC flagship reports: *Best Practices in Competitiveness Strategy* and the *Competitiveness Principles*. Following the year's theme on Cities: Competitive, Innovative and Sustainable, *Innovative and*

Sustainable Cities: Best Practices in Competitiveness Strategy highlights examples from our member organizations that showcase this concept in action.

and private sector leaders, and your peers so that together we can continue to champion the global competitiveness agenda.

These documents are available on **our website** , and we encourage you to share them with your country's public



Inclusiveness, Innovation, Sustainability and Resiliency in the City Landscape

The foundational Global Competitiveness Principles were launched in 2010 and endorsed by more than 30 national competitiveness organizations, offering an overarching framework for recommended national policies and programs aimed at fostering innovation, competitiveness and prosperity in the 21st century global economy. This year's edition sets forth policies to strengthen countries' abilities to compete and attract investment by putting in place both the hard infrastructure — ports, roads, rails, airports, broadband, energy — and soft infrastructure that will attract investment, catalyze value creation, support economic growth and promote quality of life.

Innovative and Sustainable Cities: Best Practices in Competitiveness Strategy

The GFCC promotes debate and dialogue, competition and collaboration, and innovation above all else. In this year's Best Practices report we highlight outstanding examples of competitive cities in six countries: Brazil, Canada, Ecuador, Korea, Saudi Arabia and the United States.



2016 ANNUAL MEETING

GFCC fellows, sustaining, general and corporate members convened for the 2016 GFCC Annual Meeting hosted by Jim Clifton, Chairman and CEO of Gallup, Inc. Members delivered presentations on their respective organizations and discussed the future of competitiveness and the GFCC. In the evening, some of our distinguished Global Fellows delivered lightning talks on subjects such as energy, finance, talent and urbanization.



The GFCC Annual Meeting is the moment of the year when GFCC members get together to share updates and identify common topics in their agendas, review trends in competitiveness strategies, and envision new initiatives for the organization. The 2016 Annual Meeting was comprised of three main conversations featuring GFCC members and fellows.

In an initial conversation, participants highlighted the need to connect the different generations of competitiveness agendas in a coherent way. In today's world, competitiveness agendas are becoming increasingly multilayered and need to, at the same time, include foundational aspects, such as trade and economic freedom, and forward-looking elements related to sustainability, social cohesion and disruptive technologies. Members and fellows highlighted the importance

of cross-sector collaboration and the continued need for the development of innovation ecosystems around the globe. They also acknowledged the imperative of supporting sustainability models and working globally toward the realization of the Sustainable Development Goals. Government transformation was also noted as a critical issue in today's competitiveness agendas, particularly at a time when technology, business and society are evolving quickly.

Building on the ideas of the initial conversation, the day proceeded by providing continued opportunities for GFCC leaders to weigh in on the future competitiveness landscape at city and national levels. GFCC leaders recognized the role of data and the opportunities opened up by technology to improve urban conditions and human experiences, driving competitiveness and prosperity.

Data from Gallup's World Poll, presented in the session by Gallup's Managing Consultant Andrew Rzepa, suggested competitiveness strategies should not lose perspective of the ultimate goals: building prosperity, investing in inclusive growth and improving living conditions. The importance of having competitiveness agendas anchored in human aspects at city and national levels also was stressed, and social sustainability was recognized as a topic of growing relevance in future competitiveness agendas.

Aging and the rise of entrepreneurship were two other important trends noted, which should be reflected in future competitiveness agendas. In that context, it was commented that a transgenerational bridge should be built to connect competitiveness policy conversations with the global entrepreneurship movement.

In synthesis, GFCC leaders recognized the need to connect sustainability with competitiveness at various levels and in various dimensions. The GFCC has proven to be an outstanding platform for thoughtful conversations, high-profile connections, and the dissemination of best practices and collaboration. It was suggested the GFCC is ideally positioned to accelerate new global collaborations and convergence.

GFCC FELLOWS DELIVER "LIGHTNING TALKS"

The GFCC hosts a number of fellows with impressive accomplishments in economics, technology, business, arts, research, academia and other fields within the broader competitiveness arena. During a series of "lightning talks," these fellows gathered to share their expertise, insights and thoughts on the future of cities and highlight aspects related to different competitiveness dimensions studied by the GFCC.

GFCC's Chairman and global sustainability champion, Chad Holliday, noted the importance of global engagement and trade for sustainable future growth. Joan MacNaughton, an internationally recognized expert in energy policy, spoke about the connections between energy, technology and business growth. Cities in the present must prepare to be cities of the future by investing in new ideas



MOU SIGNED WITH MIGHT

The GFCC signed a memorandum of understanding with the Malaysian Industry-Government Group for High-Technology (MIGHT). With more than 100 members from industry, government, and academia, MIGHT works to develop Malaysia's high technology for business, and is one of our proud partners for the 2017 Global Innovation Summit.

that use technology to harness the potential of the energy revolution. Greg Horowitz, cofounder and managing director of T2 Venture Capital, shared lessons about the development and growth of innovation ecosystems, informed by his experience as entrepreneur, venture capitalist and innovation ecosystem architect. Susan McCalmont, an executive and thought leader with a variety of experiences in creativity, arts and innovation, discussed the need to incorporate creativity, arts and culture into the economic equation. Jerry Hultin, Chairman of Global Futures Group and expert on smart cities, made the case for cities as the focal point for better living, offering that cities should

be centered around empowered communities, not just capital expenditures. Michiharu Nakamura, former VP of Hitachi and President of Japan Science and Technology, spoke of building resilience at a societal level by creating connections globally and praising diversity. Mark Minevich, an internationally-renowned technology thought leader and investor, explored the role of artificial intelligence and shared examples of how AI is transforming industries across the globe. Christos Megalou, CEO of Piraeus Bank, reviewed how finance is being transformed by technology and geared towards impact projects.

OUR HOST FOR THE GLOBAL INNOVATION SUMMIT: IMPERIAL COLLEGE LONDON

Under the leadership of Professor Alice Gast, Imperial College London is one of the world's leading universities. Their mission is to achieve enduring excellence in research and education in science, engineering, medicine, and business for the benefit of society.

Imperial staff and students work across disciplinary boundaries and collaborate each year with academic, corporate and charitable organisations in 95 countries. With their partners, Imperial defines excellence in new and unexpected ways to improve health and wellbeing, understand the natural world, engineer novel solutions and lead the data revolution. The rigour of an Imperial education gives students the ability to apply their knowledge to real-world problems. Imperial brings pioneering discoveries, innovations, and inventions to society and is recognised as one of the most impactful and innovative universities in the world.



Watch a video recap of the Global Innovation Summit:

https://www.youtube.com/watch?time_continue=2&v=juT_JTq5uwl 



Top: Mr. Charles Kiefel OAM, Distinguished Fellow, GFCC; and Mr. Kwanza Hall, Senior Fellow, GFCC.

Center: Prof. Datuk Dr. Raduan Che Rose, CEO, Majlis Profesor Negara; The Honorable Deborah L. Wince-Smith, President, GFCC; Dr. Michiharu Nakamura, Distinguished Fellow, GFCC; Prof. Alice Gast, President, Imperial College London; Mr. Mauricio Zuazua, Partner, A.T. Kearney; Mr. Adham Nadim, Chairman, NADIM Industries; and Ms. Lori Schmidt, CEO, Go Productivity.

Bottom: Ms. Ida Semurni Abdullah Ali, Programme Director, Malaysian Industry-Government Group for High Technology; and Mr. Chad Evans, Executive Vice President, Council on Competitiveness.

Top: Mr. Mauricio Zuazua, Partner, A.T. Kearney; Mr. Andrew Rzepa, Managing Consultant, Gallup; and Dr. Abdul Rahim Hashim, Vice Chancellor, Universiti Teknologi PETRONAS.

Center: Dr. Raduan Che Rose, CEO, Majlis Profesor Negara; and Professor Noor Azlan Ghazali, Vice Chancellor, Universiti Kebangsaan Malaysia.

Bottom: Ms. Gianna Sagazio, Director, National Confederation of Industry (CNI); and Dr. Hatem Samman, Chief Economist, Saudi Arabian General Investment Authority.



Top: Dr. Chris Locke, Head of Portfolio Strategic Policy, Department of Industry, Innovation and Science, Government of Australia; Dr. Pradeep Khosla, Chancellor, University of California San Diego; Mr. Chad Evans, Executive Vice President, Council on Competitiveness; and Prof. Zakri Abdul Hamid, Science Advisor to the Prime Minister, Government of Malaysia, and Distinguished Fellow, GFCC.

Bottom left: Dr. Roberto Alvarez, Executive Director, GFCC.

