



Compete.

Council on
Competitiveness

Launch.

A Summary of the Kick-off Meeting
of the National Commission on Innovation
and Competitiveness Frontiers

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Letter from the Co-Chairs

The United States faces new, even existential challenges to its global innovation leadership which pose a threat to our distinct competitive advantage. Factors like a rapidly shifting economy along with the convergence of new technologies, increases in R&D spending by other nations, and the blurring of the digital and physical worlds force us to confront new realities about the scope and impact of America's innovations—and our responsibilities to safeguard and make productive use of our innovation capacity.

As global competition increases, as the nature of innovation changes (more turbulent and transformative than ever in human history), and as America confronts fundamental changes in how it thinks about and pursues innovation (new business models are emerging and innovation is democratizing), sustaining, much less, strengthening our global competitive advantage requires ongoing conversation between the nation's private and public sectors leadership.



Dr. Mehmood Khan
Chief Executive Officer
Life Biosciences, Inc.



Mr. Brian T. Moynihan
Chairman and
Chief Executive Officer
Bank of America

In that vein, the Council on Competitiveness has launched a new, flagship initiative, the **National Commission on Innovation and Competitiveness Frontiers (Commission)** to leverage our broad, cross-sector membership in: confronting and overcoming critical challenges to U.S. innovation capacity and capability; creating momentum across the country to pick up the pace of innovation; defining and shaping America's innovation path for the 21st century; and developing new-to-the-world partnerships to launch and scale research, businesses and ventures.



Dr. Michael Crow
President
Arizona State University



Mr. Lonnie R. Stephenson
International President
IBEW



**The Honorable
Deborah L. Wince-Smith**
President & CEO
Council on Competitiveness

The Commission is a multi-year, national movement to transform the way in which we innovate across the United States, and to drive long-term productivity and inclusive prosperity. **For its initial work, the Commission will focus on three key and connected pillars:**

- **Developing and Deploying at Scale Disruptive Technologies;**
- **Exploring the Future of Sustainable Production and Consumption, and Work; and**
- **Optimizing the Environment for the National Innovation System.**

The Council on Competitiveness and its members sense the nation faces a distinctive juncture, fraught with uncertainty, but also filled with incredible promise. Goals of the Commission include tackling the competitiveness challenges facing the nation; leveraging these challenges and opportunities into productivity and prosperity gains; and supporting a wave of innovators and entrepreneurs accessing new, democratizing “tools of innovation.”

We thank our fellow Commissioners (see page 42 for a full, current list)—and the general membership of the Council—for their support and contributions to this all-of-nation effort. We look forward to developing together a robust national policy and action agenda for a more prosperous and productive nation.

Setting the Stage

“At the moment, our nation has a tremendous inability to understand complexity. We need human enhancement recommendations as a core deliverable of this Commission.”

Dr. Michael Crow
President
Arizona State University

As Americans enter the third decade of the 21st century, a new urgency faces the nation. While the United States has stood apart from the rest of the world during the past half century in its record of sustained innovation, across industries old and new, and through the ups and downs of economic cycles, the nation today faces new realities and new imperatives transforming the context for continued innovation leadership.

In today's global economy, low costs, high quality, rapid product and service design and deployment, and organizational dexterity all come together and form a baseline to compete—but, increasingly, these traits characterize many markets and nations. Long-term prosperity requires strengthening this baseline by placing more attention on innovation to confer competitive advantage. As a driver of productivity and economic growth, job creation, and rising living standards, innovation—and spurring an innovation ecosystem—is critical to ensuring long-term U.S. competitiveness.

Nature of Technological Disruption

A dramatically more interconnected, turbulent and transforming world—driven by the convergence of the digital, the atomic, the cognitive and the genetic realms—places the American innovation enterprise at a distinctive inflection point in history.

New technologies can have a significant impact on multiple facets of the economy, including jobs, economic growth, productivity and wealth. For example, smart phones unleashed the app economy, and the dramatic cost decrease of genome sequencing—occurring at an even more rapid pace than in the semiconductor industry—has opened new corridors for the biopharmaceutical business (Figure 1). Technological innovation has created entirely new industries, companies and jobs over the past several decades and made others obsolete.

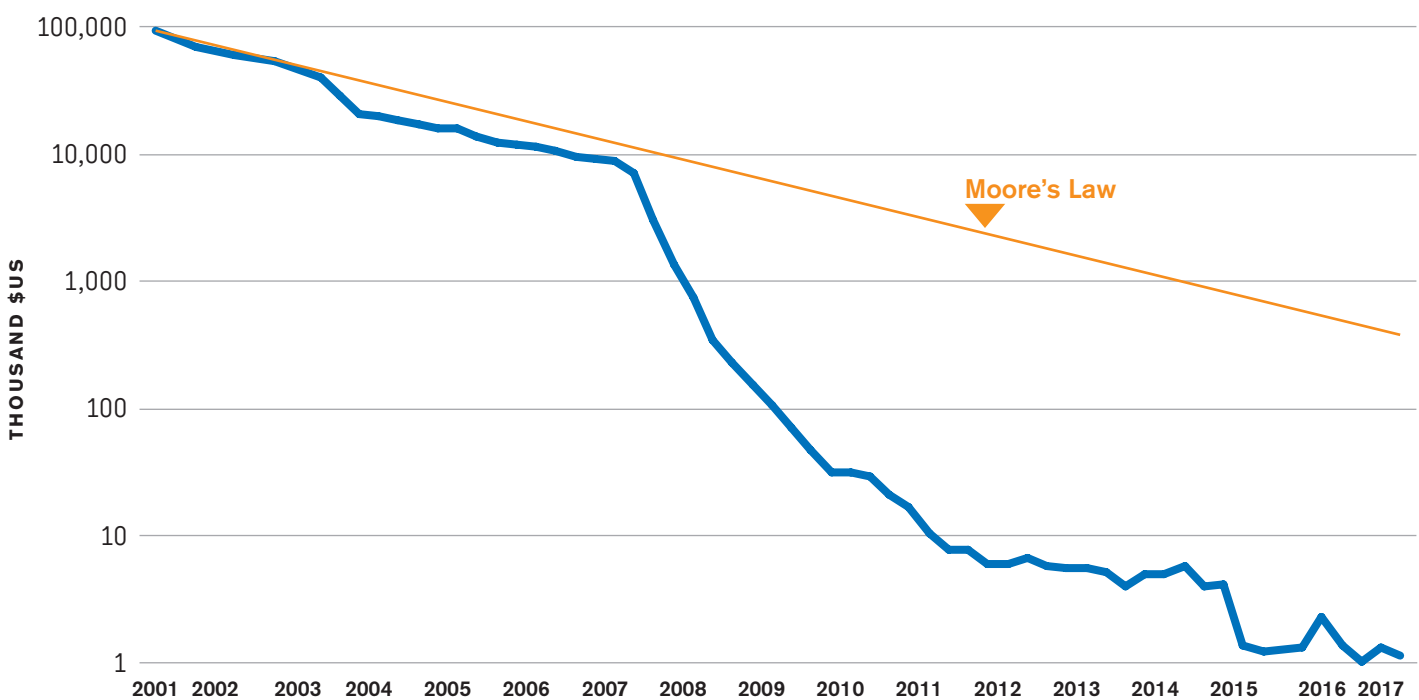
In addition to the great benefits technology can confer on people and the economy, it too can disrupt industrial and consumer markets—positively and negatively. And, so, its development and implementation must be done thoughtfully in a way that transforms business, the economy, and society in a positive manner.

Workforce Readiness, Productivity and Efficiency

Technological disruption affects every level of the labor economy. Widespread fears that high-paying jobs are migrating overseas—or that automation is obviating these jobs—are just an aspect of this transformation. As tasks at the individual level become increasingly complex, employers will need to organize a workforce around these changes to maximize productivity—and to provide new opportunities for workers.

Figure 1. Cost Per Genome

Source: National Human Genome Research Institute, genome.gov/sequencingcosts.

