



**Compete.**

Council on  
Competitiveness

2015 Science and Technology in Society (STS) *forum*

# Reflections and Findings from the STS *forum* and Primer

October 2015

**THE COUNCIL ON COMPETITIVENESS** has developed this report with the support of Lockheed Martin.

The **COUNCIL** is a nonprofit, 501 (c) (3) organization as recognized by the U.S. Internal Revenue Service. The Council's activities are funded by contributions from its members, foundations, and project contributions. To learn more about the Council on Competitiveness, visit [www.compete.org](http://www.compete.org).

On October 4-7, 2015 in Kyoto and Tokyo, Japan, Lockheed Martin Leadership participated in the 12th Annual Meeting of the STS *forum*.

The STS *forum* is a global movement of top leaders from different constituencies to discuss science and technology issues from the long-term viewpoint of humankind.

The STS *forum* was established to solve a challenging conflict: reconciling the interplay of science and technology in contributing to rising living standards and economic development, alongside understanding S&T's role in addressing a rise in truly global problems.

In 2015, Lockheed Martin leadership participated in a series of engagements in the context of the STS *forum*.

**2015 Science and Technology in Society (STS) *forum***

# Reflections and Findings from the STS *forum* and Primer

October 2015



## Table of Contents

Arc of the 2015 STS <i>forum</i>	4
CTO Meeting—Sunday, 4 October	5
Science and Technology in Business Management and Strategy Plenary Session—Monday, 5 October	8
Background and Prep Material for Lockheed Martin Leadership Team	11
Sunday, 4 October, Kyoto	12
Monday, 5 October, Kyoto	15
Tuesday, 6 October, Tokyo	32

# Arc of the 2015 STS *forum*

## **Sunday, 4 October—Kyoto**

12:20-1:50 p.m. CTO Meeting  
Dr. Keoki Jackson

## **Monday, 5 October—Kyoto**

12:30-1:10 p.m. U.S. Participants Power Lunch  
Mr. Rod Makoske and Dr. Keoki Jackson

4:50-6:00 p.m. “Science and Technology in Business Management  
and Strategy” Plenary Session 204B  
Dr. Keoki Jackson

## **Tuesday, 6 October—Tokyo**

7:00 p.m. Special Dinner  
Mr. Rod Makoske

# CTO Meeting

## Sunday, 4 October

### Opening Remarks

Kicking off the 3rd consecutive meeting of the STS *forum* “CTO Meeting”, 2015 co-chairs provided introductory and framing remarks in advance of the gathered CTOs engaging in a set of moderated table conversations over lunch.

STS *forum* founder and chair, Koji Omi, opened the lunch, thanking participants, noting the criticality of an annual network event for global CTOs, and introducing the lunch’s two co-chairs: Dr. Keiji Kojima, Vice President and Executive Officer, CTO and General Manager of Research and Development Group, Hitachi, Ltd.; and, Dr. Elias Zerhouni, U.S. Science Envoy; President, Global R&D, Sanofi.

Dr. Kojima focused his opening remarks in three areas—and asked participants to think about their ensuing conversations in these terms:

1. CTOs are at the center of the global debate and action around energy/environment.
2. Industry cannot solve regional, national and global challenges in traditional ways. He noted that “open innovation” (OI) efforts going beyond corporate walls is increasingly important.
3. Echoing the themes from the 2013 and 2014 CTO Meetings, Dr. Kojima outlined his vision of the modern CTO:
  - Leading corporate innovation for growth.
  - Managing internal technology development.
  - Overseeing the “control tower”—to promote OI, while balancing with internal R&D and innovation efforts.
  - Creating new opportunities for internal and external collaborations to drive long-term innovation.

Dr. Zerhouni supported Dr. Kojima in noting the rise of complex, converging global networks of innovation—focusing on a range of social, economic and political challenges—and made the case that the role of the CTO was central in cultivating and strengthening these networks.

Dr. Zerhouni charged each of the four CTO tables to consider the role of OI in driving new value creation—as well as in addressing the “lights and shadows” of science and technology, as articulated by STS *forum* Chairman Omi. In particular, he challenged participants to think about four key questions:

1. Open innovation: is this “real” or just a trend?
2. How is OI having an impact on your industry, firm and role as a CTO?
3. What is driving—or impeding—OI?
4. What opportunities does OI present for your enterprise and industry—and society as a whole?

### Table Summary Reports

#### Table A

Table A participants identified 10 key attributes of OI.

1. OI is more relevant for basic research.
2. OI has particular relevance in addressing large, global, cross-cutting problems.
3. OI has relevance for problems that are common to industries—problems in a pre-competitive state.
4. OI has a role to play in helping firms cross various “valleys of death” in the design, development and production continuum.



5. OI benefits from the interaction of inter- and intra-company innovation activities.
6. OI engages customers.
7. OI perhaps more critical for rapidly changing industries—like information and communications technologies—and less critical for capital intensive industries.
8. OI does not benefit from a focus by corporations on short-term profit motivations.
9. OI supports vision-driven innovation.
10. OI resonates with a new generation of researchers and workers attuned to idea sharing, digital environments, i.e. the “maker generation.”

#### **Table B**

Table B participants focused on three issues: OI, intellectual property and—for most of the time—on the role of the CTO.

With regard to the role of the CTO, participants noted that they need to make technology risks across an enterprise—and to be aware of disruptive technologies and the potential impacts of these disruptions on existing business models. Another critical role for the CTO remains talent identification, attraction and retention. Ultimately, the CTO creates the technology and infrastructure base for an enterprise’s long-term innovation capacity and capability.

Participants noted in passing that OI is a complex spectrum of activities; but, in the end, perhaps a most critical issue for CTOs to address is balancing valid intellectual property concerns with speed to market and speed to value creation. This imperative might challenge traditional notions of IP.

### Table C

Table C's participants argued that OI is a "must-do"—and not just for singular enterprises but also for their entire supply chains. In pursuing this imperative, OI will be a new business generator. And, echoing Table B, participants here noted the criticality of "getting right" the balance of IP across different industry sectors.

### Table D

Table D's participants argued that the non-linearity and complexity of today's global challenges necessitates open innovation. And this OI has to incorporate "shared costs" and facilitate speed to market. Elaborating on the comments from the other three tables, Table D notes that the "domain of the CTO" is widening, the activities and timelines under the CTO's purview are increasing, and the scope of the CTO's responsibilities are growing.

## CTO Meeting Summary

Dr. Zerhouni summarized his thoughts and provided overarching observations from the CTO Meeting, focusing on 3 major "dimensions."

First, Dr. Zerhouni focused on the dimension of "maturity."

1. OI appears to be more important earlier in the innovation process than later.
2. OI appears to be particularly helpful and fruitful in the pre-competitive space—and less so for firms focusing on infrastructure development and or that are capital intensive in nature.

The second dimension focused on the role of the CTO—and "vision versus execution."

1. The CTO is not just an in-company technology manager.
2. The CTO has to go both "wide and deep"—and know not only his own enterprise's technology portfolio but also those of competitors and other companies.
3. The CTO must align vision and execution—generate 5-10 percent "crazy ideas" and make them happen internally both by: tapping deep knowledge, as well as integrating across areas of expertise.

The third dimension is "time."

1. Can CTOs use OI to improve risk investment?
2. Can CTOs leverage OI to provide solutions—not just products?

# Science and Technology in Business Management and Strategy Plenary Session

## Monday, 5 October

This session focused on how chief technology and science leaders in companies define an innovation and technology strategy in a changing technology environment—and how they encourage (“impulse”) paradigm changes through the use and application of disruptive technologies.

Plenary participants reflected on their personal and organizational perspectives, and focused on the following topics:

- Open innovation
- Crowd innovation
- Big Data’s role in changing business models
- New processes from design to manufacturing
- New business models and regulation
- The role of public-private partnerships to address large-scale/global grand challenges

In the context of opening the panel, chair Mr. Pascal Colombani, Chairman of the Board of Valeo, and Vice Chairman of the French Nuclear National Research Strategy Council, argued that the world faces a new industrial revolution characterized by, among others, the following trends:

- The emergence of Big Data linked to manufacturing.
- The increasing decentralization of energy development and provision.
- The development and deployment of new materials—making things possible today that previously were not possible.