Bottom center: Mr. Alexey Prazdnichnykh, Executive Director, Eurasia Competitiveness Institute and Partner, Strategy Partners Group.

Bottom right: Mr. Andrew Rzepa, Managing Consultant, Gallup.



Top: HE Tae-Shin Kwon, Director of Asia Pacific Centre of the UN University for Peace.

Center: Prof. Zakri Abul Hamid, Science Advisor to the Prime Minister, Federal Government of Malaysia, and Distinguished Fellow, GFCC; Dr. Raduan Che Rose, CEO, Majlis Profesor Negara; and Dr. Roberto Alvarez, Executive Director, GFCC.

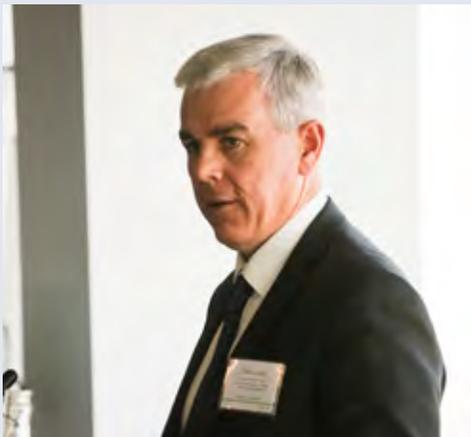
Bottom left: Mr. Symeon G. Tsomokos, Chairman, Delphi Economic Forum.

Bottom center: Mr. Chad Evans, Executive Vice President, Council on Competitiveness.

Top: Ms. Lori Schmidt, CEO, Go Productivity; and The Honorable Deborah L. Wince-Smith, President, GFCC.

Center: Mr. Adel Belcaid, Principal, A.T. Kearney; and HRH Saud K. AL-Faisal, Acting Governor, Saudi Arabian General Investment Authority.

Bottom: Dr. Michiharu Nakamura, Distinguished Fellow, GFCC.



Top: Panel session at the 2016 GIS.

Center left: Mr. Jerry M. Hultin, President, Global Futures Group, and Distinguished Fellow, GFCC.

Center middle: Mr. Rashik Parmar, Technical Executive—Europe, IBM.

Bottom left: Dr. Chris Locke, Head of Portfolio Strategic Policy, Department of Industry, Innovation and Science, Government of Australia.

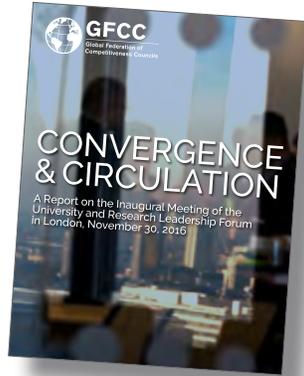
Bottom center: Datuk Dr. Mohd Yusoff Sulaiman, President & CEO, Malaysian Industry-Government Group for High Technology (MIGHT).

Center right: Dr. Dirar Khoury, Executive Director for Research Coordination & Special Initiatives, Qatar Foundation.

Bottom right: Mr. Charles Kiefel OAM, Distinguished Fellow, GFCC.

UNIVERSITY AND RESEARCH LEADERSHIP FORUM

More than 40 leading research universities from 20 countries have joined the University and Research Leadership Forum, which met for the first time in London and was hosted by Khazanah Nasional and Chaired by Dr. Pradeep K. Khosla, Chancellor of University of California San Diego. The new Forum is addressing the role of universities as drivers of economic growth. The first report from the Forum, *Convergence & Circulation*, was launched in the spring of 2017 and can be found here: <http://www.thegfcc.org/university-report/>.



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

The meeting was made possible by the generous support of Khazanah Nasional and was hosted at the offices of Khazanah Europe Investment Limited, at The Shard.



The University Research and Leadership Forum launched two new task forces dedicated to optimizing innovation alliances and leveraging extreme innovation. These task forces will be releasing their preliminary findings at the 2017 Global Innovation Summit in Kuala Lumpur, Malaysia, November 29-December 1.

TASK FORCES

OPTIMIZING INNOVATION ALLIANCES

This task force reviews different models that universities use to engage and work with industry, government and other key stakeholders in innovation ecosystems. It covers issues such as research agreements, joint ventures, IP licensing, venturing, consortiums and more. It conceptualizes and decodes 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 develops 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 identifies, analyzes, and decodes new and emerging models for big science and technology projects, leading global initiatives and their stakeholders in philanthropy, industry, government, and research. It highlights how universities are or could be engaging in extreme innovation, identifying the key structures, capabilities and functions needed.

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

Co-chairs

Prof. Sethuraman Panchanathan
Executive VP and Chief Research and Innovation
Officer of Knowledge Enterprise Development
Arizona State University

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



Top: Dr. Keoki Jackson, Vice President and Chief Technology Officer, Lockheed Martin; and Mr. Charles O. Holliday, Jr., Chairman, GFCC.

Center: 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.

Bottom: 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.

Top: 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.

Center: Prof. Zakri Abdul Hamid, Science Advisor to the Prime Minister of Malaysia; Dr. Roberto Alvarez, Executive Director, GFCC; and the Honorable Deborah L. Wince-Smith, President, GFCC.

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

UNIVERSITY AND RESEARCH LEADERSHIP FORUM: FOUNDING MEMBERS

Chair

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

Co-chair for 2016 meeting

Prof. Alice P. Gast, President, Imperial College London

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. Javid 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. 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. 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

2016 Global Innovation Summit



FROM OUR HOST

It was an honour to welcome fellows, members and friends of the GFCC to the great city of London as hosts of the 2016 Global Innovation Summit. By drawing together corporate, university and public policy leaders, the summit demonstrated how Imperial College London promotes collaboration between sectors and disciplines and seeks to inform policy makers through debate on pressing global issues.

Drawing together the nationalities and experiences of the GFCC to debate the future for our cities was urgent and important. GIS 2016 provided a venue to promote the collaboration and cooperation essential for creating a bright future for cities, for nations and for the world.

At Imperial, we know that our university community is enriched by faculty, students and staff who come from many different countries. We benefit from the differences in culture and outlook that our colleagues bring when understanding and solving complex problems and developing new ideas.

The same is true for cities and for countries, and I congratulate the GFCC for providing a forum for a thoughtful and meaningful discussion of issues that are so important to our collective future. I was struck by the synergies and shared goals of summit participants, who generated new



Prof. Alice P. Gast, President, Imperial College London.

insights in areas from technological innovation in the developing world to the interaction between city leaderships and the populations they serve.

I would like to thank all of our sponsors, and especially gold sponsors KPMG and IBM. They are two of Imperial's most valued partners, and we benefit greatly from our collaborations with them. They bring us perspectives and challenges from their businesses, which catalyse our research and education. I also want to thank the many other friends and partners of Imperial who participated in the summit. Working with our partners Imperial conducts leading research in

areas from advancing mars exploration to addressing the world's greatest public health challenges. We could not achieve our mission without these collaborations.

Imperial is proud to be a founding member of the GFCC's University and Research Leadership Forum. We look forward to continuing the conversation started at the 2016 Global Innovation Summit.

Prof. Alice P. Gast
President
Imperial College London

Opposite page: The Honorable Deborah L. Wince-Smith delivers opening remarks for the Gala Dinner, held in the historic Guildhall, which was built in the 15th century.

CITIES: COMPETITIVE, INNOVATIVE AND SUSTAINABLE

Fifty-four percent of the world's population already lives in cities, and that percentage is expected to grow in the decades to come, reaching 66 percent by 2050. Cities play a pivotal role in the global economy and the innovation landscape — mega-cities (cities with more than 10 million inhabitants) already include 7 percent of the world population and account for 15 percent of world's GDP. Urbanization and agglomeration mean that cities tend towards congestion as populations grow faster than infrastructure can cope, signaling demand for innovation in city utilities, environment and healthcare.

Cities are where talent and technology combine to create economic growth. They are where ideas from science are put into practice, and they serve as home to most of the world's top universities. They have been the locus for business, creativity and innovation for millennia, but becoming and remaining attractive to investors and the world creative class is a constant challenge for cities and their leaders.

City competitiveness is also increasingly connected to sustainability. Beyond the moral imperative, sustainability is also critical for future business opportunities — for new technologies and business models.

The 2016 Global Innovation Summit entitled "Cities: Competitive, Innovative, and Sustainable" brought together entrepreneurs, policy makers, CEOs, investors, thinkers, innovators and competitiveness game changers from around the world on November 29-30 2016.

Hosted by Imperial College London, with support from partners in London and across the United Kingdom, the Summit built upon the realities of nations and cities represented in the GFCC to develop a contemporary competitiveness agenda for cities.

