Mehmood Khan, M.D.
Vice Chairman and Chief Scientific Officer
PepsiCo

Dr. Mehmood Khan is PepsiCo's Vice Chairman and Chief Scientific Officer, Head of Global R&D. PepsiCo's businesses make hundreds of foods and beverages that are respected names globally.

Dr. Khan oversees the PepsiCo global *Performance with Purpose* sustainability initiatives, inspired by the fundamental belief that business success is inextricably linked to the sustainability of the world including agriculture, energy and water. He leads PepsiCo's research and development (R&D) efforts, creating breakthrough innovations in food, beverages and nutrition—as well as delivery, packaging and production.

Prior to joining PepsiCo, Dr. Khan was President, Takeda Global Research & Development Center, overseeing Takeda Pharmaceuticals Company's worldwide R&D efforts. Previously, Dr. Khan was attending staff endocrinologist at the Mayo Clinic and Mayo Medical School in Rochester, Minn., serving as Director of the Diabetes, Endocrine Trials Unit.

Dr Khan has been recognized by academic and international organizations including honorary doctoral degrees, the Ellis Island Medal of Honor, Career Achievement Award and Pinnacle Award and is an elected Fellow of the Royal College of Physicians, London.

Dr. Khan is a member of the Board of Directors of Reckitt Benckiser , Life BioSciences and Indigo Ag. He serves as Chair of both the US Pakistan Business Council and the U.S. Council on Competitiveness in Washington DC and is member of the Board of FFAR, US Department of Agriculture and the Visiting Committee for Advanced Technology at the National Institute of Standards and Technology. He also serves as a Judge for the Lemelson Innovation Prize at Massachusetts Institute of Technology.

Dr. Khan lives in Greenwich, CT with his wife Shahida. Together they have two sons, one daughter and three beloved grandchildren.

700 Anderson Hill Road
Purchase, NY 10577

MEHMOOD KHAN, MD

914-253-3110 (Office)
914-426-3304 (Cell)
mehmood.khan@pepsico.com

Work Experience	PEPSICO, INC., May 2012 –March 2019 **Vice Chairman** Has lead PepsiCo to become the leader in Innovation in the food and business industry. Leads PepsiCo's research and development (R&D) efforts, creating breakthrough innovations in food, beverages and nutrition—as well as delivery, packaging and production technology for all of PepsiCo businesses around the world. Oversees the PepsiCo global sustainability agenda, including environmental, agriculture, energy and water as well as human and talent sustainability. This work is focused on shrinking PepsiCo's environmental footprint, conserving natural resources and promoting sustainable agriculture, while improving human nutrition. Executive Lead of PepsiCo's award winning Food for Good program. PEPSICO, INC., October 2010-May 2012, Purchase, NY **CEO, Global Nutrition Group |Executive Vice President, Chief Scientific Officer head of global R&D); Member of PepsiCo's 11-person Executive Committee** Set strategy and direction, overseeing day-to-day operations of 120-person global business unit charged with accelerating PepsiCo' overall portfolio growth by increasing revenues from fast-expanding nutrition based business to $30 billion by 2020 from $10 billion in 2010. Work across core brands including Quaker, Gatorade and Tropicana. Oversee and support joint ventures and integration of acquired global brands. PEPSICO, INC., December 2007-October 2010, Purchase, NY **Executive Vice President, Chief Scientific Officer (head of global R&D)** TAKEDA PHARMACEUTICALS, 2006-2007, Deerfield, IL **President, Takeda Global Research & Development** Center Responsible for global R&D pipeline excluding Japan, for pharmaceutical company whose worldwide sales were $11 billion and whose market capitalization was $100 billion. Led worldwide product development, reporting to general manager of strategic product department (responsible for commercialization). Created and maintained R&D budget in excess of $1 billion, leading a team of thousands including outsourced staff. TAKEDA PHARMACEUTICALS, April 2003-2006, Lincolnshire, IL **Senior Vice President | Vice President, Medical & Scientific Affairs Department** MAYO CLINIC, 2001-2003, Rochester, Minnesota 55906 **Director; Diabetes, Endocrine and Nutrition Clinical Trials Unit | Senior Consultant Physician, Endocrinology and Diabetes** HENNEPIN COUNTY MEDICAL CENTER, 1992-2001, Minneapolis, Minnesota **Division Chief, Endocrinology, Metabolism and Nutrition |Director, Diabetes and Nutrition Consultant Endocrinologist**