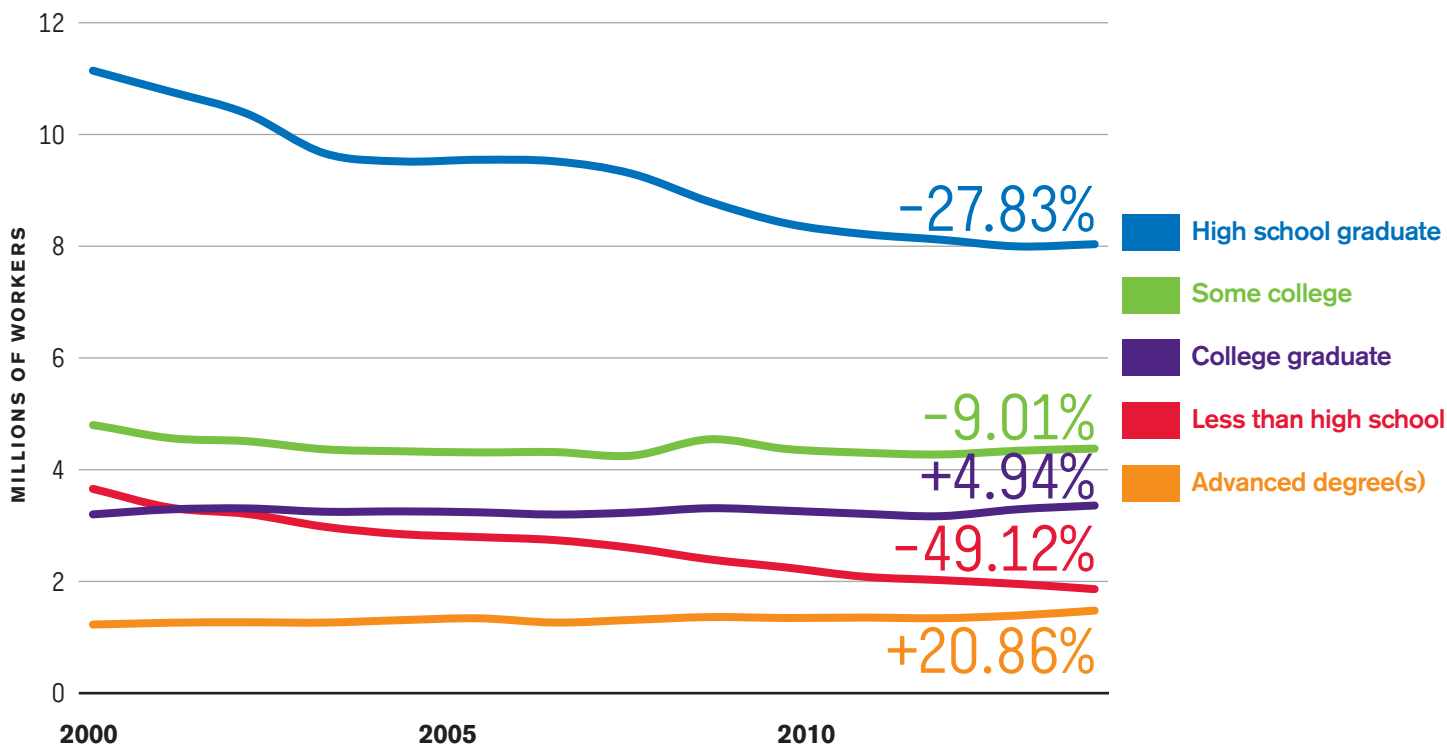


Employment in many industries could expand while employment in others decreases. Occupations can emerge and disappear. And changing supply and demand for skills could change the labor market value of those skills. While there is little consensus on how many jobs future innovation will create or obviate, the integration of automation in manufacturing has shown that unskilled or routine labor suffers from increased technological integration while high-skill labor increasingly benefits (Figure 2).

To prepare for the expansion of these effects across the economy, America must take several steps to adapt, such as expanding the STEM-educated workforce, establishing greater opportunity for experiential learning, retaining more skilled immigrants, increasing access to lifelong education, and re-establishing hands-on skill training in K-12 education.

Figure 2. Manufacturing Jobs by Educational Achievement

Source: Steven Ruggles, J. Trent Alexander, Katie Genadek, Ronald Goeken, Matthew B. Schroeder, and Matthew Sobek. Integrated Public Use Microdata Series: Version 5.0 [Machine-readable database]. Minneapolis: University of Minnesota, 2010.



Optimizing for Technology

New models for innovation have emerged, and others have matured in response to the transformation of the global competitive landscape. As a result of a shifting focus toward shorter-term research and development (R&D) investments in businesses, many businesses are now also looking externally toward universities, national laboratories, and small start-ups for sources of long-term innovation potential. Regional, state and local communities increasingly value innovation and expect institutions of higher education to contribute to economic growth. As a result, these communities are investing in technology initiatives that showcase and attract further investment in innovative technology.

Additionally, big data and automation technologies provide new tools that allow for advanced research beyond the traditional lab environment. These tools can also identify optimal pathways for innovation,

increasing its speed and efficiency—and time to illumination and deployment. Beyond institutions, the democratization of innovation through self-organization, crowdfunding, citizen science, and open-source digital platforms has expanded the universe of innovators and capacity for collaboration.

Why Now?

Today, someone can—for the first time in history—imagine, develop and scale a disruptive technology independent of traditional institutions of innovation. And new business models are emerging, challenging the traditional; cutting the linkage between production and capital; increasing the pace of innovation by collapsing boundaries between fields, sectors and disciplines—thereby setting the stage for truly disruptive innovation.

To confront and overcome critical challenges facing the U.S. innovation engine, the United States—at a minimum—must set the pace for the rest of the world in innovation capacity, capability and competitiveness. Building on the Council's history of work in defining, articulating and activating America's innovation movement, the National Commission is poised to set this agenda.

As important to building a domestic innovation infrastructure—investment, physical and natural resources, regulations, and workforce—the United States must also address the risk that other innovation-focused ecosystems pose to our competitiveness.

The current global competitive landscape requires immediate action from the United States. Why? There are many reasons, like the decrease in the U.S. share of global R&D investments (Figure 3); or because of issues like forced technology transfer, joint ventures, acquisitions, and early-stage investment, industrial espionage and criminal cyber activity.

And, of course, there is tremendous global competition along all those vectors. For example, as China's economy grows, its R&D spending is now second only to the United States and is expected to overtake the United States in the coming decade. (Figure 4). China has also overtaken the United States in the production of science and engineering publications. China has posted double-digit growth rates in international patent filings every year since 2003, and it continues to implement strategic initiatives to accelerate this type of growth and advantage. The United States must recognize these external challenges, while also putting its own house in order by, for example, investing more of its considerable resources to reverse the downward trend in many key metrics, like the nation's federal investments in R&D as a percentage of GDP (Figure 5).

Figure 3. U.S. Share of Global R&D Expenditures

Source: OECD.