The Innovation Summit convened participants through panel conversations and breakout group sessions structured around four themes:

THE SEAMLESS CITY

How different stakeholders and technology come together in cities to improve urban living and how cities are connected with their surrounding regions.

THE EVOLVING CITY

How cities are transformative entities that change continuously, creating resilience to external and internal pressures.

THE WELL CITY

How sustainability in cities plays an active role in public health, wellbeing and competitiveness.

THE FREE CITY

How freedom of expression plays a role in city growth and development.



Top left: Mr. Chad Evans, Executive Vice President, Council on Competitiveness.

Top right: Dr. Mehmood Khan, Vice-Chairman and Chief Science Officer, Pepsico.

Center Left: Dr. Dirar Shafiq Khoury, Executive Director, Research Coordination and Special Initiatives, Qatar Foundation—Research and Development; Dr. Ahmad Tajuddin Ali, Joint Chairman, Malaysian Industry-Government Group for High-Technology (MIGHT); and Dr. Abdul Rahim Hashim, Vice Chancellor, Universiti Teknologi PETRONAS.

Center right: Prof. David Gann, Vice President (Innovation), Imperial College London; and Prof. Alice P. Gast, President, Imperial College London.

Bottom left: Prof. Thais Russomano, Professor, Pontifical Catholic University at Rio Grande do Sul (PUCRS); and Prof. Joaquim Clotet, President, Pontifical Catholic University at Rio Grande do Sul (PUCRS).



Top left: Mr. Chad Holliday, GFCC Chairman, visits the IBM booth. Among the technologies on display was the IBM Smarter Grid, a solution that utilizes low cost sensors to monitor and adapt power lines to changing environmental conditions.

Top right: The Hon. Deborah L. Wince Smith, GFCC President, delivers opening remarks.

Middle left: HE Tae-Shin Kwon and fellow "Seamless City" panelists.

Middle right: Dr. Roberto Alvarez, Executive Director, GFCC.

Bottom right: Mr. Bill Bohnett, President, Whitecap Investments; and Dr. Mehmood Khan, Vice-Chairman and Chief Scientific Officer, PepsiCo.



2016 Global Innovation Summit Sessions

SESSION 1: COMPETITIVENESS AND SUSTAINABLE DEVELOPMENT

● P A N E L I S T S ●

H.E. Amr Al-Dabbagh

Chairman and CEO, Al-Dabbagh Group,
and
Distinguished Fellow
Global Federation of Competitiveness
Councils

The Rt Hon. the Lord Mark Malloch-Brown KCMG

Co-Chair, Business and Sustainable
Development Commission

Former Deputy Secretary-General,
United Nations

Dr. Mehmood Khan, M.D.

Vice-Chairman and Chief Scientific
Officer, PepsiCo

● M O D E R A T O R ●

Mr. Charles O. Holliday Jr.

Chairman, Global Federation of
Competitiveness Councils

Chairman of the Board, Royal Dutch
Shell plc

There are ongoing challenges in achieving sustainable human development, many centered in cities. Around the world, parts of society have abundance and, in the same city or village, other members of the community lack adequate food or access to clean water. For example, in the United States, the wealthiest nation on the planet, 50-60 million people are dependent on food subsidized by government, a charity or other entity. Food deserts and people living in poverty can be found in the most affluent cities, adjacent to great institutions, academic campuses and health centers, whether in London, Chicago or Baltimore. Seven hundred million people have no access to clean water, 1.3 billion have no access to electricity, and advances in technology could eliminate two billion jobs in the decades ahead. Additionally, by 2050, the world may need to feed an 2.5 billion more people.

The UN Millennium Development Goals saved many lives, helped lift more than one billion people out of extreme poverty and made inroads against hunger. The Sustainable Development Goals take the next step by addressing issues such as climate change, clean water, affordable clean energy, sustainable cities, and sustainable consumption and production. Achieving these goals for sustainable human development requires private sector engagement, new innovations and disruptive thinking.

For example, agriculture and food production is a top contributor to greenhouse gas emissions and accounts for 70 percent of the world's water consumption. Companies in the agriculture and food industry are positioned to make the production and distribution of food more sustainable. Selling 3,000 different food and beverage products around the world, PepsiCo adopted the philosophy of "performance with purpose"—making money, but with a concern about how that money is made in the context of people, products and planet. The company re-thought its production and supply chain from seed-to-shelf to conserve water. But, looking to the future, making the same products sustainably is not enough. In terms of planetary impact, labor practices of the company and its suppliers should not ignore inequities on the farm, or environmental impacts throughout the supply chain. This approach requires leadership at the highest levels of the company, and a diversity of perspectives, backgrounds and cultures to bring different thinking to the challenge.

Every dollar the Al-Dabbagh Group distributes as a dividend is matched with a philanthropic dollar invested strategically in initiatives that are scalable, sustainable, cost-effective and game changing. For example, since 40 percent of the population in developing countries lives in slums, the Group's housing business developed an affordable housing



Top left: Mr. Chad Holliday, Chairman, GFCC, and Chairman of the Board, Royal Dutch Shell plc.

Top right: Dr. Mehmood Khan, Vice-Chairman and Chief Scientific Officer, PepsiCo; and H.E. Amr Al-Dabbagh, Chairman and CEO, Al-Dabbagh Group, and Distinguished Fellow, GFCC.

Bottom: The Rt Hon. the Lord Mar Malloch-Brown KCMG, Co-Chair, Business and Sustainable Development Commission.

concept called "new home, new lives." Concrete housing units enable people to move out of the slums, and an ecosystem helps them move from low income to mid-income through startup stimulation initiatives, job counseling, health education and other support services.

Many large companies understand the importance of sustainability to their value, product portfolio and their stakeholders, from employees to shareholders. Start-up companies

may not think about sustainability at their beginning, or have a chief scientific officer or function to think about and engage the sustainability agenda. Other small and medium-sized enterprises see sustainability as a way to get into the supply chains of large multinationals that value it. These latter companies could be encouraged to become more fully engaged in sustainability through messaging and examples that make a business case with an ethical dimension: companies

live longer, are more valuable, more profitable and more respected if they adopt a purpose-driven and sustainability perspective on people, planet, profit and philanthropy. For example, the most valuable companies in the world have sustainability at the heart of their strategies. At Unilever, the brands that stand for social and environmental progress grow twice as fast as other company brands.

SESSION 2: GLOBAL CITY SPOTLIGHT

● P A N E L I S T ●

Mr. Giorgos Kaminis
Mayor of Athens

● M O D E R A T O R ●

The Hon. Deborah L. Wince-Smith
President, Global Federation of
Competitiveness Councils
President & CEO, Council on
Competitiveness

When Georgios Kaminis was elected Mayor of Athens, he had to confront an economic crisis that had persisted for nearly a decade, a massive influx of refugees, and a racing technological industry that seemed to be evolving at an increasingly rapid pace. He discussed these issues and his plans for the future at the Global City Spotlight Panel with the Hon. Deborah L. Wince Smith, President of the Global Federation of Competitiveness Councils.

Ms: Wince-Smith: At a time of great challenges in your country and in your city, what is your vision for what you can do as mayor?

Mayor Kaminis: Well, the most important challenge is to make Athens an example for the rest of my country. My country is in a deep economic crisis. So, I dedicated my first term from 2010 to 2014 to helping the city stay on its feet. That was the major challenge in my first term. I had to pay very important back loans. Now, in the second term, we are trying to secure European funding from European structural funds to help create jobs in the city, promote entrepreneurship, promote innovation and promote tourism among other things. Unfortunately, we now have to cope with the refugee crisis.

Ms: Wince-Smith: Speaking of the refugee crisis, how were you able to marshal the individual citizens in Athens?

Mayor Kaminis: We are estimated to have had more than 900,000 refugees pass through Athens. First, we located land to build a refugee camp. Second, we participated in the relocation program run by the United Nations Commissioner for Refugees. This program helps with finding apartments in either other countries in Europe or trying to disperse them in the city. At the same time, we worked on educating the population to combat the fear that unfortunately arises from stereotyping.

Ms: Wince-Smith: Do you think, as a result of the crisis, there may be some changes in some of the traditional obstacles for starting up businesses and entrepreneurship?

Mayor Kaminis: Even now, we have managed to obtain funds to promote innovation and entrepreneurship, especially among young people. The municipality will organize the whole thing, bring them together through mentoring, offering space, creating innovative hubs. One thing a mayor can do is bring many forces together, and we've tried to do that in every important field, from tourism to business development. By promoting entrepreneurship, we've managed to secure European funds so that we could engage in more projects around innovation, especially those that provide opportunities to young people. So if young people have ideas, and they want to launch a startup, they can work through the municipality and organize the whole thing. But in such a quest, we still have to go through our traditional channels and unfortunately, we have a judiciary that moves very slowly. What we need is reform that will eliminate bureaucracy and red tape.