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mehmood.khan@pepsico.com

	UNIVERSITY OF MINNESOTA, 1991-2001, Minneapolis, Minnesota **Assistant Professor, Department of Medicine |Associate Specialist, Department of Food Science and Nutrition**
Corporate Boards	**2019 Member, Board of Directors, Life BioSciences** **2018 Member, Board of Directors, Reckitt Benckiser Group** **2017 Member, Board of Directors, Indigo Agriculture** **2017 Member, Board of Directors CorMedix** **2017 Member, Board of Directors Spectrum Health**
Education	**1988-1992** University of Minnesota, Minneapolis, Minnesota **1976-1981** University of Liverpool Medical School, England
Honorary Degrees	**July 2016,** Ph.D International Law, University of Liverpool **May 2016,** Ph.D Humane Letters**,** Cardinal Stritch**,** Wisconsin
Postdoctoral Training	**1988-1994**, Graduate student/Fellow, Department of Food Sciences and Nutrition, University of Minnesota, Minneapolis, Minnesota Nutritional Biochemistry Fellowship (Advisors: Dr. F.Q. Nuttall and Dr. A. Levine). **1985-1987**, Medicine/Endocrinology Registrar with Chairman, Department of Medicine, University of Liverpool **1984-1985**, Medical Registrar (Senior Medical Resident), University of Liverpool **1982-1984,** Senior House Officer **,** Medical Resident, University of Liverpool **1981-1982,** Internship, Royal Liverpool Hospital and Medical School
Subspecialty Fellowships	**2017** Fellow, Royal College of Physicians, London UK **1997** Fellow, American College of Endocrinology **1988-1992**, Clinical Endocrinology Fellow, Department of Medicine University of Minnesota, Minneapolis, Minnesota
Licensure and Certification	Available on Request
National Professional Positions (Current)	**2019-Present,** Chairman for Industry, U.S. Council for Competiveness, Washington, DC **2019-Present,** US Dept of Commerce, National Institute of Standards and Technology Visiting Comm. **2016-Present,** Member Board of Directors, Foundation for Food and Agriculture Research **2016-Present,** Chairman, US Pakistan Business Council, US Chamber of Commerce, Washington, DC **2010-Present,** Member Strategic Board, Lahore University of Management Sciences, Pakistan
Distinctions, Prizes, and Fellowships	**2016 –** University of Minnesota Commencement / Outstanding Career Achievement Award **2016** - U.S. Ellis Island Medal of Honor **2015 -** Upwardly Global Outstanding Leadership Award – Honoree, **2015** - Harvard University Illuminate Global Award for Innovation, **2015** - Fast Company 100 Most Creative People In Business for 2015 **2013 -** Outstanding 50 Asian American Award Dinner – Pinnacle Honoree **2012 -** Keynote and Chancellor's Award East-West University **2003** - ADA Minnesota Health Award, American Diabetes Association **1997** - Medical Leadership Services Award, Health Partners and Insight News, Minnesota **1992** - Member: National Honor Society of Agriculture, Gamma Sigma Delta **1991** - American College of Nutrition - Anafred N. Halpern, New Investigator Award **1988** - W.K. Kellogg Fellowship in Nutrition Metabolism **1976** - Valedictorian: John Rhodes Memorial Award for Best GCE A Level Student of the Year
Visiting Professorships and	**Feb 2018** Keynote, 94th Annual USDA Agricultural Outlook Forum **May 2017** Keynote, Ross School of Business, University of Michigan **Apr 2016** Landon Lecture, Kansas State University