A major challenge for chief technology officers and business leaders is forming strategy to take advantage of these trends.

Colombani notes that the solution for CTOs—and their enterprises in general—lies with more innovation and a better transfer between upstream research and productization.

Following his opening statements, session chair Colombani called on each of the session panelists to provide remarks addressing the key session topics.

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

Thanking the session chair, as well as STS *forum* Chairman Omi, Dr. Jackson kicked off his remarks noting that innovation is at the heart of Lockheed Martin’s (LM’s) business strategy—but that current innovation models may not be sufficient to maintain competitive advantage over the long term.



In thinking through LM’s priorities, Dr. Jackson uses three key “frames” to understand and shape LM’s innovation strategy: complexity, velocity and non-linearity.

- Complexity—today’s technology landscape is multinational, global and intersecting.
- Velocity—the pace of innovation is ever-accelerating.
- Non-linearity—the outcome of ubiquitous connectivity is exponential change in technology outcomes and innovation potential.

Within this framework, Dr. Jackson contends the role of the CTO must encompass three core “tasks”: creation, integration and anticipation.

- **Creation**—CTOs must develop an aligned business and technology strategy. For example, LM is deeply engaged in the National Network for Manufacturing Innovation institutes (NNMI) in the United States. The technologies and resulting innovations that will emerge from this pre-competitive research platform will accelerate LM's own product and service creation for the marketplace. At the same time, aligning LM's business strategy to this tech development platform will add value to other core business interests: building a talent pipeline; better engagement and collaboration with key customers and partners; etc.
- **Integration**—CTOs have a responsibility to develop and deploy tools to drive business excellence. For example, LM's "digital tapestry" is a set of digitally-based tools to integrate a range of LM capabilities to deliver value to customers and society.
- **Anticipation**—CTOs now have a role in examining and leveraging the increasing democratization and systematization of innovation systems globally. However, the CTO must balance self-disruption with external disruption.

### **Dr. Anatoly B. Chubays**

Chairman and CEO  
RUSNANO

Dr. Chubays focused his remarks on the globally transformative effects of developing and deploying new, advanced materials—with a particular focus on the ensuing effects on climate change (and mitigation).



Chubays made the case for the need to "innovate around" the fact that 28 percent of all greenhouse gas emissions coming from the manufacturing, transportation and storage of basic materials—and moving beyond "clean energy" to smart, "clean materials." In essence, Chubays lobbied for a new approach in innovation and business strategy centered on the confluence of clean materials PLUS clean energy.

### **Mr. Olivier Piou**

CEO  
Gemalto

Mr. Piou shared his thoughts around obsolescence—and what he thinks are both challenges and opportunities for his business and industry.

- Digitalization
- Low-cost—not cheap. He envisions pushing for his customers to do more in the product/service creation process to drive down his costs.
- Increasingly democratized production.
- Continued search for inspiration—e.g., bio-mimicry.



### **Dr. Ed Hays**

SVP and CTO  
The Coca-Cola Company

Dr. Hays made that point that science and technology has a direct impact on Coca-Cola's strategy—and that adopting innovation is at the core of Coca-Cola, noting the thousands of product innovations in more than 200 countries.



Hays noted that R&D is in the “DNA” of Coca-Cola—and that it is tightly linked to consumer needs. For example, transformational efforts in modernization and miniaturization have come about through engagements with customers. In addition, S&T collaboration outside the Coca-Cola wall is critical—and not just in traditional settings like start-ups and universities. Coca-Cola finds leveraging work in adjacent industries is also critical for long-term innovation capacity and competitiveness.

### **Ms. Susana Quintana-Plaza**

SVP

Technology & Innovation,  
E.ON

Ms. Quintana-Plaza's major point is that defining strategy in an innovation environment in which speed is the most critical factor is difficult. And potentially impeding the ability to move fast and innovate to meet customer needs are traditional notions surrounding intellectual property rights.

Provocatively, Ms. Quintana-Plaza takes her industry—energy—as a mini case study in arguing that establishing any long-term innovation strategy is useless. She contends, for example, that the energy space is now totally democratized—with zero dollars now needed to be an energy producer.

What will matter in the long-term for CTOs and businesses: human capital within and without the organization; data and knowing everything about your customers; and agility in the workplace.



### **Dr. Mauro Varasi**

CTO

Finmeccanica SpA

Dr. Varasi's perspective on innovation generation is that of a “federation”—a coupling of internal R&D and innovation assets with external partners, including demanding customers with long-term life cycles (defense industry). In this federation model, external customers are increasingly key innovation partners.



### **Q&A Session**

In the short Q&A session with the audience, Dr. Jackson made a point to address a question asking panelists how they motivate (academic) researchers to work with industry.

Dr. Jackson's point was that he sees the opposite—that in LM's experience, researchers from academia and national laboratories (in the United States and round the world) are ready to engage with industry to change the world. For example: the India Innovation Growth program; Lockheed Martin's Republic of Korea Science, Technology and Research (RoKST&R) program; etc.

# 2015 Science and Technology in Society (STS) *forum* Primer

# Sunday, 4 October Kyoto

## 12:20-1:50pm: CTO Meeting

**Location:** ICC Kyoto, Room E

**Participating:** Dr. Keoki Jackson

**Note:** In the past, this meeting occurred over breakfast—and was a moderated conversation. In 2013, the conversation was a single, roundtable dialogue. In 2014, the conversations broke out into several smaller roundtables—with short reports from each table at the end of the breakfast. Set-up for 2015 is unclear at this point in time.

## Lunch Co-Chairs

### Dr. Elias Zerhouni

U.S. Science Envoy  
President, Global R&D  
Sanofi

A native of Algeria where he received his basic education and training, his academic career was spent at the renowned Johns Hopkins



University and Hospital where he is currently professor of Radiology and Biomedical engineering and senior adviser for Johns Hopkins Medicine.

He served as Chair of the Russell H. Morgan Department of Radiology and Radiological Sciences, Vice Dean for Research and Executive Vice Dean of the School of Medicine from 1996 to 2002 before his appointment as Director of the National Institutes of Health of the United States of America from 2002 to 2008.

He has authored over 200 publications, holds eight patents and has founded or co-founded 5 start-up companies. Dr Zerhouni holds a number of prominent

positions on prestigious Boards, including most recently, Senior Fellow of the Bill and Melinda Gates Foundations, the board of trustees of the Mayo Clinic and the Lasker Foundation. Among his many honors, Dr. Zerhouni earned membership into the Institute of Medicine of the US National Academy of Sciences in 2000 and the prestigious Legion of Honor medal from the French National Order in 2008. He was appointed as Chair of Innovation at the College de France and elected to membership at the French Academy of Medicine in 2010.

He was appointed to his present position on January 2011.

### Dr. Keiji Kojima

Vice President and Executive Officer  
CTO and General Manager of Research and Development Group  
Hitachi, Ltd.



Education:

- March, 1982: Graduated from the Graduate School of Informatics, Kyoto University

Business Experience:

- Apr. 2012: Vice President and Executive Officer
- Apr. 2011: General manager, Hitachi Research Laboratory
- Apr. 2008: General manager, Central Research Laboratory
- Mar. 2005: Took doctoral degree of Information Science
- Apr. 2004: Deputy general manager, Internet Platform Division

- Apr. 2000: Department manager, Systems Development Laboratory
- Apr. 1982: Joined Hitachi, Ltd.