Ms. Wince-Smith: Greek citizens are pretty fabulous innovators in information technology in the digital revolution, and you have some tremendous universities in Athens. What could you do as mayor that would spur Athens' growth into a test bed for the 'Seamless City,' connecting

everything with your young millennial IT experts and growing your innovation models?

Mayor Kaminis: Well, one of the consequences of the crisis is the brain drainage; we lose tens of thousands of young Greeks - smart, intelligent people who go abroad, so the major challenge is to keep them in the city. So we try to welcome programs on innovation and help them develop their ideas, and the municipality offers space and support and resources for them to build and grow.

We have an electronic platform that won an international award from Eurocities a few days ago and from the Bloomberg Philanthropies Award two years ago, where we find all the groups formed especially by young people in the city, and we bring them together with the municipal services, so that we can learn from them and work to channel their ideas and energy directly into the city. So it's important to offer opportunities to young people, but as well, to ensure that economic growth comes from the central state, which is responsible for the economic policy.

Ms: Wince-Smith: If you can think forward five years, what is on the horizon?

Mayor Kaminis: We are facing a global crisis. We see the rise of populism, we see people who are very angry, who feel they have been left behind. We have had some growth, but it was not distributed fairly, and that's what we need to do something about. We need inclusive growth that will reach everybody. Five years from now, we need to see that inclusive growth has been a priority.

Ms: Wince-Smith: On behalf of the Global Federation of Competitiveness Councils, we are very proud of our distinguished fellows from Greece, a



The Hon. Deborah L. Wince-Smith, President, GFCC; and Mr. Giorgos Kaminis, Mayor of Athens.

number of whom are here today. We would like to work with you to launch the very first City Competitiveness Council that you might chair in Athens, bringing together CEOs, the university presidents, and as well, some of these dynamic millennials you've spoken about. We'd like to put them together to form a leadership group to begin to address some of these issues about inclusivity, and given Athens' centrality to Greece, the leadership of your city could offer a unique private sector growth strategy. There is tremendous untapped potential for innovation in this great city. So, we hope to bring the GFCC to Greece in the next few years and to work with you on a competitiveness council for the city of Athens.

Mayor Kaminis: I think this is a wonderful idea. We have created a very active municipal business council for the city, and a competitiveness council could complement that work perfectly.

Facing dueling challenges in the form of a persistent socio-economic crisis and a dramatic influx of refugees, Mayor Giorgos Kaminis forged ahead with innovation, creativity and a commitment to the people of his city. While developing initiatives to improve the quality of life for Athenians, he worked simultaneously to bring thousands of refugees into the fold, preserving the basic human rights they were being denied elsewhere and truly taking action to ensure inclusive growth that would benefit everyone. Mayor Kaminis recognized that long-time residents and new arrivals could work in harmony to propel the city forward and fulfill its potential as a hub of innovation and growth, looking towards the future instead of the past. In 2016, he was one of only three awardees of the World Mayor Commendation. The Global Federal of Competitiveness Councils is committed to a future that advances a competitiveness agenda that provides equitable opportunities and benefit-sharing for all.

SESSION 3: THE SEAMLESS CITY

● PANELISTS ●

Mr. Roger Bailey

Asset Management Director, Thames Tideway

H.E. Tae-shin Kwon

President and Chief Executive Officer, Korean Economic Research Institute

Mr. Alan Mitchell

Executive Director, Cities, KPMG Canada

Ms. Giana Sagazio

Director for Innovation, Brazilian National Confederation of Industry

Dr. Pete Worden

Chairman, Breakthrough Prize Foundation

● MODERATOR ●

Professor David Gann

Vice President (Innovation), Imperial College London

SITUATION

Cities and metro areas are complex agglomerations of time, places, people, jurisdictional boundaries, systems, routine events such as commuter traffic, and temporary non-routine events such as major sports games, extreme weather or natural disasters — connecting and interacting with each other in dynamic ways. The city situation changes over time as

well. For example, congestion can increase due to long-term population growth or the impact of growing e-commerce with more delivery vans moving goods through the city. Yet, these various converging, colliding and cascading elements are often analyzed, managed and operated in stovepipes, rather than in an integrated, seamless manner that recognizes their interdependencies and how they affect one another. This fragmented approach can lead to failure to optimize city systems, gain efficiencies and provide the best services to citizens.

KEY QUESTIONS

- How can different stakeholders and technology come together in cities to improve urban living and how cities are connected with their surrounding regions?
- What kinds of initiatives, systems, management methods and technologies can contribute to transforming cities from a patchwork quilt of places, people, things and systems into a seamless interwoven tapestry that provides a high quality of life for its citizens?

CHALLENGES

A sprawling city's physical infrastructure, natural systems such as waterways, drivers and transit users may cross several jurisdictional boundaries. Yet, often, disparate administrative bodies act independently without coordinating

with each other in fulfilling their responsibilities in areas such as safety, security, movement of people and goods, environmental protection and economic development.

As more pieces of infrastructure are woven together in the seamless city, events such as terrorism or natural disaster could create cascading problems across city systems, raising the need for integrated disaster management.

New technologies — such as big data, artificial intelligence, unmanned aerial vehicles (UAV), satellites and drones create new opportunities, but also new challenges for cities. For example, UAVs, satellites and drones create new capabilities but raise concerns about citizen privacy. Artificial intelligence and driverless vehicles have the potential to displace many workers in diverse occupations, and require other workers to acquire new skills. However, many citizens are not prepared to deal with rapid technological transformation.

OPPORTUNITIES

Sharing Data About the City. Sharing data about how the city operates can engage citizens and businesses in improving the seamlessness of cities. For example, the Smart London Board's London Data Store made 800 data sets available. Thousands of businesses have plugged into the data sets and created new businesses, including Citymapper, a dynamic routing app.



Mr. Alan Mitchell, Executive Director, Cities, KPMG Canada; and Dr. Pete Worden, Chairman, Breakthrough Foundation.



Prof. David Gann, Vice-President (Innovation), Imperial College London.

Funding Cross-Jurisdictional, Cross-Functional Projects. KPMG's City Deals has helped cities secure funding from national government to extend a transportation system, in which multiple local authorities collaborate to develop a plan to extend and operate the transit system in ways that create economic development benefits.

Seamless Payment Systems. Korea's T-money System is a smart phone accessible payment system that allows citizens to pay bus, taxi and metro underground gate fares. There is no additional charge to transfer from underground to train or vice versa within 30 minutes. T-money can also be used for some retail purchases. The T-money system is credited with reducing daily traffic by 24 percent between 2004-2009, reducing air pollution, and savings millions of dollars in social costs.

Multi-stakeholder Engagement. London's Thames Tideway Tunnel Project follows the River Thames 25 km from west to east, and seeks to control sewer overflows from storm sewage runoff that have caused problems in the river, including fish kills. The new system will capture

storm flows and transfer them to a sewage treatment works. The project has involved multi-stakeholder engagement, and the movement of construction materials and equipment by river, to minimize the project's impact on London's traffic. The project is also training workers in safety and river work best practices, embedding skills into the river supply chain, benefitting the Thames' marine employers and leaving a lasting legacy.

New Technologies Reveal New Views of the City. Satellite measurement and imaging, UAVs and drones can provide new views and insights on how cities and systems perform across space and time. For example, NASA helped deploy UAVs and small satellites to improve the management of water resources in support of California's winery industry. Hundreds of small satellites can give a daily image of a place, providing imagery that could assist in traffic, disaster and water management, and other city functions. Emerging small satellite capabilities will enable the observation of nightlights that could help measure energy use or carbon emissions without intrusive ground-based

instruments, or infrared emission or ionospheric changes that may give early warnings of earthquakes.

New Learning Technologies Can Help Provide Skills. The UK Ship Simulation Centre simulates the driving and pushing of a barge up and down the river, and big ships coming into harbors and ports, in different types of conditions. Not only can workers hone their skills, they can demonstrate their competency in the skills before they work on a job.

.....
 "In our case, the main challenge has not been the technology, but the people. They have not been well prepared to deal with this new world, with this new technology. So they need to be trained to this new challenge."