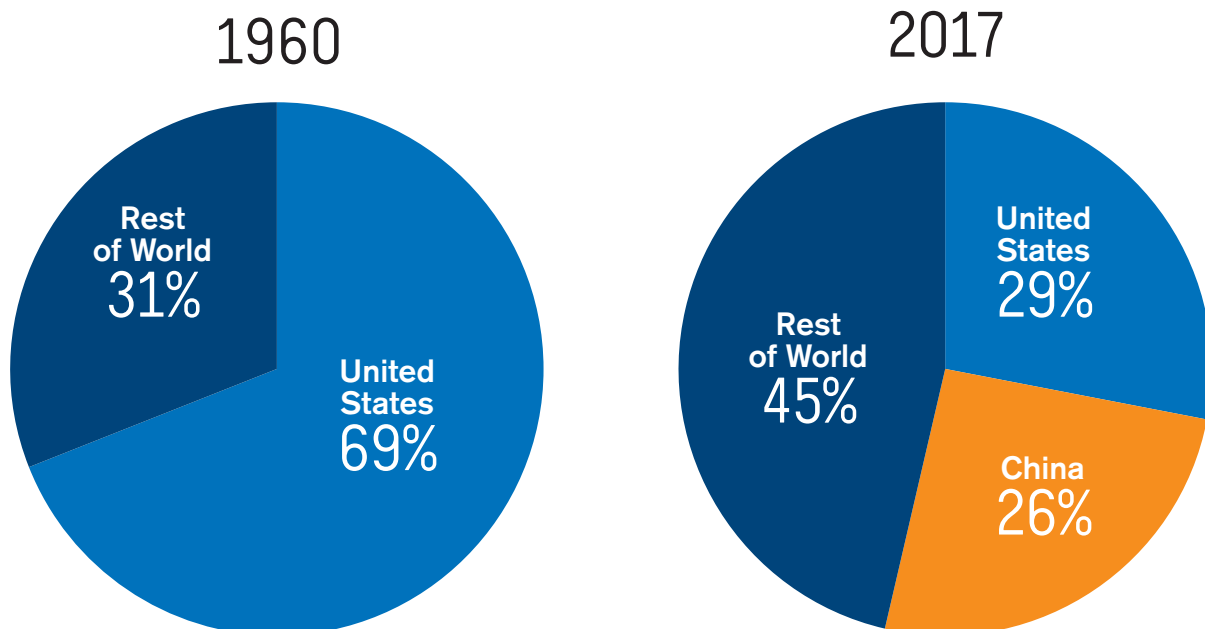


Figure 4. Gross Domestic Expenditure on R&D, 2000–2017

Source: OECD Main Science and Technology Indicators

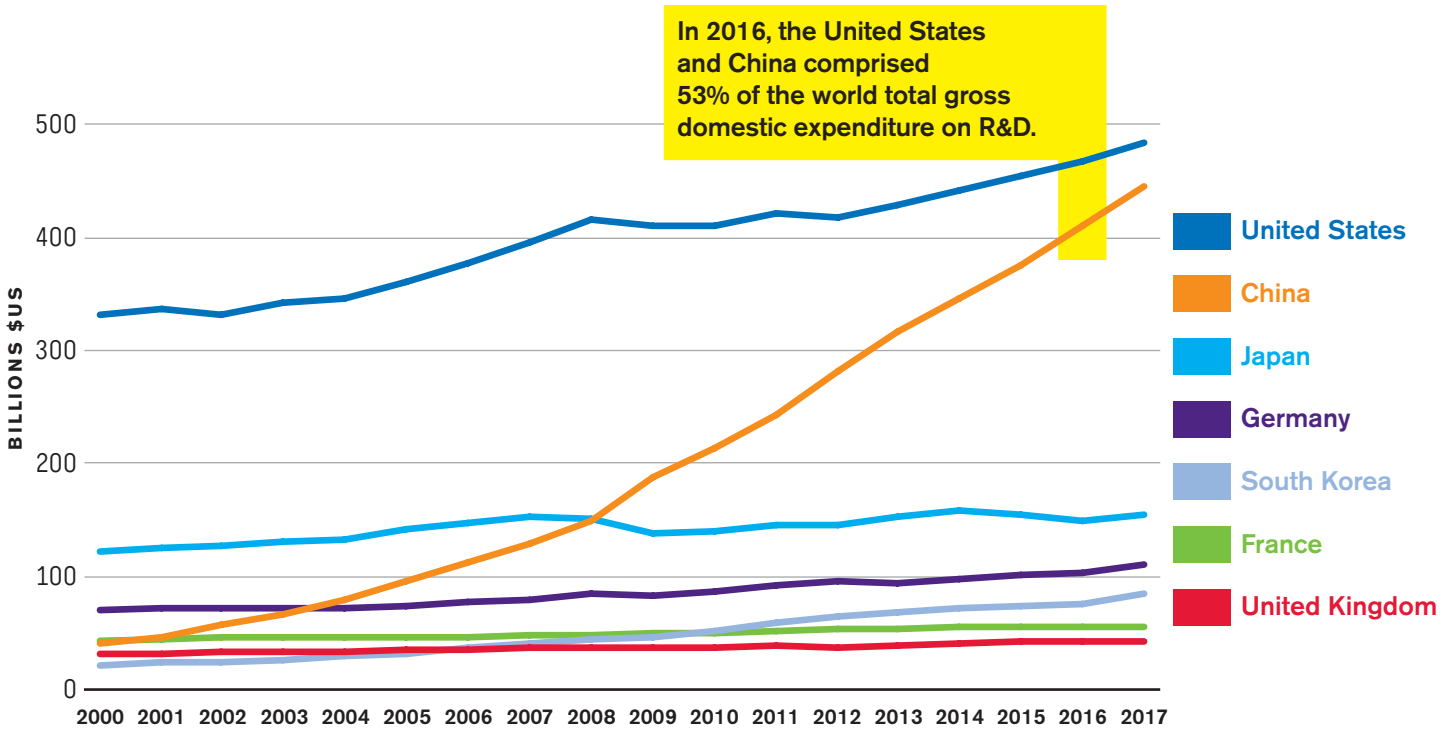
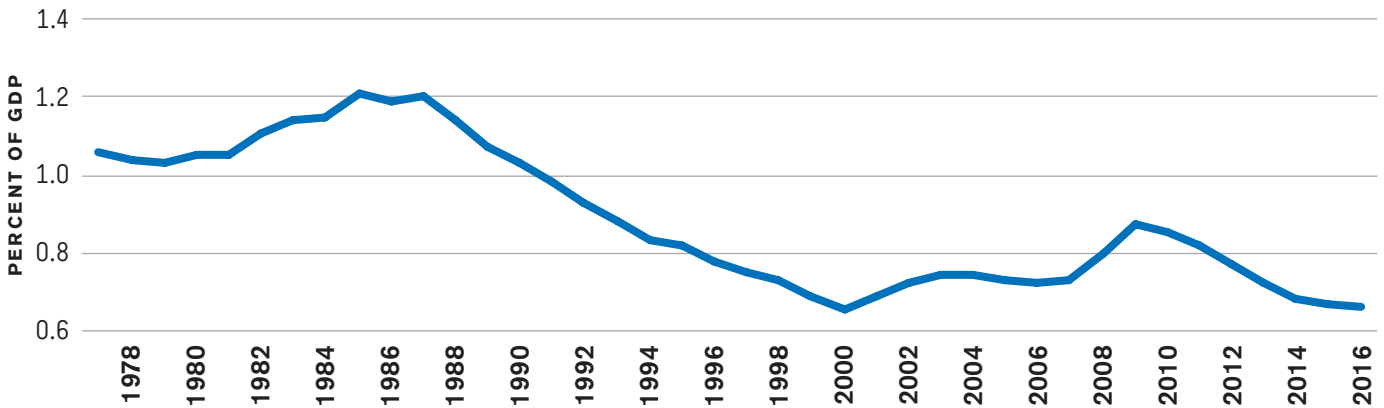


Figure 5. Federal Government Funding of R&D as Percent of Gross Domestic Product

Source: National Science Foundation





“Again, the Council on Competitiveness—through this National Commission and its ambitious agenda—is punching above its weight.”

Mr. Charles O. Holliday, Jr.
Chairman
Royal Dutch Shell plc

Pictured with Ms. Janet Foutty, Chair of the Board, Deloitte.

Additionally, China and other Asian countries, as well as the EU, are trying to set the global standards for a range of critical, future productivity-enhancing technologies—like artificial intelligence (AI). Whether it is China’s 2017 Next Generation Artificial Intelligence Plan or the EU’s AI Alliance, which met for the first time in June 2019, the race for innovation dominance is afoot. The nation that leads in AI development, application and deployment will lead to a massive global transformation of the economy, society, national security and culture. Despite significant U.S. strengths in a range of critical technologies, our government—in partnership with the private sector—must bolster knowledge and response capabilities for this new age of global competition in an age of disruption.



“With a \$20 trillion economy, a diverse population of over 330 million people, the United States is an incredible incubator of ideas. But it is also a nation of unequal opportunity. What we need is a ‘modernization model’—our Commission must be unbelievably creative in re-inventing America. We need to develop national innovation systems, not a single innovation system.”

Dr. Michael Crow
President
Arizona State University

Launch Overview



On Wednesday, August 7, 2019, the Council on Competitiveness formally launched the National Commission on Innovation and Competitiveness Frontiers, a multi-year flagship initiative to define a new path for innovation, productivity and prosperity for America and every American.

Under the leadership of the National Commission Co-Chairs—Dr. Mehmood Khan, CEO, Life Biosciences, Inc.; Dr. Michael Crow, President, Arizona State University; Mr. Brian Moynihan, Chairman and CEO, Bank of America; and Mr. Lonnie Stephenson,

International President, IBEW—the Commissioners and their designees, along with the Council team, will chart a path forward to implement a policy and action agenda for the United States to innovate and compete.

More than 35 CEOs, university presidents, labor leaders and national laboratory directors—National Commissioners—kicked off this new movement to develop the next generation of critical, actionable and measurable policy recommendations and private sector actions to bolster America's investments in talent, technology, innovation and infrastructure.



“The Commission’s concept paper and charter was meant to get feedback—it will change to reflect the dialogue and perspectives shared by Commissioners.”

Dr. Mehmood Khan
CEO
Life Biosciences, Inc.



Bottom: Mr. Brian Moynihan, Chairman and CEO, Bank of America; Mr. Chad Evans, Executive Vice President, Council on Competitiveness; Dr. Mehmood Kahn, CEO, Life Biosciences, Inc.; and Dr. Michael Crow, President, Arizona State University.

Mr. Lonnie Stephenson, International President, IBEW; and Dr. Keoki Jackson, Vice President and Chief Technology Officer, Lockheed Martin.

Throughout the launch event, Commissioners engaged in robust dialogue about the ways in which the Commission—through its organized Working Groups and Committees—would tackle emergent challenges and threats, and seize strategic opportunities at the heart of long-term competitiveness.

Commissioners emphasized the need specifically to create action-oriented measurable outcomes—not only policy recommendations—that the Council’s membership and affiliated constituencies could put into practice and track results. Of specific impor-

tance, Commissioners emphasized that their work must improve outcomes for all constituencies—business, labor, education, research, and consumers—for the outcomes to be successful.