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mehmood.khan@pepsico.com

Invited Lectures (Selected)	**Dec 2015** Institute of Medicine Forum Keynote (Invited) **Nov 2015** Berkeley Sustainable Business & Investment Forum Keynote **Nov 2015** Princeton University Business Today Executive Seminar Leader **Nov 2015** Harvard Business Research Conference Keynote **Oct 2015** World Food Prize Keynote, **Oct 2015** AACCI Forum Keynote **Mar 2015** Economist Forum **Nov 2014** Cavendish Forum Keynote, Blenhiem Palace, at Oxford University **Oct 2014** George Washington Carver Inaugural Lecture, Tuskegee University **Jun 2014** Campden BRI Day**,** Keynote **Jan 2014** The Atlanta Summit on Public Health and Prosperity, CDC **April 2013** National Science Foundation Science, Engineering & Education for Sustainability (SEES) Program. Washington D.C. **Oct 2012** World Health Summit – Tackling Non-Communicable Diseases to Enhance Sustainable Development**.** Berlin, Germany **Oct 2012** Iowa World Food Prize – Integrating Nutrition for Human and Animal Health **Jun 2012** 18th Annual International Economic Forum of the America, Perspectives on the intersection of business and science, Montreal, Canada **Oct 2011** TedMed Food Processing and Feeding the World
National and State Committee Responsibilities (Past)	**2016-2019** Vice-Chairman for Industry, U.S. Council for Competiveness, Washington, DC **2014-2018** Lamelson Prize Judging Committee, MIT **2009-2017,** Member Board of Governors, New York Academy of Sciences **2014-2017,** Industrial Research Institute, Awards Committee **2014-2016**, Sustainability Task Force, National Academy of Sciences **2014-2016**, Vice Chair, US Pakistan Business Council, US Chamber of Commerce **2013-2016,** UN Public Private Partnerships Advisory Group **2013-2016**, FDA Food Advisory Committee **2013-2016**, Sackler Institute Board, New York Academy of Sciences **2011-2014**, Member, Illinois Innovation Council **1998-2012**, Member, Central Society for Clinical Research **2009-2012**, Member Board of Directors, America Diabetes Association Research Foundation **2003-2003**, Member, Endocrine Research Committee, Division of Endocrinology, Mayo Clinic **2001-2003**, Member, Academic Advisory Board, Pfizer Visiting Professorship Program in Diabetes **1999-2003**, Member, National Diabetes Educational Council **1999-2001**, Member Glycemic Control Working Group, Prevention of Cardiovascular Disease in Diabetes Trial, (ACCORD) National Institutes of Health **1999-2001**, Member, Pharmacologic Intervention Sub Committee, Study of Health Outcomes in Weight Loss Trial (SHOW), National Institutes of Health **1998-2001**, Member, National Committee on Community and Volunteer Development, American Diabetes Association, Virginia **1998-2001**, Member, Board of Directors, American Diabetes Association, Great Lakes Region (Minnesota, North Dakota, Wisconsin, Illinois and Michigan) **1998-2001**, Member, Board of Directors, Minneapolis Medical Research Foundation **1997-2001**, Member (appointed), Board of Directors, Hennepin Faculty Associates **1997-1998**, President Elect, American Diabetes Association, Minnesota Affiliate **1996-1997**, Vice-President, American Diabetes Association, Minnesota Affiliate **1995-1998**, Member, Board of Directors, Minnesota Chapter of the American Diabetes Association, Minnesota Affiliate **1994-1999**, Member, Board of Dietetics and Nutrition Practice, State of Minnesota

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914-253-3110 (Office)
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mehmood.khan@pepsico.com

	1994-1997, Physician representative, State of Minnesota Nutrition Supplementation Advisory Committee, Department of Human Services
Educational Activities	Available on Request
Manuscript Reviews	Available on Request
Research Grant	Available on Request
Publications	Available on Request

Testimony before the Congress of the United States House of Representatives
Committee on Science, Space and Technology

Dr. Mehmood Khan
Chairman, Council on Competitiveness and
Vice Chairman and Chief Scientific Officer, PepsiCo

March 6, 2019, 2:00 PM EST

Introduction

Thank you, Chairwoman Johnson, Ranking Member Lucas and members of the committee for inviting me to discuss the current state of U.S. science and technology and what it will take to maintain U.S. leadership.

My name is Dr. Mehmood Khan and I am the Chairman of the Council on Competitiveness, a non-partisan membership organization of 150 CEOs, university presidents, labor leaders and national laboratory directors. Founded in 1986, the Council is led today by the Honorable Deborah L. Wince-Smith who as President and CEO has led the development of impactful policies and actions that will boost U.S. productivity drive inclusive prosperity for every American and ensure the success of U.S. goods and services in the global marketplace.