Giana Sagazio
 Director for Innovation, Brazilian National Confederation of Industry

SESSION 4: THE EVOLVING CITY

● PANELISTS ●

Dr. Nawal Al Hosany

Executive Director, Sustainability and Brand, Masdar

Dr. Keoki Jackson

Vice President and Chief Technology Officer, Lockheed Martin

Ms. Lori Schmidt

Chief Executive Officer, GO Productivity

Mr. Mauricio Zuazua

Partner, Innovation, Government and Economic Development Practices, A.T. Kearney

● MODERATOR ●

Mr. John Thornhill

Innovation Editor, The Financial Times

SITUATION

Cities are constantly evolving—reacting to external and internal pressures, adopting and adapting new technologies, and responding to new challenges, needs, opportunities and societal patterns. As cities grow larger, their complexity is magnified; understanding the dynamics among complex city systems and environments becomes ever more

vital to city operations, sustainability, safety and security. New technologies offer existing cities new ways of doing old things, and the chance to build new cities that leapfrog the current generation by adopting cutting-edge infrastructure and systems. However, new technologies such as driverless cars and drones create new interplay with city systems in areas such as infrastructure, transport and energy, as well as between the public and private sector.

KEY QUESTIONS

- How can cities create the innovation capacity to develop, assess and effectively implement new technologies and solutions that work best in their city environments?
- How can cities in developing countries use new technologies to leapfrog the development curve, and legacy systems, and establish state-of-the-art infrastructure and operations?

CHALLENGES

The speed at which technology is advancing and demographic shifts are affecting cities is unprecedented. For example, demand for energy is soaring with rapid growth in population and industrial development in emerging economies, raising the need for clean energy and sustainable systems.

While cities must evolve with new technology, they must integrate new technologies and solutions with their particular environmental, social, financial and economic conditions. Innovation is going to change the way cities operate, but many cities do not have the capabilities and capacity to develop and deploy innovations.

New technologies may create new problems. For example, driverless cars, drones or artificial intelligence may get ahead of societal readiness and regulatory frameworks, causing problems ranging from accidents to intrusions on privacy. Increased digitization of infrastructure makes cities more vulnerable to cyber threats.

OPPORTUNITIES

Create City Platforms for Innovation.

UAE's Masdar City is designed and evolving as an exemplar city of the future to demonstrate how cities can accommodate rapid urbanization sustainably, sustain a high quality of life, serve as a hub for innovation, and dramatically reduce energy and water consumption. Focused on energy and sustainability research, the Masdar Institute of Science and Technology is the core and innovation engine of the city, incubating enterprises and attracting talent.

Learn Globally. Cities can learn from other cities around the world — for example, through participation in conferences and international organizations such as the GFCC —



Mr. John Thornhill, Innovation Editor, The Financial Times; Mr. Mauricio Zuazua, Partner, A.T. Kearney; Dr. Nawal Al Hosany, Executive Director, Sustainability and Brand, Masdar; Dr. Keoki Jackson, Vice President and Chief Technology Officer, Lockheed Martin; and Ms. Lori Schmidt, CEO, Go Productivity.

and then adapt what they learn or build on it to innovate, accounting for city and regional differences. For example, Masdar partners with others on renewable energy projects around the world to develop its knowledge base needed to innovate and operate globally in the clean energy industry.

Engage Diverse Knowledge

Contributors Early. To address city design, infrastructure or other transformative projects, collaboration is needed to integrate economic, social and environmental needs. Collaboration among innovative thinkers, designers, constructors and regulators at the front end of a project creates the capacity to be more time and cost efficient, and more effective in adapting innovations and technologies in support of citizen services and environmental sustainability.

Engage the Community. Invite the private sector, civil society and youth to be part of innovation in the city. UAE's Innovation Week stresses that, for the country to thrive, innovation needs to be at the heart of everything it does. In Canada, mega project owners, labor, and energy, engineering and industrial construction companies

come together to identify opportunities for efficiencies throughout the supply chain, and to look for better ways of executing on project delivery.

Big Data. In addition to using data analytics to examine the routine performance of city systems, services and infrastructure, social media — during large non-routine events — can produce data at a high rate in real time that can help assess in detail what is actually happening in the city. With diverse data on population behavior, urban terrain, infrastructure and services, and how they interact with each other, models can simulate what might happen, be used to examine different actions in different scenarios and see how they enable better outcomes. These models can be used to simulate what happened in other situations or in other cities, and then be disseminated to users around the world so they do not have to develop models from scratch.

Solutions that Deliver Multiple Benefits. Some solutions have an interconnectedness that delivers multiple benefits. For example, waste-to-energy technology — such as biomass gasification — can generate

electricity, be used to produce biofuels, and reduce waste disposal and emissions. Nanotechnology holds promise to improve water desalination, and improve the energy efficiency of this energy-intensive process. In addition to being a platform for developing innovations, Masdar City is structured with incentives to attract businesses and talent, including 100 percent foreign ownership of companies and intellectual property, and no corporate or individual taxes.

Reduce the Risk of Cyber Threats.

Cities can reduce cyber threat by using, for example, encryption and block chain technologies, offering cyber security education and training, and designing redundancy and resiliency against adverse situations into systems from the earliest concept phases.

Common Global Standards and Regulatory Regimes. Developing global standards and regulatory regimes for technologies such as driverless cars or drones could reduce problems in areas such as safety and security, easing their introduction.

.....
 "I think we need to ask ourselves...are we designing for today or designing for the future? We tend to do really good looking in the rear view mirror, but how good are we at looking out and being creative about where we need to go?"

Lori Schmidt
 Chief Executive Officer, GO Productivity

SESSION 5: THE WELL CITY

● PANELISTS ●

Professor Noor Azlan Ghazali

Vice Chancellor, Universiti Kebangsaan Malaysia

Dr. Arab Hoballah

Chief of Sustainable Lifestyles, Cities and Industry Branch, United Nations Environment Program

Dr. Laoucine Kerbache

Chief Innovation Strategist, Qatar Foundation Research and Development Professor, HEC-Paris

Associate Professor Dr. Lutfu Savas

Mayor, City of Hatay, Turkey

Mr. Paul Scialla

Chief Executive Officer, Delos Living

● MODERATOR ●

Mr. Jamison Steeve

Executive Director
Martin Prosperity Institute

Executive Director
Institute for Competitiveness and Prosperity

SITUATION

Cities are societal and economic engines, accounting for the majority of the world's population and GDP, but also for the most resource use, CO₂ emissions and waste generation. The urban metabolism—for example, sanitation, water and air quality, mobility and education—has a significant effect on the health, wellbeing and quality of life of a city's citizens and its ability to attract talent and grow the economy.

Cities attract both the rich and well educated, and the poor and unskilled. Around the world, inequality in many cities is significantly worse than national inequality, not improving and, in many cases, getting worse. For example, Thailand's Gini coefficient (a measure of income or wealth distribution, with zero expressing equality, and 1.0 or 100 percent representing maximal inequality) is about 38. But the coefficient in the city of Bangkok is 55.

KEY QUESTION

- How can cities connect the issues of quality of life, productivity of natural resources, and new models of production and consumption to improve the prospects for growth and sustainability that can enhance wellness in the city?

CHALLENGES

Overarching challenges in creating the well city include: improving the quality of life for citizens, making the city more environmentally sustainable and fostering economic development. One way to examine these challenges is through the lens of people, planet and profit (3Ps). A study of 100 cities around the world found that they are not able to balance the three Ps. Cities in advanced economies do better, particular those in northern Europe, but those in developing economies such as many in Latin America, China, India and Africa are more challenged in striking a balance.

Economic growth is increasingly driven by intellectual capital, bolstering economic opportunities for the well educated and higher income group, exacerbating the gaps between the rich and the poor that affect a city's level of wellness.

While there are many solutions to city problems, a challenge is scaling up and supporting these solutions globally. For example, when planning a green building in a developing country, the banking system, the market or the structure of government may not be ready. Architects and engineers, or business school students may not be trained in the systems thinking needed to address the value chain, for example, in recycling or improving energy efficiency.



Mr. Jamison Steeve, Executive Director, Martin Prosperity Institute; and Dr. Lutfu Savas, Mayor, City of Hatay.



Dr. Arab Hoballah, Chief of Sustainable Lifestyles, Cities and Industry Branch, United Nations Environment Program; Mr. Paul Sciallia, CEO, Delos Living; and Dr. Laoucine Kerbache, Chief Innovation Strategist, Qatar Foundaiton Research and Development.

We know today how to build very energy efficient buildings. However, much of today's construction around the world is not moving toward energy efficiency, but rather built "business as usual," so buildings that will be in service for 50 years are not as energy efficient as they could be.

OPPORTUNITIES

Well-building Movement. Well-building merges building science with medical science to create building environments more conducive to human health, wellbeing and productivity. More than 300 projects in 26 countries are adopting the principles of Well Building certification, a building rating systems that focuses on air quality, lighting, water quality, nourishment as well as acoustical, thermal and overall comfort. Similarly, several city pilots are demonstrating the Well Community Standard or Well City Districts Standard, addressing areas such as walkability, accessibility, communal gardens, low pollen trees and low idle zones for cars.