### Potential Background / Talking Points for Dr. Keeki Jackson for the CTO Lunch

- Good afternoon.
- I am grateful to participate in the 3rd CTO peer-to-peer meeting taking place in conjunction with the STS *forum*.
- I would like to thank Chairman Omi for his vision in hosting this session and in continuing to build on the inaugural meeting last year—in which many of you participated, so thank you for coming back and joining us.
- I would also like to thank our co-chairs, Dr. Zerhouni and Dr. Kojima, for chairing today's lunch.
- As was noted in the prior two years' sessions, which focused on the "Role of the CTO", any effort truly to understand the deeper implications of the scientific and technological "lights and shadows" must engage the modern chief technologist and chief scientist.
- The CTO—or in some cases, the CSO—is particularly—even distinctively—positioned and capable to address the changing nature of science, technology and innovation:
  - Poised to define, articulate and act in an age of growing complexity
  - Situated to deal with the increasing rapidity of technology development and diffusion
- Able to position strategically firms and organizations in an era of global competitive leveling—as Ian Bremmer calls it, the "G-Zero" world, as opposed to the G-20 or G-7.
- And many of you around the table may recall that a key outcome of this meeting over the past two years was the synthesis of the "CTO/CSO Top 10"—ten core lessons, findings that encapsulate our evolving conversation at the STS *forum*:
  - The CTO/CSO is the "starting point" of corporate R&D, and the development of new/core technology to bring products to market.
  - The CTO/CSO creates and manages a "federation of ideas" and leads the integration of all R&D capabilities and technological development activities.
  - The CTO/CSO has clear line responsibility for, priority setting and management of R&D, IP strategy and business execution.
  - CTOs/CSOs are increasingly core leaders in the internal and external "communications" strategy of firms and organizations.
  - CTOs/CSOs must focus on "technology intelligences"—identifying mega-trends, opportunities internal and external to their organizations that will drive future business success.
  - CTOs/CSOs must be involved directly in defining a company's core business strategy, aligned to technology.
  - CTOs/CSOs must play a growing role in overall supply chain management for their organizations.

- CTOs/CSOs must play a role of “reconciliation”—balancing, for example: competition and collaboration; optimizing internal IP with open innovation networks; etc.
- CTOs/CSOs must push beyond traditional corporate social responsibility definitions—weighing technological innovation and development with broader, societal sustainability and environmental goals.
- The CTO/CSO is also a critical leader in a firm’s human resources development.
- In the context of these major learnings from the past two years’ conversations, I know today we want to press forward—and explore not just these roles for today’s CTO and CSO, but also their future roles.
- And these future roles will be defined in many ways by the continuing, and fast-paced evolution from industrial to post-industrial societies, from the early 21st century “dot.com economy” to an even more pervasive, ubiquitous, “digitally enabled economy.”
- And in this world of turbulence, transition and transformation, leaders of innovative organizations must look to identify and exploit differentiated, competitive, non-linear, exponential opportunities (e.g., artificial intelligence, advanced and quantum computing, robotics, 3-D and 4-D printing, etc.) to create value—not only for their respective organizations but also across traditional political and economic geographies and for society at large.
- These non-linear opportunities are becoming more frequent, and are beginning to marginalize more and more companies.
- Consider Kodak—inventor of the digital camera in 1976 and at its peak a 145,000 person, US\$1.28 billion global company—reduced to bankruptcy in 2012 by digital imagery.
- And in the wake of the Kodak collapse? Exponential innovation: Instagram’s 13 employees and valued at over US\$1 billion at the time of its acquisition by Facebook.
- Even more recent? The disruption in communications from a small start-up like WhatsApp: with 50 employees, handling more messages in 2014 than all SMS messages around the world combined, and valued at US\$19 billion upon acquisition.
- What I would like to discuss today and pose for everyone’s consideration in this room: is this type of disruption more and more likely as time passes—or is this anomalous?
- If this is not anomalous, what is the role that each and every one of us needs to play in steering our organizations—and even society—through these turbulent waters?
- How are you and your organizations already thinking about, characterizing and working through these sorts of disruptions? Can you share examples of these challenges—and the potential opportunities you see coming from such disruptions?
- I am eager to share my own thoughts—and to learn from those in the room today.
- Thank you all.

# Monday, 5 October Kyoto

**12:30-1:10pm**

## **U.S. Participants Lunch Meeting**

**Location:** ICC Kyoto, Room H

**Participating:** Mr. Rod Makoske and Dr. Keoki Jackson

Hank McKinnell, Chairman of the Board of Directors of the American Associates of the STS *forum*, will host this lunch for distinguished forum participants from the United States. Participants are not required to make formal presentations.

**4:50-6:00pm**

## **Plenary Session 204B: Science and Technology in Business Management and Strategy**

**Location:** ICC Kyoto, Room A

**Participating:** Dr. Keoki Jackson

### **CHAIR**

#### **Mr. Pascal Colombani**

Chairman of the Board  
Valeo, and  
Vice Chairman  
French Nuclear National Research Strategy Council  
(France)

### **PANELISTS**

#### **Dr. Keoki Jackson**

Vice President and Chief Technology Officer  
Lockheed Martin

#### **Dr. Anatoly B. Chubays**

Chairman and CEO  
RUSNANO (Russia)

#### **Mr. Olivier Piou**

CEO  
Gemalto (France)

#### **Dr. Ed Hays**

SVP and CTO  
The Coca-Cola Company (USA)

#### **Ms. Susana Quintana-Plaza**

SVP, Technology & Innovation  
E.ON (Spain)

#### **Dr. Mauro Varas**

CTO  
Finmeccanica SpA (Italy)

### **PANEL MATERIALS**

1. Primer / Background Document
2. Suggested 6-minute Talking Points for Dr. Keoki Jackson:
  - This session will be conducted in English, recorded, and uploaded to the STS *forum* website. No PowerPoints allowed. The session is open to the press.
  - The Chair will provide 6 minutes of opening remarks. He will then turn to each of the panelists to give remarks—~6 minutes each.
  - After each panelist speaks, the Chair will open to the audience for Q&A.
3. Panel Bios

## 1. Primer / Background

Plenary session Chair, Mr. Pascal Colombani, notes this session will focus on how to define a strategy in a changing technology environment—and how to “impulse” paradigm changes through the use and application of disruptive technologies.

In particular, he has asked plenary participants to reflect on their personal and organizational perspectives, and focus on topics such as:

- Open innovation
- Crowd innovation
- Big Data’s role in changing business models
- New processes from design to manufacturing
- New business models and regulation
- The role of public-private partnerships to address large-scale/global grand challenges

The following background/“primer” seeks to provide Dr. Keoki Jackson with thoughts, ideas, data, potential “talking points”—based on and reflecting upon the guidance from Chairman Colombani—to consider in preparation for the moderated conversation.

### **Setting the Stage: The Changing Nature of Science Technology and Innovation—and the Impacts on Business Management and Strategy**

As the past decade’s work of the Council on Competitiveness and its members, partners, sponsors, and affiliates—including work supported by and driven by LM leadership—has shown, the role of innovation has been pivotal to the competitiveness and success of companies and countries over the past half century.

Yet the work also makes clear the context for innovation in the second decade of the 21st century is changing; the ground is shifting beneath our feet.

Models of innovation—for companies and countries—have continued to evolve, and the environment for innovation in the United States (and most developed economies) presents new challenges, but also new opportunities (Figure 1).