I am honoured to serve on the Board of the Council with a tremendous group of leaders including industry vice chair, Mr. Brian Moynihan, the chairman of the board and CEO for Bank of America, our university vice chair Michael Crow, the president of Arizona State University, our labor vice chair, Mr. Lonnie Stephenson, international president of IBEW, and our Chair Emeritus, Mr. Sam Allen, CEO of Deere and Co.

This hearing comes at an important, possibly historic time for U.S. innovation.

Given the profound impact of science and technology on U.S. prosperity, standards of living, national security, modern society and geopolitical standing, every American should be concerned with the nation's ability to lead in science, technology and innovation.

More than any country in history, the United States has been the greatest driver and beneficiary of technology, innovation and a vibrant entrepreneurial spirit.

In the 19th century, entrepreneurship and innovations surrounding agriculture, rail, oil, steel and electricity turned the United States into an industrial and economic powerhouse, laying the foundation for a manufacturing sector that provided middle class jobs and a higher standard of living for millions of Americans.

In the 20th century, American inventions and advancements in vehicle and aircraft technology revolutionized transportation and changed society and the geographic face of the country. American-born digital technologies unleashed a revolutionary new age of computing, communications and information mobility, disrupting industries and business models, changing society and culture around the world, and creating enormous new wealth. This continuum of innovation has delivered prosperity and rising standards of living to Americans, and propelled the United States to global leadership.

As we enter the third decade of the 21st Century, a new urgency, a new innovation reality, a new imperative faces the nation. The Council on Competitiveness has long characterized the competitive landscape, and examined where America stands. When major competitive opportunities or challenges emerge, the Council has sought to bring those to national attention, explore their implications and develop recommendations for action. Notwithstanding a currently robust economy – rising and strong economic, productivity and job growth; historically low unemployment; wage increases; an improved tax environment; etc. – the Council believes U.S. leadership in technology and long-term competitiveness is under threat. This potential demands the urgent attention of our nation's leaders, and a focused examination of our capabilities, investments and policies related to science, technology development and innovation.

The Case for On-Going Investment

While the United States is enjoying an economic upswing on many fronts, U.S. leadership in technology is under renewed threat. In 1960, the United States dominated global research and development (R&D), accounting for 69 percent share of the world's R&D investment. The United States could drive developments in technology globally by virtue of the size of its investment. Today, we have evolved into a multipolar science and technology world. As other nations have increased their R&D investments and capacity for innovation, the U.S. share of global R&D expenditures has dropped to 28 percent in 2016, diminishing the U.S. dominance and leverage over the direction of technology advancement. At the same time, China has risen to the account for a quarter of global R&D spending.

In addition, America's lead in venture capital is shrinking, further diminishing its role as a driver of technology and innovation globally. In 1992, U.S. investors represented 97 percent of the $2 billion in venture finance, and accounted for about three-quarters just a decade ago. However, in 2017, U.S. investors led 44 percent of a record $154 billion in venture finance, with Asian investors (with China leading) accounting for 40 percent. Moreover, while the absolute level of venture capital coming to the United States has increased substantially the U.S. share of the growing global pool of venture capital – which has increased more than 200 percent since 2010 – has dropped sharply from 95 percent in the early 1990s to about half in 2017.

While traditional U.S. competitors – such as Germany, Japan, France and the U.K. – continue to be strong R&D performers working at the leading edge of technology, many emerging economies seek to follow the path of the world's innovators, transform to knowledge-based economies, and drive their

economic growth with technology and innovation. A growing number of emerging economies are establishing government organizations and ministries focused on technology and innovation, adopting innovation-based growth strategies, boosting government R&D investments, and developing research parks and regional centers of innovation. Some of these economies are also working to increase their production of scientists and engineers. These actions are raising technology and development capabilities and innovation capacity around the world.

A nation's R&D intensity expressed as R&D expenditures as a percentage of GDP provides another gauge of national R&D performance. In this measure, the U.S. position globally has lagged in recent years, as other countries have expanded the range and scope of their R&D activities. Notably, South Korea, one of the world's largest R&D performers and another formidable U.S. competitor, ranks at the top in this metric.

At the same time, key U.S. science and technology infrastructure is eroding. Much like roads, rails and power plants were essential for the Industrial Age, infrastructure that supports knowledge creation and technology development is vital for the 21st century knowledge economy and U.S. success in innovation-based global competition. This includes laboratories, research and technology demonstration centers, supercomputers, test-beds, wind tunnels, propulsion and combustion facilities, simulators, accelerators and other user facilities.