Deliver Preventive Medicine Through Real Estate. Real estate is the world's largest asset class, and health

and wellness is one of the fastest growing industries. Homes, schools, offices, hotels and other real estate can be delivered differently using more intelligent science when these properties are built or renovated. For example, appropriate lighting has been shown to improve sleep, and reduce depression and agitation in persons with Alzheimer's disease. Merging wellness and real estate represents one of the most significant societal and economic opportunities of our time, and scaling from a building level to a city level is an even more profound opportunity. The incremental cost to achieve well buildings is low, and many people are willing to pay a premium for well-certified homes and offices.

Make the Case for Resource Efficiency. Using a systemic perspective, we can explain why resource efficiency and sustainable production and consumption make a good business case for everyone in the long-term—for industry, for cities and for consumers.

Optimize Supply Chains. Optimizing supply chains can create well benefits, such as reduced vehicle traffic. For

example, Japan's largest chain of small convenience stores established an IT infrastructure and integrated store information system that enabled supply chain optimization, and better matched supply with local demand, significantly reducing the number of truck deliveries serving stores on a daily basis.

Engage and Empower Youth.

Reaching into poor city neighborhoods to engage disadvantaged youth with sustained programs can enhance their capabilities. Involving them in micro businesses or activities that lead to better living can help divert them onto positive and productive pathways.

.....
 "The solutions are there. We don't need to invent them. We just need to implement what we have at the larger scale."

Dr. Arab Hoballah
 Chief of Sustainable Lifestyles, Cities and Industry Branch, United Nations Environment Program

SESSION 6: THE FREE CITY

● PANELISTS ●

Mr. Jim Clifton

Chairman and CEO, Gallup Group

Mr. Alexander Idrisov

Chairman, Strategy Partners Group

Co-founder, Eurasia Competitiveness Institute

Mr. Dylan Jones

Deputy Minister, Western Economic Diversification Canada

Mr. Charles Kiefel OAM

Chairman, The Principals Funds Management Pty Ltd.

Distinguished Fellow, Global Federation of Competitiveness Councils

Dr. Geoff Mulgan

Chief Executive Officer, NESTA

● MODERATOR ●

Dr. Pradeep K. Khosla

Chancellor, University of California, San Diego

SITUATION

A free city is open, creative, inclusive and entrepreneurial, with a spirit of free enterprise. Great creative cities throughout history were open and free, but also closed and structured. They were open to immigrants, new ideas, entrepreneurs and inventors, but they integrated them into structures of power and capital. Similarly, today, cities and their institutions, such as universities, are taking on a bigger role in driving innovation, entrepreneurship, and the transfer and application of knowledge. For example, they are using procurement, accelerators or incubators, and other tools to bring together creators and users of knowledge, and to drive new business formation. The rate at which new firms are started in the city is vital, because the majority of middle class jobs come from new firms.

The free city thrives on creative talent, and talent is attracted by a number of factors. This includes money, and access to opportunities to achieve professional and personal goals. People follow competitive industries for jobs. And they go to places where they can improve their lives and lifestyles, for example, an environment of high quality social systems and services, health care and education, with a creative, free, friendly, open and tolerant atmosphere. People also want to contribute, to gather in networks and solve problems, rather than just picking up the phone and calling city hall.

KEY QUESTIONS

- How do cities build a culture of entrepreneurship and free enterprise?
- How do cities attract and nurture creative talent?

CHALLENGES

Welcoming new people and encouraging diversity in a city requires change. Going beyond adjustment to being open to the talents of others can be challenging for a society. Being open and inclusive involves being more liberal, but the world is tilting to conservative, and many people are trying to hold onto their past and want the future to be like that.

The kinds of experiences and level of resources available to individuals can affect creative talent development. For example, a study of patenting in the United States showed that a person was much more likely to be an inventor if from a rich family, if the school experience included experience in innovation, or if parents worked in technology invention. The study concluded that more of the U.S. population had potential to be creators and inventors, but many people were not getting the right backing at school or in their life experiences.

Solutions need to take politics and society into account. Political leaders have to keep constituents happy, but may not have much money, and people have many expectations.



Mr. Alexander Idrisov, Co-founder, Eurasia Competitiveness Institute; and Mr. Charles Kiefel OAM, Distinguished Fellow, GFCC.



Mr. Jim Clifton, Chairman and CEO, Gallup Group; and Mr. Dylan Jones, Deputy Minister, Western Economic Diversification Canada.

Also, it is increasingly important to communicate with and respond to the needs of particular audiences — for example students or the elderly — which requires a different model of city administration.

OPPORTUNITIES

Create an Environment that Attracts Creative Talent.

Cultivate a messy, open and dynamic spirit alongside physical infrastructure. This can include world-class institutions such as universities that push the frontiers of knowledge, as well as orchestras, theaters, museums and art galleries. Also, seek to develop a culture that encourages and uses the full potential of all a city's people.

Active Brokering and Intermediation.

Brokering and intermediation can help link universities, entrepreneurs and companies, as well as link civil society to politicians.

Nurture the Young. To increase the flow of innovation across the whole population, give the young experiences involving creativity and invention much earlier and on a much larger scale.

Be Globally Connected. For the sixth consecutive year, the Economist Intelligence Unit has ranked Melbourne, Australia as the No. 1 most livable city in the world. Its population is drawn from more than 190 countries. Its nine universities play a major role in population and cultural diversity. About ten percent of university students in Melbourne are international.

Encourage Gender Diversity in the Workforce and Workplace.

Increasing female workforce participation can increase productive capacity of the economy and GDP. For example, in Australia, 59 percent of females participate in the workforce, while 70 percent of males do. Ways to encourage female participation include tax deductibility for childcare, offering flexible part-time work and offering work at a time more accommodating to family and managing children.

Kick-start Solutions. The City of Edmonton in Canada wanted to replace its streetlights with low power use streetlights that were expensive, but would save significant money over time. They kick started replacement,

spending a few million at the front end, and then establishing a dedicated fund with savings from the power bill to pay for full replacement of the street lights over time. To identify an innovative solution, the first step was tendering a problem rather than a solution — what was the cheapest way to get the lighting?

Provide City Data. Providing data about the city helps enable citizens to engage in the democratic process. Also, when several cities made such data sets available, others used the data to create new businesses and services.

BREAKOUT 1: THE SEAMLESS CITY

● PRESENTERS ●

Dr. Wilfried Aulbur

Managing Partner, Roland Berger, India

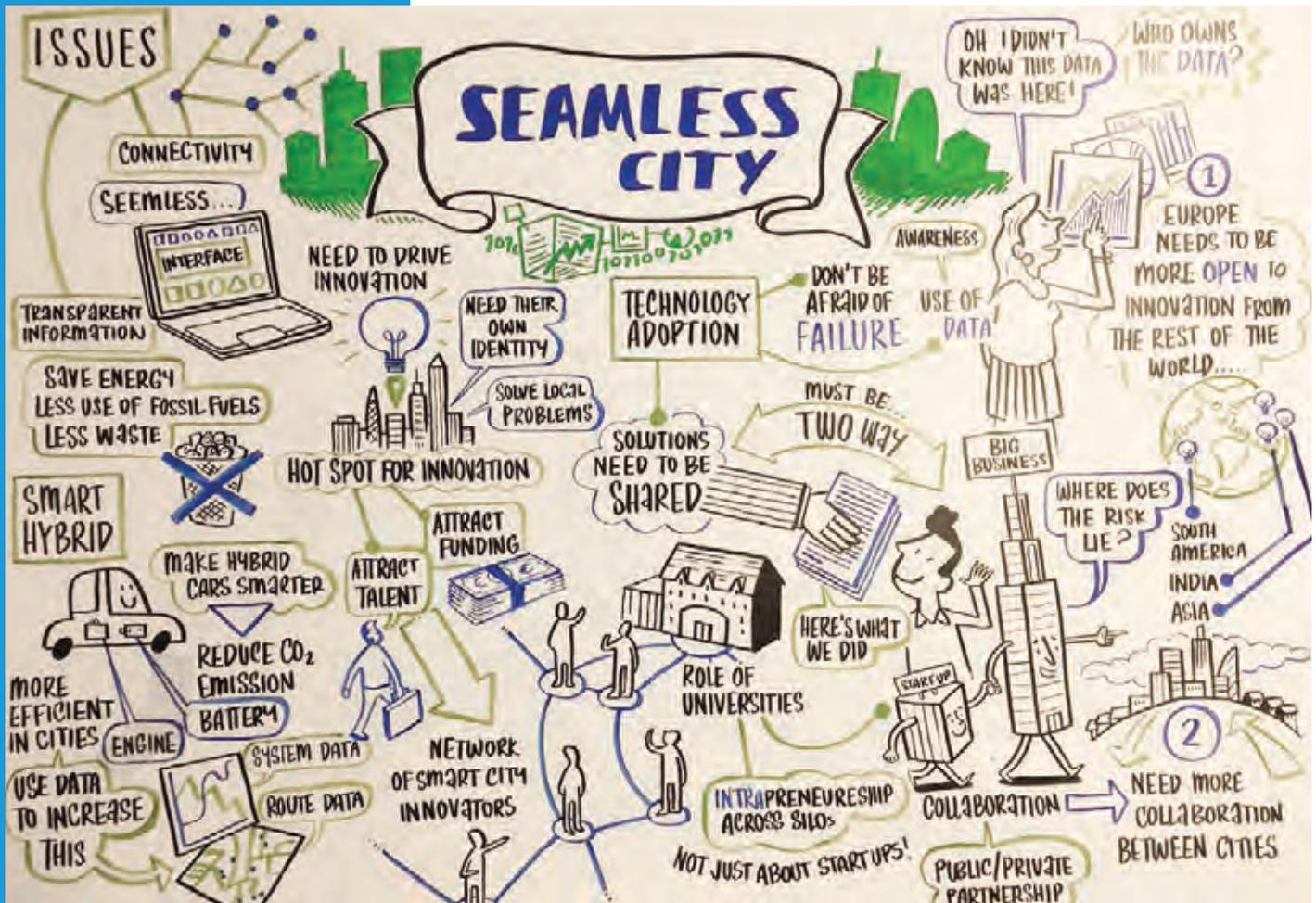
Chairman, Indian Council on Competitiveness