### **Opportunity—Democratizing Innovation**

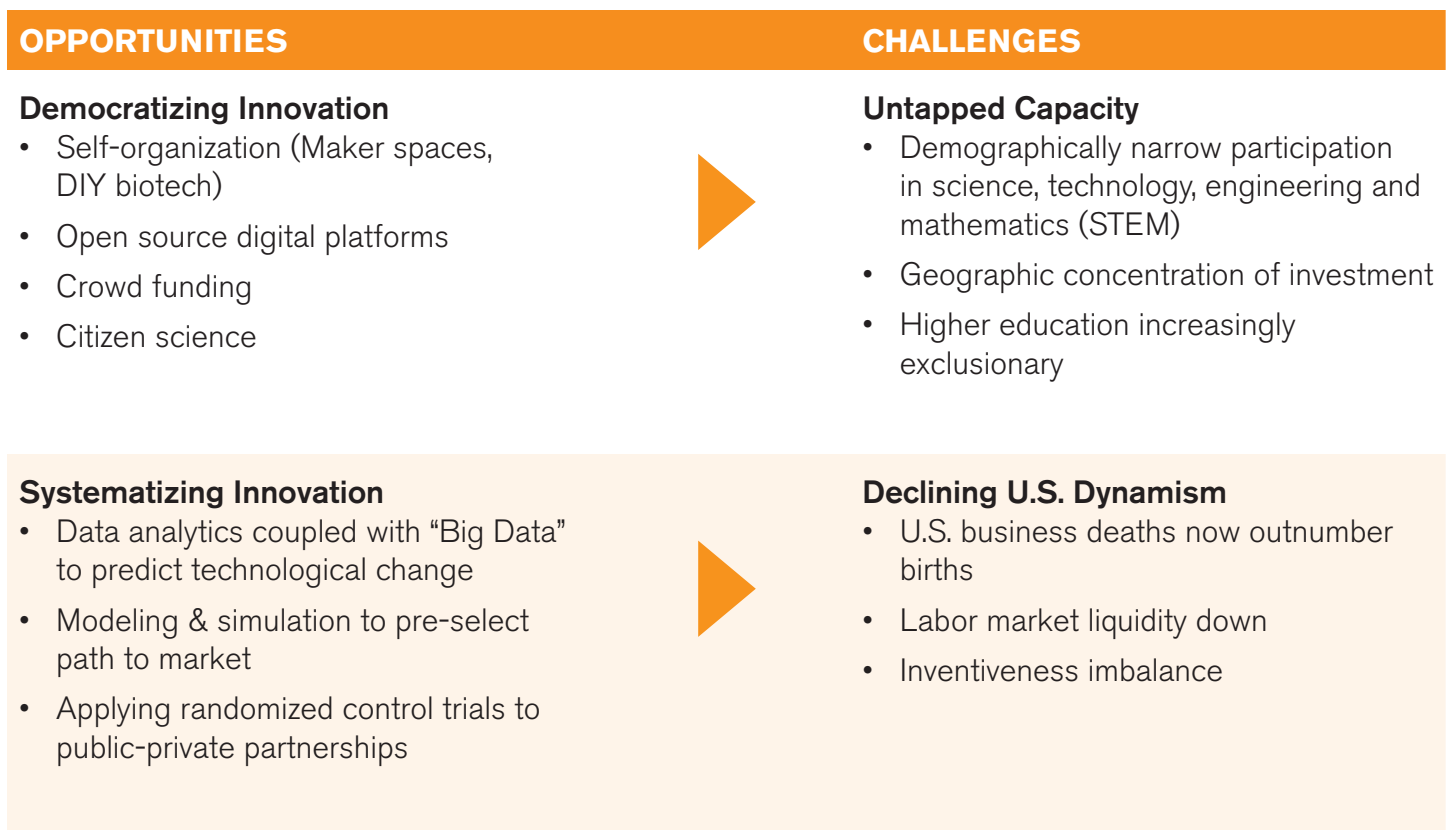
In the early 2000s the open innovation movement emerged in response to the transformation of the global industrial landscape that began in the 1980’s.

Vertically integrated corporations shed business units (particularly manufacturing) to focus on their core competencies, and shifted research and development (R&D) away from basic research and toward the near-term needs of their respective business units.

This ushered in an era in which foundational, technological breakthroughs were as likely to come from universities, national laboratories, and small start-up companies. Thus, businesses today increasingly look as much externally as internally for sources of invention and innovation.

In addition to the ever more outward focus of private sector innovators, the Great Recession of the late 2000s has created new pressures both on other critical actors in the innovation ecosystem, like academia and legislators. The expectation that universities and community colleges will be active centers for economic development has heightened, and public expenditures on R&D are increasingly justifiable only if they directly boost the economy and create jobs in the near term.

Figure 1.



As such, the last decade has witnessed the creation by innovation stakeholders—including companies—of quasi-public institutions (public-private partnerships; proof-of-concept centers; technology demonstration facilities; innovation hubs; etc.) to bridge the gaps in the innovation ecosystem—be they financial, institutional, or behavioral—widened by the open innovation movement.

Bridging institutions like these, nonetheless, are firmly rooted in Vannevar Bush’s 20th century vision of the U.S. STI enterprise—which took firm hold across Western Europe, Japan and other major markets after WWII.

And while this model remains the global standard for national systems of innovation, transformational models rooted in the democratization and self-organization of innovation are beginning to emerge—with profound implications for companies across all sectors of the economy.

For example, doctoral students—enabled by the plummeting cost of synthesizing and decoding DNA, by the development of relatively inexpensive tools such as centrifuges, and by the proliferation of crowdfunding platforms—are dropping out of big-budget academic institutions and corporate R&D departments to build their own labs in urban centers across the country.

Manufacturing innovation is following a similar path (i.e. maker spaces)—a path that is now well-worn by the information and communication technology (ICT) community and its “hobbyists” that launched the personal computing revolution in garages across America. ICT—specifically the shrinking, ever cheaper, more powerful, and cloud enabled computing tools alongside the emergence of Big Data—in fact underpins the revolutionary changes in fields such as biotechnology and manufacturing. 3-D printers, inexpensive reactors, and microfinance websites are what is emerging on the surface as individuals and smaller players emerge in the evolution of design to prototype to manufacturing.

Less obvious than these surface trends is a fundamental change in how people think about and pursue innovation. It is now possible for someone to imagine, develop, prototype and scale a disruptive technology independent of traditional institutions of innovation.

The linkages between production and capital are increasing, expanding the financial options well beyond traditional sources—including the rise of the crowdfunding/“kickstarter” movement. Innovation in one field, sector, or discipline increases the pace of innovation in another. The stage is set for exponential innovation, and we must optimize our nations for this new, unfolding reality.

### **Challenge—Untapped Innovation Capacity**

While we may be experiencing a historical proliferation of democratic models of innovation, it is unwise to conclude that the traditional national systems of innovation are not critically important to productivity and prosperity.

Moreover, leading experts in science, technology, and innovation policy are concerned that the innovation ecosystem is increasingly characterized as exclusionary—as evidenced by concerning trends in demography, higher education, and risk capital.

This demographic and social challenge is critical as much for companies—and their strategies to manage for innovation and growth—as it is for nations looking to compete in the global economy.

Take the United States as an example.

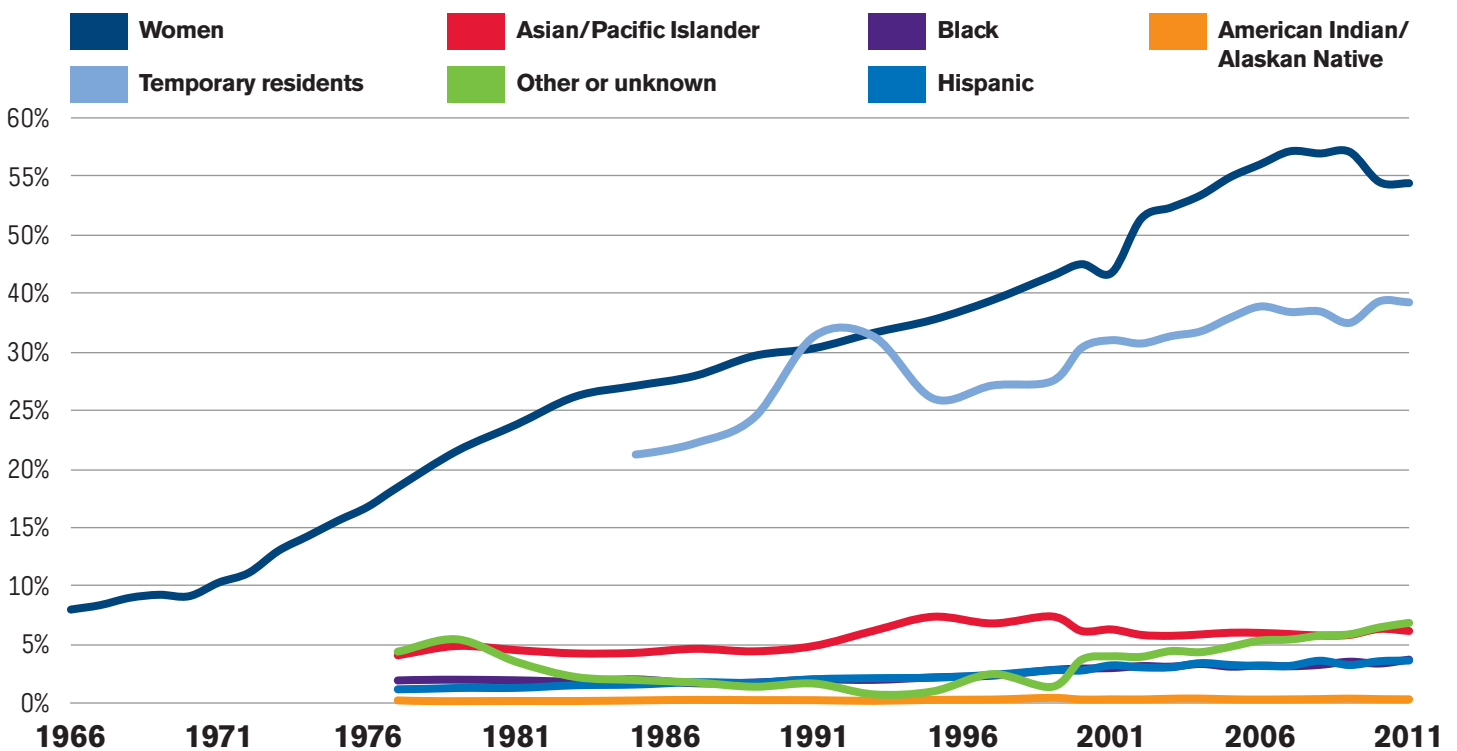
Historically, women and people of color have been underrepresented in the U.S. innovation ecosystem. Figure 2 highlights the dismal state of STEM diversity in academia at the middle of the 20th Century—when neither women nor minority groups (individually) could claim more than a seven percent stake in the academic community.