The Commissioners endorsed the formation of three Working Groups to develop initial content, and policy research: Developing and Deploying at Scale Disruptive Technologies; Exploring the Future of Sustainable Production and Consumption, and Work; Optimizing the Environment for the National Innovation Ecosystem.



“A guiding principle for the commission is ‘innovation for all.’ We want to engage the public on how they think about innovation, learn how innovation can solve challenges, and then communicate the findings of our work back to them.”

Mr. Brian Moynihan
Chairman and CEO
Bank of America

To sustain the momentum from the Commission launch meeting, Commissioners will identify a strategic Advisor to represent their interests and perspectives, and vet policy recommendations coming from Working Groups. Additionally, an Outreach & Engagement Committee will support the National Commissioners and Council team in efforts to share and scale major findings.

Throughout 2019, Council staff will begin to populate the Working Groups and Committees, and continue building a digital collaboration platform to engage Commission stakeholders. On January 16, 2020, Commission Co-Chair Dr. Michael Crow will host a “Commission Community Launch Conference” to kick off the ongoing dialogues, research and reporting of the Groups, which will lead to sets of interim and final policy recommendations by the Commission.



“The Commission would serve the nation—the world—well by bringing converging sciences to solutions.”

Dr. Victor Dzau
President
National Academy of Medicine



Mr. Steve Rogers, Managing Director, Center for Consumer Insights, Deloitte; and Mr. Imran Sayeed, Senior Lecturer, Technological Innovation, Entrepreneurship, and Strategic Management, Massachusetts Institute of Technology.

Commission Structure

“We want to succeed at the benefit to—not at the cost of—others. This work of our National Commission is not a zero-sum game.”

Dr. Mehmood Khan
CEO
Life Biosciences, Inc.

The Commissioners will leverage the individual Working Groups and the cross-pollination of distinctive perspectives and recommendations. The Commission will maximize the efforts undertaken in the Working Groups, and the Outreach and Engagement Committee across several platforms including in-person Working Group sessions, and a virtual environment to collaborate within and across groups. Commissioners noted several opportunities and challenges associated with this multi-year effort. Of note, timing, metrics, and engagement were identified as critical drivers to advocate for accelerating U.S. competitiveness policy recommendations.

The Commission will convene twice a year: a physical meeting in late Spring or early summer, complemented by the opportunity also to convene alongside the Council’s annual National Competitiveness Forum in early winter. Focused initially along the thematic arcs of the three Working Groups, the Commission will guide and prioritize the most crucial talent, technology, innovation, and infrastructure investment in order to drive long-term economic growth, strength, sustainability and prosperity. The Commissioners, Advisors, and Working Group members will serve as representatives of the effort for innovation

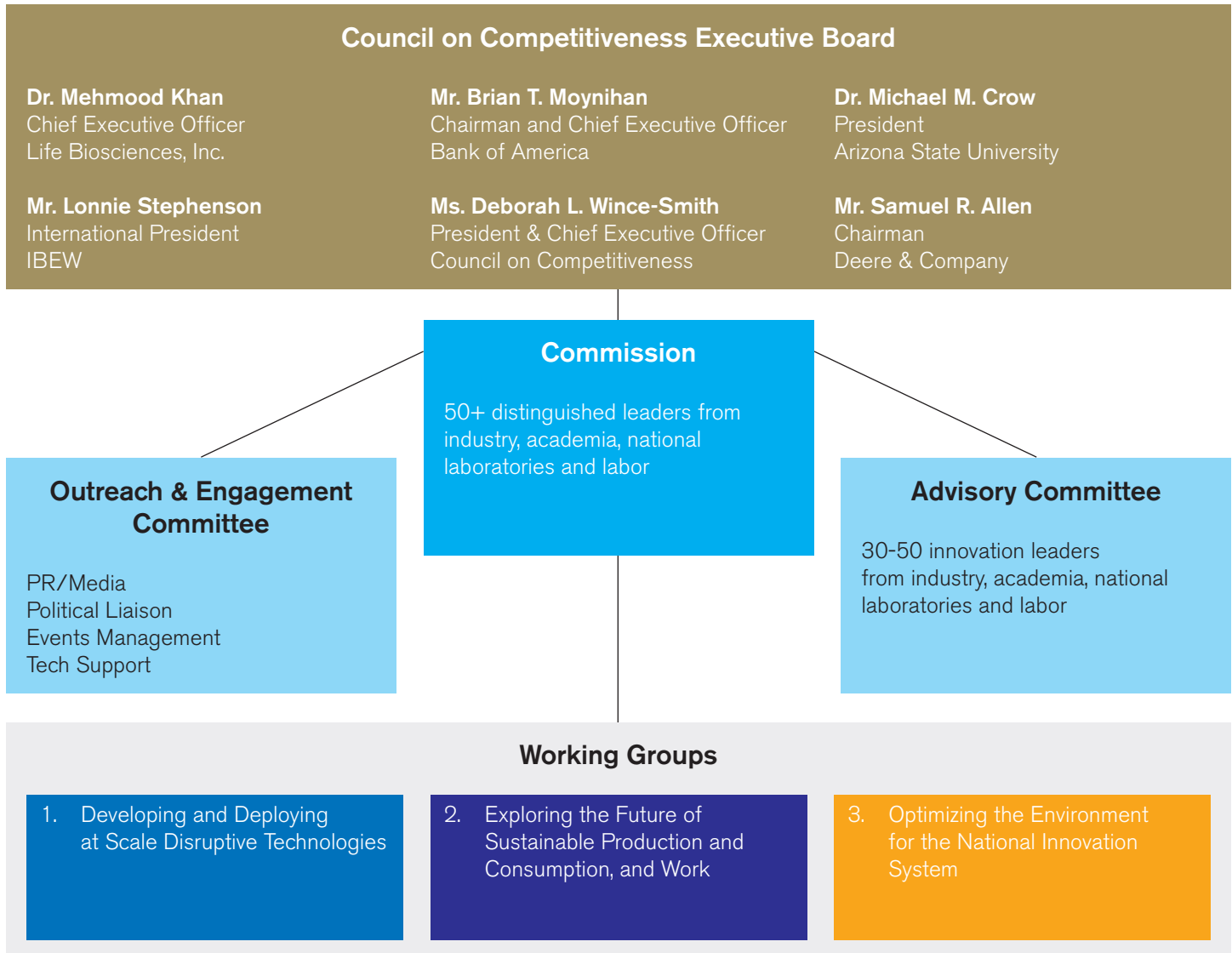


“The Commission must examine the impact of disruptive technologies on both consumers and companies.”

Ms. Janet Fouty
Chair of the Board
Deloitte

by not only contributing to final reports and statements but also actively participating in the dissemination of the Council’s policy recommendations.

The Commission’s Advisors will organize, filter and prioritize the recommendations emerging from the Working Groups—acting as a critical filter to help focus the impact of the Commissioners and Commission. The Advisors will develop the final set of reports and recommendations for debate and approval by the Commission and Council Board. The Working Groups will each consist of a diverse set of Com-



mission and Advisory Committee members, Council members, national affiliates and issue area experts who will meet in D.C. and across the country for moderated dialogues on relevant research issues in member fields, producing reports with recommendations for the Commission.

The Commissioners will also appoint an Outreach and Engagement Committee to envision and execute a comprehensive “go to market” strategy for the Commission’s findings and recommendations—while also helping to develop and manage the initiative’s media, outreach and government relations strategy.

Key Considerations

- The Commission will require more diversity of thought to represent more accurately the whole of U.S. labor. This includes diversity in demographics such as age, gender and race as well as underrepresented populations and industries. This is a recognized need not only for representation but also for new perspectives.
 - Working Group recommendations need to center on competitiveness, while also recognizing that any recommendations may have unintended consequences in potentially lowering competitive advantage or negatively impacting certain elements of the workforce.



“We need to bring in new, younger innovators who add distinctive expertise to the conversation and who think about things differently.”

Dr. Jonathan McIntyre
CEO
Motif FoodWorks, Inc.

- The pace of change across workforce skills, technology adoption and policy changes will need consideration. There was a concern that the multi-year Commission approach may not be timely enough to impact near-term policy changes. The Commissioners will charge the Outreach and Engagement Committee to help communicate initial findings throughout the Commission process.
- The Commission identified the need to examine the role of culture and the future of work in U.S. economic competitiveness. Consideration for workforce skills, retirement timelines in key sectors, alternative work arrangements, and public attitudes toward science and engineering should be incorporated into the Commission’s assessment.
- The Commission must be specific about the economic impacts to families and individuals of investments in research and development, physical infrastructure, natural resources, intellectual property, and industry and academic sectors.