America's national laboratory system is considered a distinctive and globally unique competitive asset. But, across the system, core scientific and technological capabilities are potentially at risk due to deficient and degrading infrastructure and repair hamstrung by chronic underfunding, and maintenance backlogs in the hundreds of millions of dollars.

At the National Institute of Standards and Technology (NIST) – where I was recently appointed to a three-year term on the Visiting Committee for Advanced Technology -- more than half of the facilities on its two main campuses are in poor to critical condition. Forty-two percent of the space in its Boulder facilities is outdated or obsolete, with older laboratories there unable to support controlled environments required for advanced research. Other NIST facilities have experienced water damage, electrical failure and power outages. Facilities in poor to critical condition include those with capabilities in engineering mechanics, metrology, physics, materials, fluid mechanics and building research.

There are similar conditions in laboratories managed by the Department of Energy and the NASA. These "crown jewel" facilities in the national laboratory system are vital to U.S. global leadership across numerous science and technology disciplines. This infrastructure is absolutely vital to a future U.S. global leadership across numerous science and technology disciplines.

New Disruptors

At the same time that competition in technology and innovation is rising around the world, and U.S. technology leadership is under threat, we are witnessing accelerated advancement of the greatest

revolutions in science and technology; a new phase of the digital revolution characterized by vast deployment of sensors, the internet of things, artificial intelligence (AI), and the big data tsunami; biotechnology and gene editing; nanotechnology; and autonomous systems. Each of these technologies has numerous applications that cut-across industry sectors, society and human activities. Each is revolutionary; each is game-changing in its own right. But they are now colliding and converging on the global economy and society simultaneously, with profound implications for U.S. economic and national security.

These technologies are crucial drivers of productivity and economic growth, altering the patterns of society and many dimensions of everyday life. For countries and companies, the ability to leverage these technologies for economic impact is fundamental to their competitiveness and economic success.

In addition to their economic potential, these technologies could solve many of the world's critical challenges surrounding areas such as health, energy and sustainability, clean water and the global food supply.

As Vice Chairman and Chief Scientific Officer of PepsiCo -- the largest food and beverage company in the United States – I am acutely aware of this potential. What goes into the creation of food and beverage products on a global scale requires serious STEM skills:

- Agronomists—people who study plants and soil—to help us manage and optimize crop yields.
- Engineers to build the lines and design equipment.
- Physicists who've mastered the laws of thermodynamics and fluid mechanics in order to make whole grain versions of extruded snacks like Cheetos.
- We need the expertise of chemists, flavorists, and food scientists —all scientific degree-holders.
- Nutritionists who work every day to improve the benefits of our foods and beverages.
- Toxicologists to ensure they're safe to consume.

We employ more than 250,000 people worldwide, including 110,000 who are directly employed here in the US and an additional 24,000 who work for our franchise partners. Every day more than 1 billion servings of our products are consumed per day by someone, somewhere in the world.

In 2017, PepsiCo was once again the largest driver of growth for our retail partners in the U.S., contributing 18% of total food and beverage retail sales growth – more than the next 15 largest manufacturers combined. Research and development is the engine that drives that growth and, accordingly our R&D spending increased 33% from 2011 to 2018.

We believe the disruptive innovation required to drive growth for a company of our scale will come from both internal and external efforts – putting the best minds to work unencumbered on our most serious challenges and greatest opportunities. Our ability to effectively recruit qualified STEM talent, establish mutually beneficial public-private partnerships to advance research and tap into a rich innovation ecosystem are essential to our success.

<u>The New Workforce</u>

The reorganization of the economy and society around powerful technologies is a dynamic process undertaken by business, government and individuals. It is inherently disruptive, both creating and disrupting business, markets and jobs. This dynamic process is essential to leveraging new technology to generate the greatest benefits in terms of jobs, economic growth, productivity and wealth.

Automation – robots, machines, devices, sensors, and software – is increasingly capable of doing routine tasks that have made up jobs for millions of Americans. In contrast, the labor market is rewarding the well-educated worker who can perform non-routine work and complex tasks. Higher-skilled workers are not only at a premium when new technologies are introduced because they are better able to use them, they are also better prepared to move to new industries, new jobs and new occupations or new skills when displaced by technological, labor market or market disruptors.