Fortunately, after the expenditure of much time, money, and political effort, science and engineering education has become much more open and diverse over the past half century—particularly for women and temporary residents.

Figure 2 reveals that, today, women in the United States are represented roughly proportional to their representation in the U.S. population and the STEM disciplines have benefited from high-skill immigration.

### Figure 2. Percentage of STEM Doctorates Earned by Demographic

Source: Graph reflects latest available numbers from the NSF's Science and Engineering Indicators. Data before 1976 is from the NSF's Science and Engineering Degrees.



Unfortunately, little or no progress has been made to broaden the participation of native-born minority groups.

One might suggest that the United States has gotten along quite well with the status quo—as pertains to underrepresented minorities—and, as such, can continue to do so with little risk. However, demographic data suggests otherwise. Census projections reveal that the country’s non-Hispanic

population will peak at 200 million in 2024, while the multiracial population is projected to more than triple by 2060. As a result, whites will be in the minority by 2043.<sup>1</sup> Thus, the U.S. innovation ecosystem is out of step with its shifting demographics. The communities in the United States that will soon represent the majority of the U.S. population are the same communities that remain disconnected from the innovation ecosystem.

<sup>1</sup> United States Census Bureau, "U.S. Census Bureau Projections Show a Slower Growing, Older, More Diverse Nation a Half Century from Now", December 12, 2012. Accessed June 1, 2015. <https://www.census.gov/newsroom/releases/archives/population/cb12-243.html>

And this is a global challenge for corporate strategic management, however, as we find similar—and perhaps even more dire—demographic trends in other nations and regions (Japan, Europe).

Finally, despite the emergence—and visible successes—of broad-based crowdfunding and related innovation, this is a nascent trend.

There remains a longstanding concentration of innovation investment—venture capital, public research and development spending, etc.—in well-established centers of innovation excellence in the United States and other developed economies.

Again, take the U.S. example: while there has been an expansion of venture capital into more regions of the country, according to the most recent MoneyTree™ Report by PricewaterhouseCoopers LLP and the National Venture Capital Association, the majority—approximately 65 percent—of venture capital investment remains in just three regions: Silicon Valley, Boston, and New York.<sup>2</sup>

Moreover, according to the latest National Science Foundation Survey of Federal Funds for Research and Development, over half of the nation's public R&D expenditures are concentrated in just eight states—which, not surprisingly, include California, Massachusetts, and New York.<sup>3</sup>

### **Opportunity—Systematizing Innovation**

At the same time we have witnessed an increasing awareness of, attention to, and democratization of the innovation process, the development of new methodologies and tools have driven a proliferation of inquiries into the science of the innovation process itself.

These efforts have largely been focused on reducing the risk and uncertainty in the innovation process through the application of novel technologies, or the novel application of science and technology to innovation management.

Researchers are using the ever-expanding availability of large data sets (Big Data) coupled with data analysis tools to predict technological change, which could provide enormous competitive advantages to organizations that perfect this technology.

R&D managers in corporate laboratories, large and small, are using advanced modeling and simulation tools to select innovation pathways with the highest likelihood of success—while avoiding unsuccessful and expensive trials that do not bear fruit.

- For example, Lockheed Martin helped to seed with the Council on Competitiveness, GE and others a first-ever public-private partnership in the United States to propagate high performance computing technologies and skills through small and medium-sized firms in supply chains.
- One of the goals of this partnership—called NDEMC—was to help suppliers accelerate their own innovation by cutting down on cycle and production times while at the same time improving quality of product for their OEMs.

<sup>2</sup> National Venture Capital Association, "U.S. Venture Capital Investment Spanned 160 Cities in 2014", January 20, 2015. Accessed June 1, 2015. <http://nvca.org/pressreleases/u-s-venture-capital-investment-spanned-160-cities-2014/>

<sup>3</sup> National Science Foundation, "Federal Funds for Research and Development FYs 2012-2014", Detailed Statistical Table, NSF 14-316, September 30, 2014.

- In addition, the project sought to “tool up” small and medium-sized manufacturers and enable them to compete in the global marketplace by eliminating some of the costs associated with design, prototype and deployment.

Universities are experimenting with open source software platforms to improve and drive down research infrastructure costs.

Whether in a corporate laboratory or on a university campus, the overarching trend here is the infusion of computing into every stage of the innovation process. For individuals and organizations that can harness these new capabilities, the benefits and opportunities are practically boundless.

Researchers are also beginning—in earnest—to apply the scientific method to stages in the innovation process, such as randomized controlled trials (RCTs) targeting bridging institutions (public-private partnerships like the U.S. National Network of Manufacturing Innovation institutes; energy and innovation hubs; proof of concept centers; demonstration facilities; etc.).

- Here, too, Lockheed Martin is pioneering new work in the United States—engaging in and supporting the development of the National Network of Manufacturing Innovation.
- The NNMI provides a manufacturing research infrastructure where U.S. industry and academia collaborate to solve industry-relevant problems—by leveraging distinctive tools, capabilities, experiences and partnerships beyond what any one company or government organization can provide.

- Through a power private-public co-investment model, the institutes will develop advanced manufacturing technologies that will “lift all ships”; help businesses which otherwise couldn’t invest in advanced manufacturing research; and build a pipeline of talent to support advanced manufacturing for the long-term.
- For Lockheed Martin—a global security and aerospace company that employs about 112,000 people worldwide and is principally engaged in the research, design, development, manufacture, integration and sustainment of advanced technology systems, products and services—engagement in all of the existing NNMI institutes is critical to long-term business strategy.
- First, the majority of Lockheed Martin’s business is with the U.S. Department of Defense and the U.S. federal government agencies supporting the NNMI.
- Therefore, partnering with customers to accelerate manufacturing innovation from the laboratory to production is a key element of our business strategy—particularly in a set of “Strategic Manufacturing Threads” like, additive manufacturing, advanced materials, digital manufacturing and next generation electronics.
- Second, this focus on accelerating manufacturing innovation has significant implications on the future competitiveness of both the aerospace and defense portion of our business, as well as our product and capability offerings in our energy portfolio.

### Challenge: Declining Dynamism

Revvig up the innovation engine does not, per se, translate into national prosperity. Innovation needs to be diffused and scaled by businesses to ensure the economic impact is as far-reaching as possible.

This is an active, not passive process undertaken by businesses and people. It is dynamic, inherently disruptive—both destroying and creating new markets, jobs, and opportunities—and lies at the core of national and economic security.

Historically, innovation has been a net positive for nations: productivity gains, through innovation, have driven up wages and living standards.

There is, however, a mechanism built into the productivity-prosperity relationship.

External forces such as technological disruption change the make-up of the economy by eliminating and replacing low-skill, low-productivity jobs with higher-skill, higher-productivity work.

In order for the nation to realize aggregate productivity gains and rising wages, workers need to transition from less productive work to newly created, more productive opportunities. However, there is evidence that, in recent years, innovation has been more destructive than disruptive.

Let us take the U.S. case again.

In 2008, for the first time in 35 years, U.S. business deaths outnumbered births. While there has been a slight uptick in start-up activities, the overall trend is clear—firm creation has been on the decline since the 1970's.<sup>4</sup>

If new firms are not established, workers are likely to remain locked up in their previous jobs or go on unemployment because there aren't new, higher productivity jobs to which they can be relocated. Data on labor market liquidity confirms this trend. Worker reallocation and churn rate have declined since 2000.<sup>5</sup> Thus, the coveted new economy jobs are slow to arrive—and workers are staying put or dropping out of the workforce.