“The Commission would benefit from having youth as a focus—both in terms of membership and policy recommendations.”

Dr. Gary May
Chancellor
University of California, Davis

- Multiple Commissioners noted the need for measures of success, clearly stated desired outcomes and structured approaches. Concurrently, there needs to be a plan to communicate these metrics and to what audiences. Of note:
 - Who are the decisionmakers to target for Commission recommendations, and how do we shape a compelling narrative that will encourage them to listen and act?
 - What is the dissemination strategy for the Commission’s findings and recommendations?
 - How do we develop public support for the Commission’s work?
 - Can we define, communicate and track measurable actions for the Commission’s recommendations—whether aimed at the public or private sector?



“We need to develop proposals and actions that can ‘move the needle.’ Which metrics do we want to influence, and which matter for the Commission?”

Dr. Steven Ashby
Laboratory Director
Pacific Northwest National Laboratory, and
Senior Vice President
Battelle



“The Council has shown its ability to have a great impact. The Commission must build on this strength.”

Dr. Michael Witherell
Laboratory Director
Berkeley Lab

Leading the Charge

The Commission is comprised of a cross section of leaders committed to enhancing and sustaining America's competitiveness by tackling real-world challenges.

At the onset of the Commission launch event, the Co-Chairs framed the challenges and opportunities the group would need to address—including those conveyed in the *Commission Work Plan* and *Working Group Charters*. The Co-Chairs reiterated that solutions and policy recommendations put forth by the Commission should follow some basic tenets.

- Examine challenges and opportunities from an ecosystem perspective inclusive of the broader economy. Do not address solutions from a purely technology-centric approach but, rather, leverage technology to democratize solutions. For example: linking the cost-benefit outcomes of agribusiness technology-enabled solutions that improve efficiency and productivity and their impact on consumers, healthcare systems and the environment.
- Create opportunities that uplift all stakeholders—business, labor, education, research, and consumers—and improve outcomes for broader segments of the population, especially for individuals who are at the lower end of the socioeconomic scale.
- Recall that success is universal, and the solutions that come out of this Commission should create mutual benefit for stakeholders and not privilege any one constituency over another.
- Stretch Commissioners' own thinking and understanding by working and contributing to topics and working groups outside areas of expertise, and seeking to challenge perspectives.

“If all we do is create greater wealth without expanding improved outcomes for broader segments of the population, we will have achieved nothing.”

Dr. Michael Crow
President
Arizona State University

This includes involving non-scientists in science and technology conversations and vice-versa to surface potentially overlooked, but valuable perspectives.

- Merely allocating more money to science and technology solutions, while necessary, is not sufficient to creating long-term competitiveness and prosperity.

In addition to Commissioners that represent industry, education, research, and labor, the concept of including another type of Commissioner—an artificial intelligence Commissioner—was raised as a way to leverage the very technologies the Commission seeks to understand and adapt as part of a competitiveness strategy. Throughout fall 2019, the Council staff will work with select Commissioners to understand better the nuances of adding an AI-enabled Commissioner and present a more developed concept to Commissioners at the December 2019 National Competitiveness Forum.



Dr. Mehmood Khan, CEO, Life Biosciences, Inc.; and Dr. Michael Crow, President, Arizona State University.



“This is going to be the most diverse workforce we’ve ever had—that’s our strength, and we should embrace that and consider how we can improve the diversity across our workforce.”

Mr. Lonnie Stephenson
International President
IBEW

Commissioners’ Opening Remarks

Following opening remarks by the Commission Co-Chairs, Commissioners shared how they viewed the work of the Commission as contributing to a greater goal of improving access to opportunities for all Americans to benefit from innovation and improved economic prosperity, productivity and competitiveness. Several themes emerged from Commissioners’ remarks.

The Commission must work to shift the way the United States thinks about innovation and competitiveness. This mindshift must guide us away from a narrow perspective of innovation and competitiveness, for example, of having a single geopolitical-specific focus or solely focusing on a bad actor or a single disruptive technology—to a broader perspective.

Focusing comparisons of innovation capacity and competitiveness solely on other global technology leaders creates a blind spot for the United States. Many smaller, often overlooked regions and nations have distinctive strategies to build global innovation competency and competitiveness. These alone may not pose a significant threat to the United States, but collectively those can manifest as a challenge to the U.S. economy and national security.

A critical aspect of better supporting and enabling U.S. innovation and technology infrastructure includes understanding and responding to threats from small and large, known and unknown competitors, that pose risk on a regional, national and international scale. This includes threats to our physical infrastructure, intellectual property, and cybersecurity, to avoid overlooking critical constraints that can cripple innovation.

The Commission needs to define its intended outcomes and set measures of success, then communicate these outcomes in a meaningful way to the public.



“The Commission should explore those things that give the nation more opportunities; that make the nation better, faster. What would be the innovation model to deliver such outcomes?”

Dr. Keoki Jackson

Vice President and Chief Technology Officer
Lockheed Martin

The policy recommendations coming out of this Commission should clearly convey the socioeconomic benefits to people and communities whose livelihoods are directly impacted by the recommendations that come out of this Commission. The Commission needs to put forth solutions that reduce or eliminate barriers for individuals on the low end of the socioeconomic scale to take advantage of opportunities. The Commission needs to ask tough questions about what it is trying to accomplish, for example:

- Do we know what we want to achieve—or enough of what we want to achieve—by 2030 to point toward the right outcomes?
- How do we build the ecosystem and associated components to achieve our stated outcomes?



“On cybersecurity, if we don’t address it as a group, a country, a world, we risk overlooking a critical constraint that could cripple our progress across all sectors.”

Mr. George Fischer

Senior Vice President and President, Global Enterprise
Verizon Business Group

- Do we want to continue with raw discovery or generate actionable solutions with roadmaps for implementation and evaluative metrics?
- What are measurable outcomes that we can use to track progress?

Many people perceive innovation as detrimental to their lives—for example, equating innovation with job-destroying automation. As a counter to these negative perceptions, the Commission needs to be mindful about how it discusses innovation, and present solutions as enhancements that improve equity and access to opportunities.

If we are not mindful about the ways in which innovation have an impact on the daily lives of Americans, the positive outcomes of the Commission’s recommendations may only be viewed by consumers as



“We should think about including an ‘AI Commissioner’ or ‘AI Advisor’—an AI-based system that can participate in the analysis of data—as an ongoing practice.”

Mr. Sridhar Sudarsan
Chief Technology Officer
SparkCognition, Inc.



“Productivity is a key metric that is not getting enough focus. Gallup identified education, healthcare, and housing as low productivity areas with increasing costs.”

The Honorable Deborah L. Wince-Smith
President & CEO
Council on Competitiveness

Pictured with Mr. Lonnie Stephenson, International President, IBEW.

posing a threat to one’s way of life or future opportunities. Along this line there is an educational component. We need to give people basic, good facts about why we need to innovate and change, otherwise, the message will not resonate.

Increasing citizen and public benefit access to research and tools of innovation is necessary to scale innovation efforts.

There is a notable distinction between the impact that innovation and technology has had on American lives in the past and present. A century ago, Americans had little knowledge of the forces that shaped their lives, but the democratization of technology has enabled people to be the forces that shape their lives as well as the communities in which they live and work.

As government-supported entities, national labs, research universities, and other non-profit research organizations have a duty to produce research for the public domain that can benefit U.S. innovation, research, and productivity in the private sector, and benefit all facets of America’s economy. Research carried out by and through national labs and universities has a public benefit purpose, and should improve the transfer of technology to the private and consumer sectors and better facilitate commercialization.

The Commission must inspire more inventive application of the tools of innovation to transform skills development.

The nature of work and learning is changing more rapidly—thanks to advances in technology, adaptive learning and artificial intelligence—than in the past



“If we don’t end up bringing all 300+ million Americans to the table, then efforts will be for naught, because our population is only a fraction of our competitors, such as India and China.”

Dr. Mark Becker
President
Georgia State University



“In education, we need to examine how learning links to earning and put innovative tools into the hands of individuals, as opposed to thinking mainly about systemic reform of established institutions.”

Mr. Andy Thompson
President and CEO
Proteus Digital Health

Pictured with Dr. James Clements, President, Clemson University, at right.

two centuries. To keep pace with the rapid changes, industry, education, research, and labor leaders must find innovative approaches to reskilling the workforce, and think critically about how to support individuals as they move to and through continuous education and training to remain prepared for a constantly changing nature of work. As part of a commitment to promulgating inclusive and equitable solutions, these should seek to close minority gaps that exist in the workforce, for example, gaps among educational outcomes to full employment for specific populations.

Improved outcomes must be equitable and felt by everyone for the Commission’s work to be deemed successful.