Smart Hybrid

A system to maximize the efficiency of hybrid cars.

During the breakout groups, participants had the opportunity to explore the day's concepts further. The Seamless City breakout explored how different stakeholders and technology come together in cities to improve urban living and how cities are connected with their surrounding regions.

One of the themes from the conversation was the lack of a platform for cities to communicate with each other and compare ideas on addressing shared challenges. Participants also emphasized that learning is not just directed from developed world to developing — mutual learning can occur.



BREAKOUT 2: THE EVOLVING CITY

● PRESENTERS ●

Mr. Rein Willems

CEO, Bieconomy Platform

Former President, Shell Netherlands

Former Senator, Government of the Netherlands

GeTriK

Assisting pilots in data collection, visualization and analysis.

The Evolving City breakout looked at the ways in which cities are transformative entities that change continuously, creating resilience to external and internal pressures.

In the discussion about how to manage constant change, participants brought up the idea that technological innovation must go hand-in-hand with social innovation — thinking about how our society interacts with technology can be as important as the technology itself.



BREAKOUT 3: THE WELL CITY

● PRESENTERS ●

Dr. Mohammad Zaidi
Strategic Advisory Board Member
Braemar Energy Ventures

LifeCradle
A low-cost, baby incubator that provides basic facilities for the child's survival.

The Well City discussion focused on analyzing the active role of sustainability in cities and how it drives and impacts public health, wellbeing and competitiveness. Participants debated best ways to balance utility and security in mobile health technology and how to encourage investments in companies with social causes.



BREAKOUT 4: THE FREE CITY

● PRESENTERS ●

Dr. Mohd Yusoff Sulaiman

President & CEO, Malaysian Industry-Government Group for High Technology

SAM Labs

Helping young people to explore coding and technology development.

Participants in the Free City breakout group examined how freedom of expression affects city growth and development. Some of the key ideas brought up during the conversation included addressing different silos that end up stifling innovation. Similar to the "Seamless City" group, participants discussed the need to bring together city leaders to compare best practices. A second theme from the discussion was that innovation policy should be coordinated across sectors — government, academia, business, and civil society.



REFLECTING ON THE FUTURE OF THE SEAMLESS, EVOLVING, WELL AND FREE CITY

Cities should be centered around people, and sustainable cities should only be called such if they truly provide improved conditions for those who live there. Exploring this concept was the mission of the 2016 Global Innovation Summit.

Cities play a key role for economies around the globe, as human activities, business, innovation and creativity are concentrated in urban settlements. Mega cities with 10+ million inhabitants have 7 percent of the world's population, but are responsible for 15 percent of the global GDP. The world is not flat, it is spiky, and big global cities are fundamental for competitiveness, innovation and sustainability.

As of today, 54 percent of the world's population lives in cities, and this is expected to reach 66 percent by 2050. Urbanization will further accentuate the importance of cities and happens in conjunction with population growth — Asia and Africa are the fastest growing and urbanizing regions of the world. It is predicted that 9 out the 10 largest cities in the world will be in Asia and Africa by 2030.

As cities are increasingly important in the global economy, they become focal points for global competitiveness. Reflecting that, city competitiveness has become part of the agendas of governments and private sector organizations around the globe, including GFCC members across continents.

The rise of global cities in the world South creates new opportunities and several challenges. New types of solutions for urban infrastructures, governance, services, management, citizenship, etc., are required in emerging nations. Advanced nations, at their turn, also need to stay alert to avoid eroding competitive advantages.

The exponential growth of technologies and climate change complement the changing global landscape that served as a background for the GFCC 2016 Global Innovation Summit. Combined, these elements enable new solutions for old and new problems. Nevertheless, technical solutions alone are not enough and will not provide the answers that nations, citizens and people need. New thinking is needed across geographies and industries.

There are big opportunities to connect global challenges to business in a profitable way — a variety of innovative infrastructures, services, products and business models are needed for humanity to achieve sustainable human development. A sustainable future can only be achieved through innovation.

Sustainability is not just about the environment; it cuts across different dimensions of life, has people at its center and is a must for business continuity over time. In summary: companies live longer, are more valuable, more profitable and more respected if they adopt a purpose-driven and sustainability perspective



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

on people, planet, profit and philanthropy. Sustainability is a source value, for business, cities and people.

The city-centered conversations held in London highlighted a series of opportunities to build the seamless, the evolving, the well and the free city. They take advantage of technology advancement, but also include and/or require new governance processes and solutions.

Metaphorically, the seamless city is a frictionless one, where there is no waste of energy — in literal terms, like the energy that is lost in traffic congestions, but also in a figurative way, the energy that is lost in ill-governed interfaces in multi-stakeholder environments. The seamless city is about the smooth flow of people, goods, ideas, data, vehicles, decisions, etc., across the city, in all levels and time horizons.

Solutions for the seamless city emerge from a combination of physical, data, transactional, analytics, regulatory and governance infrastructures. The seamless city seizes the sustainability opportunity via innovative solutions that boost efficiency and improve quality of life citywide.

While technology can allow for new ways of seeing, understanding, integrating, managing and optimizing the functioning cities, governance is the ultimate enabler of the seamless city. As different pieces of infrastructures (physical, digital and regulatory) are put together at the city level, the importance of coordination and governance is highlighted for cities to operate seamlessly.

The evolving city is about learning, purposefully building the future, adaptation and the capabilities that are needed for that. It is about the capacity that cities have to respond to global transformations, at all levels — from the changing economic landscape, to climate and technology.

In order to be globally competitive and prosper, cities need to compare themselves globally, engage local communities and evolve their economies. They need to embrace new industries and sectors, create future oriented businesses, foster the development of the talent pool and localize the skills that are needed for emerging industries. Evolving cities create platforms that enable innovation, and catalyze the economy and societal transformation, continually creating new opportunities for people to thrive.

Climate change and technology create opportunities for evolution, but they also bring about new risks for cities, like extreme climate events and cyber threats.

The evolving city needs to be aware of and prepared to deal with such risks. Resilience has to be embedded into urban solutions, from physical infrastructures to governance, from emergency response to regulation. The evolving city leverages the sustainability opportunity via investments in innovative sustainable infrastructures and future-oriented businesses, combining the local creation of new industries and businesses with the deployment of their products and services.

The well city is about quality of life and, at a broader level, the efficient and healthy utilization of resources in general — water, energy, materials, air, etc. Urban metabolism has a direct impact in city life, health and the wellbeing of citizens. In order to flourish, the well city requires a systems thinking framework.

Investments made in the well city — at the city level — pay off in different dimensions and levels. For instance, investments in sanitation, pollution reduction, wellness and others improve quality of life, increase the lifespan of citizens, decrease healthcare costs and the number of work hours lost due to health problems, and ultimately boost productivity. The well city is systemically more efficient and productive, providing excellent quality of life for people and enabling sustainability.