Moreover, the worker reallocation that is occurring is trending in the wrong direction. The manufacturing sector is a poignant and illustrative example. Millions of well-paying low- and middle-skill manufacturing jobs have been lost since 2000. While productivity-enhancing technologies are not the only cause of this job loss, together with international competition, they play a role.

There has not been, however, a commensurate rise in advanced manufacturing jobs. Figure 3 reveals that between 2000 and 2013, the manufacturing sector lost 5.39 million low- and middle-skill manufacturing jobs. Over that same period, the sector added just 280,000 manufacturing jobs that required at least a college education. So, what has happened to all the manufacturing workers? Largely, they have filled the ranks of low-skill service sector workforce. A recent National Employment Law Project data brief exploring job growth since the 2001 recession, finds that—over the last decade—job growth has been consistently dominated by low-wage service-providing industries, middle skill jobs are disappearing, and high-skill job growth is anemic.<sup>6</sup>

5 Steven J. Davis and John Haltiwanger, "Labor Market Fluidity and Economic Performance", National Bureau of Economic Research, September 2014.

6 The National Employment Law Project, "The Low-Wage Recovery: Industry Employment and Wages Four Years into the Recovery", Data Brief April 2014.

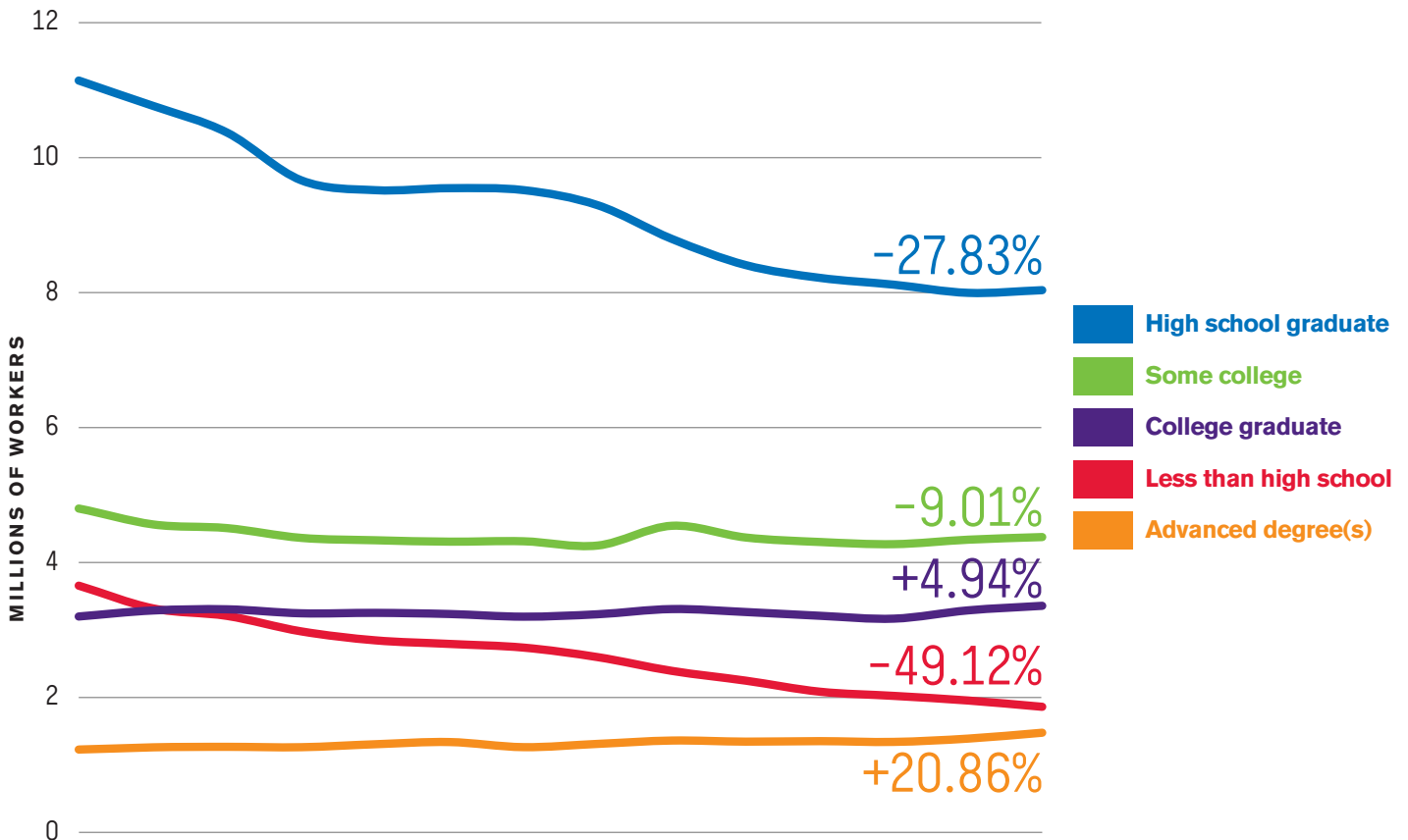
This scenario describes how a large portion of our country has, as a result of technological change, been pushed down the socioeconomic ladder. For many Americans, accelerating innovation has yet not translated to more and better opportunities. On the contrary, it is feeding several difficult trends facing our nation: wage stagnation, income inequality, bifurcation of the workforce, and social distrust. All of these trends, independently, threaten our ability to innovate either directly or indirectly.

And, taken together, structural changes tarnish the public opinion of technological innovation in a way that reduces the mandate of policymakers to invest in science, technology, and innovation.

This is also a critical challenge for businesses and industries that partner with and rely upon the public sector to fund critical, long-term basic research—as well as to support the development of the next-generation, educated workforce.

### Figure 3. 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.



### Key Take-Away Points

Competition in the 21st century—for companies and nations—requires new models of innovation built on internal and external collaboration. Recent trends driving this demand include technological convergence and the scale of technological challenges, a shifting nature of investment in innovation, and work styles/expectations of next generation innovators.

- Best practices in open innovation models include the importance of geographic proximity and efforts (organization models, new curriculum, management re-training, etc.) to create the behavioral changes necessary to better leverage the strategic partnerships that are emerging as important to long-term competitiveness.
- Barriers for organizations to deeper and more multifaceted collaborations include security, validation of external inputs, and intellectual property rights.
- Individual corporate strategies—or those of public-private partnerships—all exist in national, regional and global innovation ecosystems that rely on support from the public sector for investment in basic research and development (which is under tremendous stress).

Companies and industries—especially operating in developed economies—have to be wary of innovation ecosystems becoming exclusionary. National trends in the United States and other nations and regions (Japan, Europe) are disturbing, and could pose a significant risk to industrial and overall national innovation capacities.

There is growing concern—for companies and nations—that technological innovation, investment in research and development, etc. do not have social standing commensurate with their importance to prosperity. This is a key theme for the STS *forum*—and the impacts on corporate strategies could be profound.

### 2. Suggested Panel Talking Points for Dr. Jackson

#### Opening Remarks

#### Plenary Session 204B: Science and Technology in Business Management and Strategy

#### Dr. Keoki Jackson

Vice President and Chief Technology Officer  
Lockheed Martin

Thank you, Pascal, for the introduction.

And I would also like to thank the leadership of the STS *forum* for convening its 12th annual meeting—in particular, Chairman Omi.

Lockheed Martin is proud to be a longstanding lead sponsor and supporter of this critical gathering of leaders from around the world focused on finding and implementing solutions to some of the greatest science and technology challenges facing the world—and to identifying and seizing those exponential S&T opportunities that can transform the lives of millions for the better.

Today's panel will focus on one of the most critical pathways to ensuring we, in the words of Chairman Omi, address the "lights and shadows" of science, technology and innovation: thinking through the

most creative business management practices and strategies to optimize our societies for S&T-based innovation.

In many ways, Lockheed Martin's business strategy is predicated on the belief that we must optimize our company—and be a part of optimizing our society—for a future in which innovation will be the single most important factor in shaping our firm's competitiveness and the prosperity of citizens around the world.