The Commission must ensure solutions provide citizens with equitable access to innovations that have the potential to shape individuals’ lives and their prosperity. There is an ethical duty proactively to examine and address risks—intended and unintended—to humans, the environment, and society, and communicate the benefits and risks to all stakeholders. For example, solutions that improve efficiency and productivity in healthcare should also account for the impact of the solution on equity, affordability and access for consumers.



“It is apparent that our STEM programs are not enough. Putting drawings down on paper is where innovation starts, and it is important that we [the arts] be where that innovation conversation starts.”

Dr. Elisa Stephens
President
Academy of Art University



“We need high-level analytics of Commission membership to understand gaps and to identify strategies to communicate better the value that science has on society.”

Dr. Paul Kearns
Laboratory Director
Argonne National Laboratory

The Commission must identify and support—or envision and suggest—efforts to enhance maximum creativity in U.S. innovation systems.

Innovation should be thought of broadly, involving not only science and technology, but also an appreciation for the role of art and design in science, technology, engineering and mathematics (STEM), and the fusion of liberal arts with science and technology. Innovation is about being as creative as possible in the process to develop and deploy novel concepts and ideas, so we should view technology as a tool that helps drive innovation, not merely as an outcome of innovation.

New public-private partnerships are key to reaping the benefits of new technologies.

The Commission must recognize that to improve partnerships, participants may have to re-prioritize their individual or organization’s interests independent of the partnership for the greater benefit of the partnership. Producing a workforce to meet future needs will require not just nation-wide partnerships. The Commission also should focus on partnerships at the regional level.



“New public-private partnerships are absolutely key to reaping the benefits of new technologies. We also need to make sure to reap the benefits and prosperity of technology advancements in the country.”

Dr. Patricia Falcone
Deputy Director for Science and Technology
Lawrence Livermore National Laboratory



“We need to gather data we know is available to explain the necessity of exploring change. We need to give people the basic, good facts about why we need to innovate and change, otherwise the message will not resonate.”

Dr. Robert Johnson
Chancellor
University of Massachusetts Dartmouth

Pictured with Dr. Marianne Walck, Deputy Laboratory Director for Science and Technology and Chief Research Officer, Idaho National Laboratory.

Working Groups

Following an overview of the Commission structure and opening remarks from Commissioners and the Co-Chairs, much of the discussion focused on the organization and scope of the Working Groups. In the first year of the Commission’s work, the Council will leverage three Working Groups to build a powerful set of recommendations to optimize U.S. innovation and competitiveness.

Each Working Group will study discrete issues, and produce interim and final reports for initial review by the Advisory Committee (and, ultimately, the Commissioners). These findings reports will form the basis of a set of ongoing reports and recommendations the Commission will release each year at the Council’s National Competitiveness Forum—but also at times relevant to the broader national dialogue around innovation.

The three Working Groups are:

1. Developing and Deploying at Scale Disruptive Technologies;
2. Exploring the Future of Sustainable Production and Consumption, and Work; and
3. Optimizing the Environment for the National Innovation System.

Working Groups will collaborate in-person and virtually to explore solutions and put forth policy recommendations for consideration by Commissioners. The Commission is building an online collaboration platform to drive this engagement and co-creation.

“We want to help foster a set of rules and build the foundation to ensure that innovation continues.”

Mr. Brian Moynihan
Chairman and CEO
Bank of America

Working Group 1—Developing and Deploying at Scale Disruptive Technologies

This group will map promising, strategic technology pathways to enhance productivity and economic growth for the United States, building off previous Council assessments (Figure 6). The group will work under the leadership of Council University Vice Chair, Dr. Michael Crow, president of Arizona State University.

Observations

- Common language and scoping are required to focus the working group towards actionable policy recommendations. The term “disruptive” can have multiple interpretations that may not address the breadth of implications of technology acquisition and adoption.
- Scalability and disruption must be considered from multiple perspectives: U.S. government investments, U.S. and international regulatory environment, industry leadership, academic

communities, and societal impacts. Scalability was identified as a highly dependent issue, either technologically or organizationally. Scalability may need to be understood within certain industries or public-private partnerships.

- Industry specific examples can provide insights into successful models of technology investments and public-private partnerships. The healthcare industry was identified as an example of regionally specific and national level models, as well as long-tail examples of investments in energy technologies converging in the last decade to move the United States from a net importer to net exporter of natural gas.

Recommendations

- Commissioners urged using more inclusive language concerning technology, including consideration of the social and ethical implications of technology applications. A potential Working Group name change was offered: “Developing, Deploying and Empowering Technologies Inclusively.”
- Disruptive technologies must be assessed in terms of the supply chain and global trade implications. Scaling to production is not the only factor; the Working Group should examine all barriers to growth and opportunities for success.
- The Commission should determine regional specific models as well as national level recommendations to inform a national strategy for innovation. The regional and national focus is important because labor markets tend to be regional based on localized industry sectors, talent pipelines, and consortia of public and private



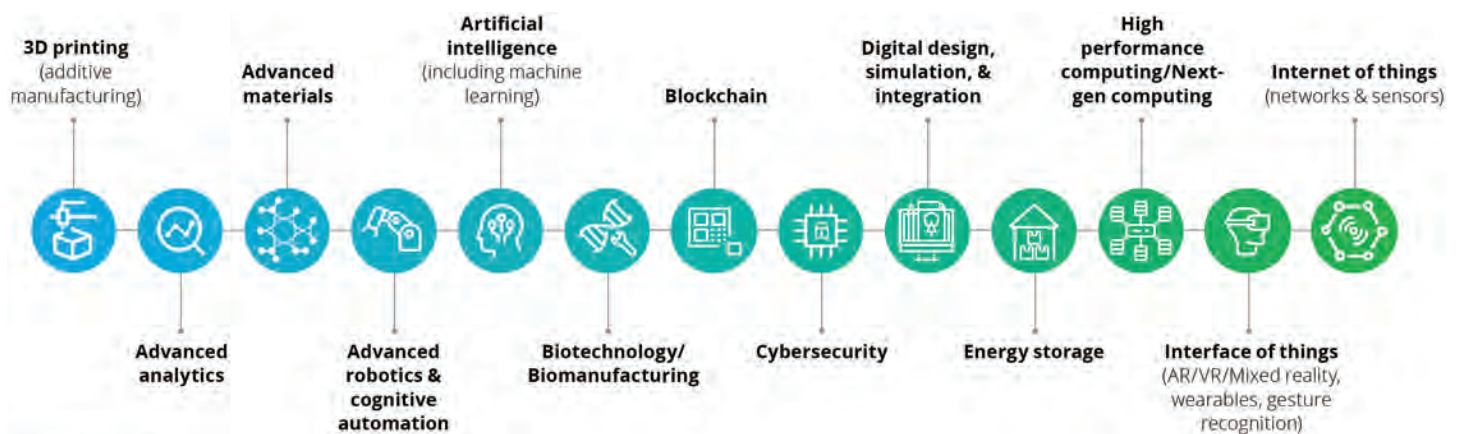
“Building strong relationships between our national laboratories, entrepreneurs and industry will drive innovation. That ought to be a goal for this Commission.”

Dr. Thomas Zacharia
Director
Oak Ridge National Laboratory

partners; the regional economies are critical drivers of a thriving national economy, but national politics and policies such as trade negotiations and tariffs directly impact regional economies as well. Strengthening regional and national economies could occur through the formation of new organizational designs or structures to maximize economic productivity and societal impacts.

Figure 6. A Snapshot of Exponential and Disruptive Technologies Driving Innovation

Source: *Exponential Technologies in Manufacturing, 2018*, Council on Competitiveness, Deloitte and Singularity University.



Working Group 2—Exploring the Future of Sustainable Production and Consumption, and Work

This group will examine the ever-evolving transformation underway in the production and consumption of goods, as well as the rapid evolutions unfolding across the American workforce. The group will work under the leadership of Council Chairman, Dr. Mehmood Khan, Chief Executive Officer, Life Biosciences, Inc., and Council Labor Vice Chair, Mr. Lonnie Stephenson, International President, IBEW.

Observations

- The broad categorization of sustainable production and consumption, and work may conflate how these issues are addressed and the recommendations that are put forth. As such a broad area, it may be fitting for subgroups to emerge within this working group.
- Different people interpret sustainability in many different ways. Therefore, the term needs adequate definition up front in the Commission's work. In the discussions, this referred to the ability to maintain and enhance one's quality of life, and includes resource consumption, business practices and production systems, not solely impacts on physical or natural ecosystems.
- The changing nature of work is deeply connected to the democratization of education. We must anticipate how the workforce will change, and how we prepare the workforce of the future and the institutions involved.
- The Commission's recommendations should produce sustaining, equitable, and sustainable solutions, but, how various stakeholders define these characteristics differs. Some Commissioners suggested the Commission should examine and coalesce around common definitions of these characteristics. For example, "What does it mean to be sustainable?"