From technology to trade skills, there is no issue on which Council members are more united than in their desire for progress on building a talented, diverse workforce. As technology and the retiring baby boomer generation contribute to reshaping the jobs landscape, leaders must work at all levels, in the private and public sectors, to prepare Americans for the changes to come.

The Council continues to recommend several steps to address the talent shortfalls, urging both government policy action and partnerships between government, industry, academia and labor. America needs to take many steps, including: growing the number and diversity of its STEM-educated workforce, establishing greater opportunities for experiential learning (e.g. co-ops and apprenticeships), and reforming rules to retain more skilled immigrants. Other critical steps include encouraging greater lifelong learning opportunities, and re-establishing hands-on training classes in K-12 that build a base for skilled trade.

Optimizing the Environment for Innovation Systems

Since the early 2000s, new models of innovation have emerged, and others have matured in response to the transformation of the global competitive landscape that began in the 1980s. Multiple technology revolutions and their convergence, and the nature of global challenges require models of innovation built on internal resources, external collaboration and a larger, more diverse innovation skill set. For example, in a recent survey of U.S. manufacturing firms, of those firms that had innovated, 49 percent reported that the invention underlying their most important new product had originated from an outside source. These models of innovation have expanded the scope of participants in the innovation ecosystem, and the ways in which companies, innovators, and entrepreneurs pursue innovation.

As companies have moved away from exploratory research toward nearer-term applied research and technology development that support business units, foundational technology breakthroughs increasingly come from universities, national laboratories and small start-up companies that are disproportionately supported by public R&D investments. While the public role in the innovation ecosystem has increased in importance, U.S. public investment has not kept pace. This government investment plays a key role as the seed for future applied research and technology development, and

for training the next generation of scientists and engineers. However, with increasing democratization of innovation, a growing pool of innovators and problem solvers are largely disconnected from the research, development and training institutions this public investment supports.

There are many factors that affect a country's ability to innovate and compete. This includes levels of investment in R&D, the availability of capital including venture capital to fuel start-ups and innovation at critical stages, the availability of talent, the environment for entrepreneurship, and the general business environment including taxes and the level of business regulation. These elements are different in countries around the world, and can play a significant role in a country's competitiveness and capacity for innovation.

U.S. competitors around the world seek to build and strengthen knowledge and technology-based economies as the basis for advancing productivity, job creation, raising standards of living and, in some cases, advancing geopolitical goals. As a result, many deploy policies and programs to harness science, technology and innovation, and to create a business environment to achieve this impact. These countries are instituting their own distinctive innovation ecosystems, which may not be compatible or friendly with the U.S. innovation system.

For example, in the U.S. the private sector dominates R&D spending and the Federal government spends significant funds on defense R&D and basic research. Other countries' R&D is dominated by government funding. The U.S. is home to many of the world's top research universities and a distinctive set of crown jewel national laboratories, while other nations are working to strengthen their university-based research and industry engagement with research institutions. The U.S. is known for its strong policies of technology transfer and intellectual property ownership of technologies developed with government funding. Other nation's science, technology and innovation efforts are strongly guided by national strategic plans, and many have high-level ministries devoted to stimulating technology and innovation. Many countries have national research programs or projects that target emerging technologies and fields. The strength of the start-up and entrepreneurial culture varies by country. In the U.S., state and regional governments play a significant role, with a wide variety of programs designed to stimulate technology-based economic growth, such as accelerators, incubators for start-up firms and seed funds. Other countries may deploy protectionist policies and illicit means to advance their technology positioning.

Can the U. S. Compete?

We are seeing changes in technology, competition and the global economy, historic in terms of their size, speed and scope. The U.S. faces hyper competition, a potential new global superpower competitor in China, and the prospect of economic and social disruption brought about by the unrelenting and accelerating march of technology.