**That future is here. That future is now.**

And that's why we are, once again, convened in Kyoto—to share in a dialogue to meet today's and the future's demands.

First, it is important to recognize that the innovation landscape has fundamentally changed.

Lockheed Martin has been a leader in a major effort in the United States over the past decade—alongside the Council on Competitiveness—to articulate and understand this change: the Technology Leadership and Strategy Initiative.

The TLSI is an ongoing dialogue with around 50 of America's Chief Technology Officers, and their peers at research universities and national labs.

A clear message we have shaped and shared over the past eight years is that we will not retain our leadership in science and technology using skills and models of the past.

And we have focused national attention on the need to increase the speed AND volume of our science and technology moving from the lab to the marketplace.

We have also co-developed with the Council on Competitiveness and the National Academy of Engineering the “National Engineering Forum.”

The NEF is exploring across the nation—in already over 16 regional dialogues—the future of engineering, and how to ensure we have the engineering capacity, capability, and competitiveness to solve the challenges, and capture the economic opportunities of the 21st century.

Our aim in these efforts—and more—is to help shape and craft a transformative action agenda that will catalyze a larger innovation movement, and dramatically increase the number of institutions, businesses, and people engaged in innovation—yes, in the United States; but also around the world in markets critical to the success of Lockheed Martin's business strategy.

I want to highlight two key themes that I hope will inform our conversation today.

FIRST, something very remarkable is happening. We see new innovation ecosystems emerging outside the traditional systems and institutions of research and innovation.

These systems are supporting independent innovators, and stretch across ideation and invention, financing, manufacturing, and partnership brokering.

For example, with the cost of DNA sequencing falling through the floor, with the deployment of inexpensive tools such as centrifuges, and with the proliferation of crowd-funding, doctoral students are dropping out of big budget academic institutions and corporate R&D departments to build their own labs.

Open innovation platforms are providing places and processes that connect innovation seekers with problem solvers...offering new ways to get more people innovating.

Dozens of these platforms have sprung-up across the United States—and are proliferating globally.

And Lockheed Martin is experimenting and engaging here—for example, we are working with the small and medium-sized firms in our supply chain to deliver new solutions and tools to existing problems.

Partnering with the Council on Competitiveness, the White House, the US Department of Commerce and others, we pioneered a first-ever public-private partnership to propagate high performance computing technologies and skills.

This partnership, called NDMEC, helps suppliers accelerate their own innovation by cutting down on cycle and production times, while at the same time improving the quality of product they deliver to Lockheed Martin—thus, improving what we ultimately deliver to the marketplace.

In addition, an important contribution of this PPP is that it helps “tool up” small and medium-sized manufacturers, enabling them to compete better in the global marketplace...and strengthen their own local and regional innovation ecosystems. This, too, is a win for Lockheed Martin’s business.

We are also seeing the democratization of financing for innovation...embodied in web-based, crowd-funding sites such as Kickstarter, EquityNet, and Crowdfunder.

Kickstarter has raised more than \$1.6 billion, from 8.4 million people.

About 1,000 technology projects seek funding through Kickstarter right now.

The tiny start-up company Oculus VR used Kickstarter to raise \$2.4 million from 10,000 people to fund development of their virtual reality headset. Last year, Facebook acquired Oculus for \$2 billion.

The Internet has also disrupted and democratized publishing, broadcasting, and communications, and hundreds of millions of new participants have poured in—with podcasts, blogs, YouTube and Vine videos, Facebook pages, and Tumblrs.

What happened in cyberspace on the Web is NOW happening in the real world...in digitally enabled, push-button manufacturing...

The tools of production are now available to individuals—disruptive technologies—\$1,000 3D printers, prototyping tools, laser cutters, easy-to-use design software, off-the-shelf electronics, and desktop machine tools.

These are changing the economics of production, who can be a manufacturer, creator and innovator... and putting the power of production into the hands of the masses.

Individual innovators can now design and make a product without owning any traditional manufacturing infrastructure—no warehouse, no assembly line, no forklifts, no heavy equipment, no inventory.

This will have a tremendous impact on the business strategies for many existing firms and industries.

Despite this environment of democratization and individuation, we are also seeing the emergence of new kinds of institutions, partnerships, and entities to bridge the gap between researchers at universities, the business community, and other key players such as financiers.

These new types of partnerships are mobilizing and leveraging competitive assets, and creating networks that fuel innovation and new business start-ups.

In fact, Lockheed Martin is engaging strategically in this space as well...

As we are witnessing leaders applying the scientific method to stages in the innovation process itself—such as taking the concept of “randomized control trials” from research in one industry sector and applying it to things like the development of new “bridging institutions” like: public-private partnerships, innovation hubs; manufacturing demonstration facilities; proof of concept centers; etc.

Here, Lockheed Martin is helping to pioneer new work—

Take a look at our efforts in the United States around engaging in and supporting the development of the National Network of Manufacturing Innovation—the NNMI.

The NNMI provides a manufacturing research infrastructure where U.S. industry and academia writ large can collaborate to solve industry-relevant problems—by leveraging distinctive tools, capabilities, experiences and partnerships beyond what any one company or government organization can provide.

Through a powerful private-public co-investment model, the institutes will develop advanced manufacturing technologies that will “lift all ships”; helping businesses which otherwise couldn’t invest in advanced manufacturing research; and building a pipeline of talent to support advanced manufacturing for the long-term.

But for Lockheed Martin—a global security and aerospace company that employs about 112,000 people worldwide—engagement in all of the existing NNMI institutes is more than just a noble exercise to “lift all ships”...it is critical to our long-term business strategy.

First, the majority of Lockheed Martin’s business is with the U.S. Department of Defense and the U.S. federal government agencies supporting the NNMI.

Therefore, partnering with our customers to accelerate manufacturing innovation from the laboratory to production is a key element of our business strategy—particularly in a set of “Strategic Manufacturing Threads” like, additive manufacturing, advanced materials, digital manufacturing and next generation electronics.

Second, this focus on accelerating manufacturing innovation has significant implications on the future competitiveness of both the aerospace and defense portion of our business, as well as our product and capability offerings in our energy portfolio.

And the NNMI public-private partnership model is just one emergent model...

But what does this all mean?

In a nutshell?

The traditional, institutional connections between invention and innovation, capital, and production are being re-wired—even severed.

It is becoming possible—because of open innovation models, crowd-funding innovation, and the emergence of new tools (like analytics to understand Big Data in real time)—for someone to imagine, develop, and scale an innovation independent of the conventional institutions of innovation.

With these new models, barriers to entry are falling... crowds are moving in...and a disruptive force like we have never seen is about to be unleashed—the collective power and potential of millions of innovators.

#### THE SECOND, OVERARCHING POINT I WOULD LIKE TO MAKE:

The greatest wealth from technology and innovation is created when they scale and diffuse across the economy, driven by the power of the private sector.

Reorganizing around new technology is a dynamic and turbulent process—as new companies come and old ones go, as capital and human resources are reallocated, market shares shift, supply chains reorder, industry clusters bubble up and recede.

This churn is the beating heart of innovation... and essential for getting the most jobs, growth, productivity, and wealth out of our innovation assets.

Looking at the United States, we have a comparatively flexible economic system that promotes dynamic creative-destruction...a main reason we have been among the countries that have benefitted most from the digital revolution.

But, in recent years, evidence has suggested that we may not be as flexible and dynamic as we have been.

We have seen a slowdown in start-ups, losses in manufacturing, and an increasingly bi-furcated economy.

We may have too much friction in our economic engines, which diminishes our ability to absorb increased innovation.

We pay attention to R&D investment, and we have increased our focus on closing the valley of death and commercialization.

But we in the United States have paid relatively less attention to how efficiently and quickly we reorganize our companies, industries and economy around new technologies and innovations.

This is a challenge we are taking on at Lockheed Martin—and in partnership with others—as we think about our firm's long-term sustainability and robustness.

In closing,

It all starts with technology, innovation, and entrepreneurship...living on the leading edge of change...driven by a mindset for progress and a belief that the future can be better than today.

Innovation is our only sustainable path to prosperity—for our company, our industry, our nation, and our world.

And, taken together, the themes I have shared today—the democratization of innovation, broadening engagement in innovation, and getting the most economic benefits from our innovation assets—are fundamental to optimizing all of our organizations and societies for innovation...and will play the pivotal role our ability to deliver widespread prosperity.