“We are increasingly absorbed by an environmental crisis, and we are not overinvesting in sustainability, but underinvesting; it is important to recognize that.”

Mr. William Bohnett
President
Whitecap Investments LLC

Recommendations

- The group should remain cognizant of up- and down-stream impacts of solutions, that is, solutions aimed at regulatory relief to provide faster time-to-market pathways for otherwise highly regulated products such as medical devices and pharmaceuticals could have disastrous effects on consumers. Another scenario in which the up-stream effects might be felt is the lack of alternative credentialing pathways outside of degrees that lead to full employment in high-demand fields in manufacturing, energy, and skilled trades sectors.
- The Commission should prioritize fundamental areas of concern for the group to explore so as to avoid trying taking too much on at the risk of overextending the available resources; this could lead to numerous solutions or policy recommendations with little in the way of implementation or advocacy resources to see the recommendations through to changes to policy and practice that yield measurable, reportable results.

Working Group 3—Optimizing the Environment for the National Innovation Ecosystem

This group will explore ways to optimize the entire system in which the nation's innovators and enterprises operate—from capital costs, intellectual property, standards and regulations, etc.—and examine the critical roles the private sector, and local, state and federal governments must play. The group will work under the leadership of Council Industry Vice Chair, Mr. Brian Moynihan, Chairman and CEO, Bank of America.

Observations

- Need to identify a specific roadmap with attributes of an optimized environment that provides competitive advantage. Because the innovation landscape is so broad, yet interconnected, what does competitive advantage look like across industries and geographies, as the resources and investments needed to sustain such an advantage will vary greatly?
- The Commission will need to recommend employment of different levers to achieve desired economic outcomes based on particular inputs and environmental factors; not all levers need activation all of the time. These levers may be the enactment of new policies or the enforcement of existing policies that can be used to impact trade, foreign investment, regulatory relief, or the use of tax incentives to spur private-sector investment in human capital or physical infrastructure. For example, different levers are needed to spur bigger versus faster change, or operate within a current versus new system. Importantly,



“It is hard to win the big global challenges as a company alone—we must, as a nation, embrace both competition and collaboration.”

Dr. René Lammers
Chief Science Officer
PepsiCo, Inc.

changes to a venture capital or a government funding model could have lasting implications on intellectual property protection.

- With such a broad concept of a national innovation ecosystem, there is a concern that too much focus on creating a singular system could cause us to lose sight of key innovation levers contained within the broader system or that could be applicable to one segment of the economy. It was suggested that we examine creating multiple innovation systems.
- National laboratories are hindered by not being able to leverage funding to bridge research deserts where little investment is available for exploration; this is however an opportunity for research universities and community-based organizations to explore and prototype solutions and share the outcomes with the broader community. This leaves the United States lagging behind other countries which have significantly different research funding streams and rules.
- The U.S. innovation ecosystem is experiencing a greater concentration of venture capital originating from foreign investors, raising concern that value and intellectual property generated through growth will not be captured domestically. Furthermore, malicious actions from independent and national actors are draining intellectual property. Protection of U.S.-funded and industry-developed IP from theft will be critical.

Recommendations

- One of the drivers of innovation is government regulation. Even if regulatory reform or guidance is not in our recommendations, it should inform our thought process.
- A potential downfall of the Commission could be the atomization of recommendations (recommendations that are too narrow) which can take significant time to develop and process.
- Find a way to incentivize large companies to invest in or support (buy from) startups as a lever to support continued R&D and bring new technologies to scale.
- Optimize a key U.S. innovation asset—its venture capital system—to solve hard problems via its culture of matching multidisciplinary technologies and applying diverse, data-driven financial tools. And, support the full stack investor capability concept, motivating new companies to progress from concept to commercial impact via a coordinated “stack” of tools (technological and financial).

“We are entering a very critical time of global climate change and resource scarcity. To solve these problems, venture capitalists need to stimulate bold action on innovation comprising a broad-based movement of coordinated vectors of technology, financial tools, regulatory action and entrepreneurial/corporate/university/labor networks.”

Mr. Thomas Baruch
Managing Member
Baruch Future Ventures

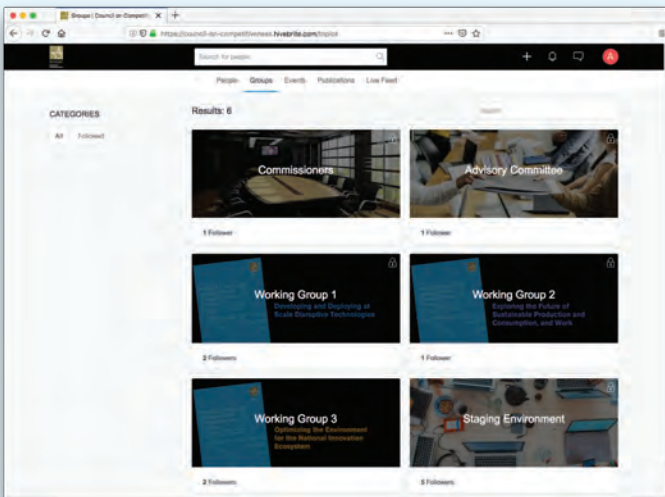
Online Portal

The Council will launch an online collaboration and engagement platform to support the development, curation and propagation of policy recommendations in support of the National Commission on Innovation and Competitiveness Frontiers. The platform will debut at the January 2020 Advisory Committee and Working Group launch conference at Arizona State University.

An innovation tool to support the creative process of the Commission, the online platform will be a collaborative space for Commissioners, Advisors, communications strategists, and Working Group members to research and engage in dialogue. The collaboration platform will facilitate virtual, ongoing discussions with these stakeholders; become a nexus for the sharing of background research, resources and publications; and disseminate information across various Commission constituents.



Mr. Chad Evans, Executive Vice President, Council on Competitiveness, explains how the National Commissioners, Advisors, communications experts and Working Group members will collaborate in a facilitated online platform.



Conclusion

Throughout the launch event, Commissioners raised several broad themes that would cut across all aspects of the initiative, which should also be evident throughout the policy recommendations suggested by the Working Groups. For example:

Restructuring the American Innovation System:

A dominant theme in the launch of the Commission was the repeatedly articulated need to reshape the nation's innovation system. In an increasingly globalized economy, nearly every city, region and nation is vetting the same technologies, the same “ecosystems” to drive innovation-based prosperity. To compete in the future, the United States must innovate faster, at a bigger scale, and more. And the country must democratize innovation beyond traditional centers of gravity like Silicon Valley.

Providing Value to All Stakeholders in the U.S. Economy:

Commissioners stated the importance of ensuring the outcomes of the policy recommendations are equitable and provide value for all stakeholders who both drive innovation and who feel the impacts of innovation. As Working Groups and Advisors research and evaluate policy recommendations for consideration by the Commissioners, they must develop these with the public benefit in mind.

Focusing on Outcomes and a Market-Driven Approach:

A critical point that dominated the conversation was the need for the Commission to remain focused on the outcomes of their work—identifying, measuring and reporting on metrics of success for intended outcomes. Following an outcomes-focused and market-driven approach will improve the chances of success for specific Commission activities or recommendations. This outcomes focus will also help the Commission communicate clearly its goals and improve accountability.

“How will we measure the success of our Commission in five years? First, we will see new activation energy from new actors at the local, state and national levels supporting innovation-enhancing investments. Second, we will have found ways to replace the status quo innovation model.”

Dr. Michael Crow
President
Arizona State University

Better Communicating the Power and Benefits of Innovation for All:

How the Commission communicates its purpose and work—and the outcomes it attempts to achieve—will be critically important to gaining buy-in from all sectors of U.S. society. This is especially true for communicating the benefits and changes that innovation will have on consumers and workers, so they can see the positive impacts innovation can have on their lives. Innovation may be perceived as threatening to Americans who view themselves as passive beneficiaries of innovation outcomes driven by national organizations, so demonstrating the “value for all” will be critical to success.

Preparing American Workers for the Future of Innovation-Based Work:

The Commission must fundamentally outline and develop pathways to innovation-based prosperity for every American. This will mean helping everyone to understand the future of work and to deal with high levels of uncertainty, turbulence, transition and transformation.



“The National Commission must create a narrative—tell a compelling story—as to why innovation matters to everyone. Telling a story is essential to our work.”

Dr. Edward Ray
President
Oregon State University



“We need to focus not on the negative side of social disruption that comes from innovation. Rather, we need to focus on how we mitigate social disruption.”