Nevertheless, in a global economy ever more driven by technology and innovation, an enabling environment for innovation remains the advantage of only a few economies, with the United States in a position of significant strength:

- The U.S. remains the world's epicenter for disruptive innovation, thanks to its exceptional research infrastructure and low barriers to entrepreneurs and start-ups.
- The U.S. remains the world leader in high-tech manufacturing. It has a 31-percent global share and its output is growing. China is closing the gap with a 24-percent share and its output is also growing, surpassing Japan and the EU.
- The U.S. remains the world's largest investor in R&D for 28 percent of global R&D spending. It now invests half a trillion in R&D per year and has built up a globally unparalleled national stock of science and technology.
- Because the U.S. is by far the world's largest innovator in basic research, it dominates patenting, sowing the seeds of future innovation, representing about one quarter of all international patent applications filed in 2016.
- The U.S. has distinctive assets – its national laboratories and top research universities.
- In the U.S. innovation ecosystem, industry, start-ups, national labs and universities collaborate on R&D across the spectrum of science and technology.
- Vast amount of venture capital is pouring in to commercialize advance technologies.
- The U.S. is seen as the global technology leader. A recent survey asked researchers across the world which country they considered to be the global leader in 12 advanced industries. The U.S. was named most often in 11 of the 12 industries.

Despite these significant U.S. strengths, the competitiveness of a wide range of nations – not to mention economic and technological change – is dynamic and ever transforming. A country's comparative position can change rapidly.

When the U.S. controlled the direction of technology, we were positioned to control our economic destiny. That is no longer guaranteed. The United States must take stock. We must assess if our innovation ecosystems and investments are enough to maintain our global economic and technological leadership. And, as technology seeps into nearly aspect of American life, our national leaders and our government at every level must bolster their knowledge and response capabilities to match the strengthening competition, technological change an disruptions that are coming.

Conclusion

The United States is at a critical moment in time in national innovation systems research and action. New, transformational models driven by the democratization and self-organization of innovation are emerging and taking root across the nation. But, at the same time, U.S. leadership is under threat. The United States faces now what are perhaps existential challenges to its global leadership in innovation. America's role in technology advancement is diminishing globally—now accounting for only one-quarter of global research & development investments, down from two-thirds in 1960. Competitors are increasing their capacity for innovation. And rapid technological change and disruption have impacted the workforce and communities.

American voters agree with this sense of urgency. According to the results of a national poll, conducted by Hart Research and Echelon Insights, on behalf of a diverse group of organizations committed to advancing U.S. science and technology, including the Council on Competitiveness, 88 percent of voters believe it's important for the federal government to fund science and technology research and 75 percent would feel more favorable toward a congressional candidate who supports increased funding.

This voter support for federal science research is driven by a number of key factors, chief among them the fear that a lack of increase in science and technology research funding could weaken national security (90 percent), and that the U.S. is falling behind in educating youth in Science, Technology, Engineering and Math (STEM) fields.

With these challenges in mind, the Council recently launched a National Commission on Innovation & Competitiveness Frontiers to double down on all efforts to optimize the nation for this new, unfolding innovation reality. I am proud to serve as co-chair of this committee alongside Michael Crow, president of Arizona State University. Over the coming three years, the Commission will assemble top minds from industry, academia, labor and the national laboratories to:

- Sharpen national, regional and local leaders' understanding of a dramatically changing innovation ecosystem, and provide them a prioritized policy recommendation Roadmap for the coming decade;
- Harness changes in the global innovation ecosystem and implement the Commission's recommendations to accelerate and sustain annual productivity growth at levels between 3.5 and 4 percent, and push U.S. living standards (GDP per capita) to the top of global rankings by the end of the decade; and
- Address, propose and potentially launch private, public and public-private solutions to specific national and global grand challenges—as defined by the Commission's work.

The Commission will build on the Council's intellectual capital in this space developed over the past thirty years. Organized around three critical competitiveness pillars—capitalizing on emergent and converging technologies; optimizing the environment for innovation systems; and exploring the future of production, sustainable resource consumption and the future of work—the Commission will acknowledge and respond to the urgency of the challenge at hand, understand and describe this new reality and position the nation to prosper and thrive with a clear set of recommendations that will enhance and expand the nation's innovation capacities at the heart of competitiveness.

The Council's leadership firmly believes that with the right policies, the strengths and potential of the U.S. economy far outweigh the current challenges the nation faces on the path to higher growth and greater opportunity for all Americans.

We stand ready to work with you to set in place the policies needed to ignite a new era of competitive and sustainable growth and productivity.

Thank you