If cities are really about people and innovation is a function of talent, it is hard to find a better concept to capture the essence of city competitiveness than the free city. The most competitive, innovative and sustainable cities in the world are those that manage to nurture and retain the global creative and innovative class. The free city

leverages global talent and knowledge assets, building a strong local entrepreneurial ecosystem that is globally by definition.

It is not a coincidence that the most livable city in the world, Melbourne, has a population that represents 190 nationalities. Beliefs and social norms that promote openness, value diversity and creativity, and emphasize risk taking and entrepreneurship lay an important foundation for the free city.

Higher education and research organizations are instrumental for global talent attraction and global connectivity. Nevertheless, investments should not just contemplate fixed assets — like research facilities, for instance — but focus on the establishment and development of connections. To be realized, the free city needs connectors — professionals, individuals, organizations and structures that catalyze connections at the local and global levels. Citizen participation, creativity and entrepreneurship can also be turbocharged by city data. The free city is also digital.

A contemporary agenda for sustainable, innovative and competitive cities encompasses a variety of dimensions.

The acceleration of the desired impacts for those constructs will require action at the local and global levels, across geographies, and can be boosted via global cooperation, the sharing of best practices, and the scaling up of proven technologies and solutions. The GFCC stands ready to help.

Dr. Roberto Alvarez

Executive Director
Global Federation of Competitiveness Councils



GALA DINNER

A Gala Dinner themed "Envisioning Our Urban Future" closed out the first day of the Summit and featured four academics from Imperial College London presenting visions of the future based on their own academic research:

- Prof. John Polak, Head of the Centre for Transport Studies
- Dr. Mirko Kovac, Director, Aerial Robotics Laboratory
- Dr. Maja Pantic, Professor of Affective and Behavioral Computer
- Prof. Nilay Shah, Head of Department of Chemical Engineering

The invite-only event was held in the Great Hall of Guildhall, home of the City of London Corporation and a spectacular setting for events since the annual Lord Mayor's Banquet in 1502.

During the Gala Dinner, H.E. Amr Al-Dabbagh was honored as the first recipient of the GFCC's Global Competitiveness Award. The Award recognizes leaders who have advanced the competitiveness agenda and made significant contributions to their nations, regions, cities and globally. With this award, the GFCC saluted Al-Dabbagh for his vast achievements in business, government, global engagement, philanthropy, and education in promoting entrepreneurship, as well as for his leadership and support in the creation and growth of the GFCC.



Opposite page: Gala dinner.

Top: "Technology in the City" panel with Mr. David Stokes, Chief Executive Officer, IBM UK and Ireland; Mr. Rajesh Agarwal, Deputy Mayor of London, Business; and Professor David Gann CBE CEng FICE FCGI, Vice President, Innovation, Imperial College London.

Bottom: H.E. Amr Al-Dabbagh (center) was the first award recipient and honored at the 2016 Global Innovation Summit in London, pictured with The Honorable Deborah L. Wince-Smith, President, GFCC; and Mr. Charles O. Holliday, Jr., Chairman, GFCC.

GLOBAL COMPETITIVENESS AWARD

2016 AWARDEE PROFILE: AMR AL-DABBAGH

In 2016, the GFCC honored His Excellency Amr Al-Dabbagh with the Global Competitiveness Award, which recognizes leaders who have advanced the competitiveness agenda, and made significant contributions to their nations, regions, cities, and globally.

His Excellency Amr Al-Dabbagh is the Chairman & CEO of Al-Dabbagh Group, a diversified conglomerate founded in 1962 with 57 companies — in food, housing, petroleum, auto services, and packaging — spanning more than 60 countries, and employing more than 13,000 people. In 1995, the World Economic Forum designated Amr as one of the 100 "global leaders of tomorrow."

A champion of sustainability, and the role businesses can play in creating a more sustainable world, Amr serves as a Commissioner of the Business and Sustainable Development Commission, making the case for why business leaders should seize upon sustainable development as the greatest opportunity of a lifetime, and leverage their companies' capabilities for social and environmental impact.

In 2004, at the age of 38, he was appointed as a Minister of the Saudi Arabian General Investment Authority, one of the youngest ministers ever appointed to a government post in the Kingdom.

For eight years, he served as SAGIA's Governor and Chairman of the Board, working to achieve its ambitious



agenda: to improve the country's business environment, encourage foreign investment in the Kingdom, and diversify its economy. Under his leadership, SAGIA created the National Competitiveness Center to address the fundamental competitiveness of the Saudi Arabian economy, and to implement a series of indicators measuring the Kingdom's competitiveness.

The NCC launched the 10x10 initiative to lead Saudi Arabia to a top ten global competitiveness ranking for its business and investment environment, which propelled the country up the World Economic Forum's Doing Business rankings from 67th to 11th in just five years.

Under his leadership, SAGIA launched the Economic Cities Initiative, with the vision of building cities around local and national competitive advantages, but also to provide a sustainable city environment where millions of people would live, raise and educate their families, and run small businesses.

His Excellency is also a globally focused philanthropist. He is the founder of the London-based Stars Foundation, which supports locally led solutions for disadvantaged children in the 100 countries with the highest "under five" mortality rate. It is on track to meet its goal of supporting 20 million children by 2020.

In education, he was a driving force in establishing Philanthropy University, which offers free online courses to NGOs and non-profit leaders around the world. Its goal is to provide access to unlimited capacity building for these change-makers, helping them scale, sustain and drive their long-term impact, with the ultimate goal of touching the lives of 100 million people by 2020. In its first cycle alone, there were 400,000 enrollees from 180 countries.

He co-authored his first book, *Governpreneurship* in 2012, which explores examples of entrepreneurial practices in government from around the world with a deep dive on SAGIA, and in 2016 published his second book, *Omnipreneurship An Organized Approach of Living a Life of Meaning*.

His Excellency is an innovator, entrepreneur, philanthropist, and leader in the global competitiveness community whose success has touched countless industries and lives. The GFCC was honored to present the Global Competitiveness Award to him in 2016 and looks forward to his continued collaboration with our community.

A CALL TO ACTION

The Global Innovation Summit highlighted a series of policy, business and technology solutions for sustainable and innovative cities. A common diagnostics of speakers and participants is that models and solutions for innovative and sustainable cities are not in short supply. Nevertheless, there is a lack of global platforms to catalyze learning, dissemination and scale-up of proven solutions.

Lots of conferences have been held, studies commissioned and publications released about sustainable development by international and policy organizations. Global donors and investors have set up funds and other investment vehicles focused on sustainable technologies and projects. Innovative and sustainable technology solutions abound, but their implementation still is localized.

Operational knowledge, financial resources, technology solutions, institutional frameworks and on-the-ground needs have to meet. Time is ripe for stakeholders to come together and implementation to be accelerated.

The GFCC urges the global community and its members to:

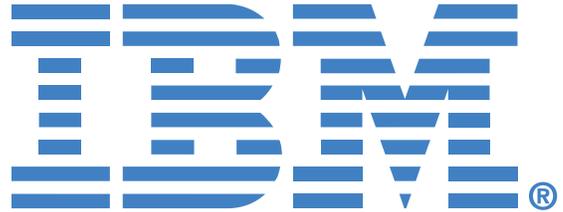
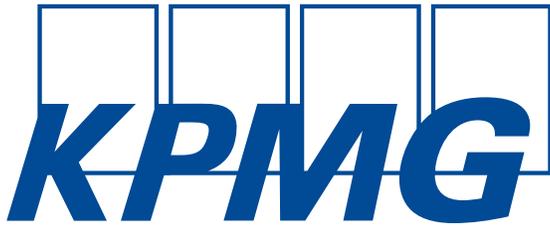
- Create a global policy learning facility oriented towards implementation (how to), oriented toward implementation and experimentation, based on concrete examples, instead of mere conceptual frameworks. Institutional specificities of different nations, regions and cities have to be understood and acknowledged.
- Implement a global scale up platform to accelerate the deployment of sustainable technologies and business models. Such a platform should be capable of identifying across the globe promising technologies and business models, connecting their providers with potential markets, investors and mentors and supporting effective implementation. Information should be gathered and systematize along the global acceleration process, in order to allow for solutions to be accessed and evaluated.

- Establish a global online benchmarking platform for sustainable and innovative cities that would allow for key metrics to be compared in a meaningful way.
- Launch a global series of multi-stakeholder solution design workshops that can cut across silos, engage a variety of actors — from entrepreneurs, to policy leaders and investors — and catalyze implementation. This series of workshops should be connected to the other initiatives and allow for entrepreneurs to have direct contact with local realities and stakeholders.

Learning and action are required and the GFCC stands ready to work with its members, international organizations and the global community in deploying these initiatives.

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