Dr. Pradeep Khosla
Chancellor
University of California, San Diego

Next Steps

Following the August 7, 2019, Commission launch event in Washington, D.C., the Council will sustain this momentum—virtually and in-person—for Commissioners and their Advisory Committee, Working Group, and Outreach & Engagement Committee designees to collaborate on research, policy discussions and recommendations, and dissemination strategies.

Important Council and Commission meetings already slated for 2019 and 2020 include:

- The Council on Competitiveness National Competitiveness Forum, December 17-18, 2019 in Washington, D.C. This is the Council's annual meeting in which the Commission will be the central organizing theme.
- The Commission's "Advisors, Communications and Working Group Launch Conference" January 16, 2020, at Arizona State University—the first key gathering of Commissioner-supporting leaders.
- The 2nd Annual National Commission Meeting, June 15-16, 2020 in Washington, D.C. This will be the next official Commission meeting following the August 2019 launch.
- The Council on Competitiveness National Competitiveness Forum, December 16-17, 2020, in Washington, D.C. The NCF will be a key platform for sharing Commission Year 1 results.



- Recruit Commissioners
- Develop WG Charters
- Launch Commission

Summer 2019

- Recruit Advisors, Outreach and Engagement Committee, WG Members
- Host Commission Community Briefing Webinars
- Build out beta of Community online portal

Fall 2019 and Winter 2020

- Host WG dialogues
- Solicit feedback on interim WG findings
- Plan annual in-person Commission meeting

Spring 2020

- Disseminate year 1 Commission findings and policy recommendations

Fall 2020

Agenda

MORNING

9:15 Welcome

The Honorable Deborah L. Wince-Smith
President & CEO, Council on Competitiveness

9:30 Opening Remarks by National Commission Co-Chairs and Roundtable Self-Introductions

Dr. Mehmood Khan
Chief Executive Officer, Life Biosciences, Inc.
Chairman, Council on Competitiveness

Dr. Michael Crow
President, Arizona State University
University Vice Chair, Council on Competitiveness

Mr. Brian Moynihan
Chairman and CEO, Bank of America
Industry Vice Chair, Council on Competitiveness

Mr. Lonnie Stephenson
International President, IBEW
Labor Vice Chair, Council on Competitiveness

11:00 Review of National Commission Structure

Kick-off Discussant:

Dr. Mehmood Khan
Chief Executive Officer, Life Biosciences, Inc.
Chairman, Council on Competitiveness

Objectives:

- Discuss Commission structure & identify additional industry leads
- Review duties of Commissioners, Advisors, Working Groups, et al.
- Charge Commissioners to appoint Advisors & Working Group participants

AFTERNOON**12:00 Working Lunch****12:30 National Commission: Foundation, Tools, Timeline****Kick-off Discussant:****Mr. Chad Evans**

Executive Vice President, Council on Competitiveness

Objectives:

- Review Council's innovation history
- Review draft management timeline
- Review key dates
- Preview online Commission collaboration platform
- Review Working Group Charters and discuss issue responsibilities

A. Developing & Deploying at Scale Disruptive Technologies**Kick-off Discussant:****Dr. Michael Crow**President, Arizona State University
University Vice Chair, Council on Competitiveness**B. The Future of Sustainable Production and Consumption, and Work****Kick-off Discussants:****Dr. Mehmood Khan**Chief Executive Officer, Life Biosciences, Inc.
Chairman, Council on Competitiveness**Mr. Lonnie Stephenson**International President, IBEW
Labor Vice Chair, Council on Competitiveness**C. Optimizing the Environment for the National Innovation System****Kick-off Discussant:****Mr. Brian Moynihan**Chairman and CEO, Bank of America
Industry Vice Chair, Council on Competitiveness

3:00 Other Key Commission Elements: Advisors, Outreach Subcommittee, Honorary Committee

Kick-off Discussant:

Mr. Chad Evans

Executive Vice President, Council on
Competitiveness

Objectives:

- Explain objectives
- Discuss potential members
- Discuss communication goals/strategy for the
National Commission

3:45 Open Discussion

Kick-off Discussant:

Dr. Mehmood Khan

Chief Executive Officer, Life Biosciences, Inc.
Chairman, Council on Competitiveness

Objectives:

- Opportunity for additional comments and
questions from Commissioners

4:30 Approvals and Adjournment

Dr. Mehmood Khan

Chief Executive Officer, Life Biosciences, Inc.
Chairman, Council on Competitiveness

Dr. Michael Crow

President, Arizona State University
University Vice-chair, Council on Competitiveness

Mr. Brian Moynihan

Chairman and CEO, Bank of America
Industry Vice Chair, Council on Competitiveness

Mr. Lonnie Stephenson

International President, IBEW
Labor Vice Chair, Council on Competitiveness

Objectives:

- Approve Commission structure; management timeline; Working Group Charters, including any changes agreed to during meeting. Council on Competitiveness to circulate any amended documents
- Approve additional recruitment activities
- Approve plan to engage Commissioners in December 18, 2019 National Competitiveness Forum
- Approve plan for a Working Group launch conference in early 2020
- Tentative agreement/approval on timeframe for 2020 Commissioners Meeting

August 7, 2019, Meeting Participants

Dr. Mehmood Khan, Co-chair

Chief Executive Officer
Life Biosciences, Inc.
Chairman
Council on Competitiveness

Dr. Michael Crow, Co-chair

President
Arizona State University
University Vice Chair
Council on Competitiveness

Mr. Brian Moynihan, Co-chair

Chairman and Chief Executive Officer
Bank of America
Industry Vice Chair
Council on Competitiveness

Mr. Lonnie Stephenson, Co-chair

International President
IBEW
Labor Vice Chair
Council on Competitiveness

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Director
Pacific Northwest National Laboratory

Dr. Dennis Assanis

President
University of Delaware

Mr. Thomas Baruch

Managing Member
Baruch Future Ventures

Dr. Mark Becker

President
Georgia State University

Mr. William Bohnett

President
Whitecap Investments LLC

Dr. James Clements

President
Clemson University

Dr. Victor Dzau

President
National Academy of Medicine

The Honorable Patricia Falcone

Deputy Director for Science and Technology
Lawrence Livermore National Laboratory

Mr. George Fischer

Senior Vice President and
President, Global Enterprise
Verizon Business Group

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Royal Dutch Shell plc

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Vice President and
Chief Technology Officer
Lockheed Martin

Dr. Robert Johnson

Chancellor
University of Massachusetts Dartmouth

Dr. Paul Kearns

Director
Argonne National Laboratory

Dr. Pradeep Khosla

Chancellor
University of California, San Diego

Dr. René Lammers

Chief Science Officer
PepsiCo, Inc.

Dr. Gary May

Chancellor
University of California, Davis

Dr. Jonathan McIntyre

CEO
Motif Ingredients

Gen. Richard Myers

President
Kansas State University

Dr. Edward Ray

President
Oregon State University

Dr. M. David Rudd

President
University of Memphis

Dr. Kirk Schulz

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Washington State University

Dr. Elisa Stephens

President
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Proteus Digital Health

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Idaho National Laboratory

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Chancellor
University of California, Riverside

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President & CEO
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Director
Lawrence Berkeley National Laboratory

Dr. Thomas Zacharia

Director
Oak Ridge National Laboratory

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Co-Founder and Chief Investment Officer
Life Biosciences, Inc.

Mr. William Eggers

Executive Director, Center for Government Insights
Deloitte

Mr. Craig Giffi

Vice Chairman, US Automotive Industry Leader
Deloitte

Mr. Stuart Hadley

Chief of Staff and
Associate Vice President
Arizona State University

Dr. Dariush Mozaffarian

Dean, Friedman School of Nutrition Science &
Policy
Tufts University

Mr. Steve Rogers

Managing Director, Center for Consumer Insights
Deloitte

Mr. Imran Sayeed

Senior Lecturer, Technological Innovation,
Entrepreneurship, and Strategic Management
Massachusetts Institute of Technology

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Executive Vice President

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Vice President

Ms. Carol Ann Meares

Special Advisor

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(as of December 1, 2019)

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President
Arizona State University, and
University Vice-chair
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About the Council on Competitiveness

For more than three decades, the Council on Competitiveness (Council) has championed a competitiveness agenda for the United States to attract investment and talent, and spur the commercialization of new ideas.

While the players may have changed since its founding in 1986, the mission remains as vital as ever—to enhance U.S. productivity and raise the standard of living for all Americans.

The members of the Council—CEOs, university presidents, labor leaders and national lab directors—represent a powerful, nonpartisan voice that sets aside politics and seeks results. By providing real-world perspective to Washington policymakers, the Council's private sector network makes an impact on decision-making across a broad spectrum of issues from the cutting-edge of science and technology, to the democratization of innovation, to the shift from energy weakness to strength that supports the growing renaissance in U.S. manufacturing.

The Council's leadership group 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.

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