### 3. Panel Participants and Bios

#### CHAIR

##### Mr. Pascal Colombani

Chairman of the Board of Valeo, and Vice Chairman French Nuclear National Research Strategy Council (France)



He is a member of the French Academy of Technology and a Director of Technip SA, Alstom SA and Energy Solutions Inc. In January 2000, he was appointed Managing Director of the French Atomic Energy Commission (Commissariat à l'énergie atomique—CEA), a position that he held until December 2002. The instigator of the restructuring of the industrial holdings of the CEA and the creation of Areva in 2000, he chaired the Supervisory Board of Areva until May 2003. Between 1997 and 1999, he was the Director of Technology at the French Ministry for Research.

Pascal Colombani spent close to 20 years (1978-1997) at Schlumberger in various positions, in the US and in Europe, before becoming Chairman and CEO of its Japanese subsidiary in Tokyo.

Pascal Colombani is a graduate of École normale supérieure de Saint-Cloud, is an associate professor of physics and has a doctorate in science.

#### PANELISTS

##### Dr. Keoki Jackson

Vice President and Chief Technology Officer Lockheed Martin Corporation

Dr. Dana (Keoki) Jackson is the Chief Technology Officer at Lockheed Martin, where he is responsible for the Corporation's advanced technology strategy. As the primary liaison to the US and international science and technology community, he manages strategic relationships with government, industry and academia to ensure the maturation and deployment of key technologies.

Prior to this role, Dr. Jackson served as the vice president for Program Excellence, where he was responsible for the cross-functional integration of five corporate councils for engineering and technology, production, program management, supply chain, and sustainment.

Dr. Jackson's previous roles at Lockheed Martin include vice president for Navigation Systems and program manager for Global Positioning System (GPS) III at Lockheed Martin's Space Systems business. In this role, he was responsible for GPS III development and production, on-orbit operations and sustainment support for the GPS IIR and IIR-M constellation, and capture of future Navigation Systems business. He also served as program manager for Space Based Infrared Systems (SBIRS) Geosynchronous Space Vehicle 2 (GEO-2).



Before joining Lockheed Martin, Dr. Jackson was a NASA research fellow at the Massachusetts Institute of Technology (MIT), conducting Space Shuttle flight experiments in the field of human adaptation to the space environment. He graduated from MIT with bachelors, masters and doctoral degrees in Aeronautics and Astronautics, and he is a graduate of the Stanford Executive Program at the Stanford University Graduate School of Business.

Dr. Jackson is a member of Sigma Xi and the American Institute for Aeronautics and Astronautics.

### **Dr. Anatoly B. Chubays**

Chairman and CEO  
RUSNANO (Russia)  
Anatoly Borisovich Chubays (Chubais) is a Russian politician and businessman responsible for privatization in Russia as an influential member of Boris Yeltsin's administration in the early 1990s. During this period, he was a key figure in introducing market economy and the principles of private ownership to Russia after the fall of the Soviet Union.

From 1998 to 2008, he headed the state-owned electrical power monopoly RAO UES. A 2004 survey conducted by PricewaterhouseCoopers and the Financial Times named him the world's 54th most respected business leader.

Currently, he is the head of the Russian Nanotechnology Corporation (RUSNANO). He has been a member of the Advisory Council for JPMorgan Chase since September 2008 and a member of global board of advisers at the Council on Foreign Relations (CFR) since October 2012.



### **Mr. Olivier Piou**

CEO  
Gemalto (France)  
Olivier Piou conducted the merger of Gemplus and Axalto which formed Gemalto in 2006, and has been its CEO since then.

Before that he was CEO and Board member of Axalto (2004-2006), which he introduced to the stock market, and Director of Smart Cards with Schlumberger (1998-2004).

He previously held a number of positions with that company across technology, marketing and operations in France and the US (1981-1998). He was a Board member of INRIA, the French national institute for research in computer science and control (2003-2010), and President of Eurosmart, the international organization representing the chip card industry (2003-2006). He is a Knight of the Legion of Honor in France.



### **Dr. Ed Hays**

Senior Vice President and  
Chief Technical Officer  
The Coca-Cola Company  
(USA)

Dr. Ed Hays leads the Technical Function for The Coca-Cola Company. The key areas within Technical are Coca-Cola Freestyle, Commercial Products Supply, Flavor Manufacturing & Supply, Global Sustainable Procurement, Quality, Safety & Environment, Research & Development, Scientific & Regulatory Affairs and Technical Governance.



Hays joined The Coca-Cola Company in 1985 as a scientist in Corporate R&D. During his career, he held positions of increasing responsibility including director Product Development in Corporate R&D, director R&D based in Tokyo, Japan for the Middle and Far East Group and director, Corporate R&D. In 2000, he was elected Vice President, The Coca-Cola Company. In 2001, he assumed responsibility for the Science Function and in 2015 was named Chief Technical Officer.

Hays has served as President for the Flavor and Extract Manufacturers Association (FEMA) and is currently on the Boards of FEMA and the International Federation of Essential Oils and Aromas Trades. Additionally, he has served on the Advisory Board of the Savannah College of Art and Design, the Board of Directors of The Atlanta College of Art, the Science and Technology Museum of Atlanta and committees of the Atlanta Area Council of the Boy Scouts of America.

He holds a B.S.A., M.S. and Ph.D. in Food Science from the University of Georgia.

**Ms. Susana Quintana-Plaza**  
SVP, Technology & Innovation  
E.ON (Spain)

Ms. Susana Quintana-Plaza is a Senior Vice President, Technology and Innovation at E.ON Strategic Co-Investments.



Previously, she had been the Vice President of Innovation Scouting and Co-investments since 2011. Ms. Quintana-Plaza is the Responsible Manager and joined E.ON in 2009 in its climate and renewables division, where she leads the

team in search of new trends and innovations that impact the energy world. She has over ten years of work experience in aerospace and energy industries with Boeing, Booz & Co and GE. Ms. Quintana-Plaza holds an MBA from Harvard Business School and Bachelor and a Masters in Aerospace Engineering from the University of Washington.

**Dr. Mauro Varasi**  
CTO

Finmeccanica SpA (Italy)

From 2004 to 2006, Dr. Varasi was the head of the Development and Photonics Laboratory of Selex Sistemi Inegrati (formerly Selenia)—including five main groups: Microelectronics and Photonics, Antennas, Microwave, Analog Design and Digital Design.

In May 2006 he moved to Selex-SI Finmeccanica—where he has been in charge of the defense policy of Finmeccanica products.



## Tuesday, 6 October Tokyo

### 7:00 pm: Special Dinner among American Business Leaders and Japanese Government Leaders

**Location:** The Capitol Hotel Tokyu, 1st Floor, “KIRI” Room, 2-10-3 Nagatacho, Chiyoda, Tokyo

**Participating:** Mr. Rod Makoske, Senior Vice President, CETO, Lockheed Martin

**Notes:** This dinner is:

- A small, private event hosted in Tokyo for a select group of attendees.
- Not advertised or noted in official STS *forum* materials.
- A high-level, off-the-record conversation and networking opportunity—with no “formal program.”

In the past, hosts have provided some opening remarks—and then they have asked dinner participants to introduce themselves. In some years, they have also asked participants to provide 1-3 minutes of comments as to why the STS *forum*—and relationships with Japan in general—are important personally and/or for their organization. In other years, they have asked for a general reflection/comment upon their experience in Kyoto at STS *forum*.

### Suggested Talking Points for Mr. Rod Makoske, Senior Vice President, Lockheed Martin

Thank you, Chairman Omi.

I want to thank you for hosting us this evening.

I am honored to be with you, and colleagues old and new—and to share thoughts reflecting on the past couple of days many of us spent together in Kyoto at the STS *forum*, and to share thoughts on why the forum and gatherings like tonight matter for Lockheed Martin.

One of the core messages coming out loud and clear from the many companies and organizations participating in the STS *forum* is that long-term productivity, economic growth, competitiveness and prosperity in the 21st century will require new models of innovation built on collaboration—collaboration inside and outside traditional boundaries and borders.

There are many trends driving this collaboration imperative—and I see them every day at Lockheed Martin:

But perhaps one of the most fundamental sets of trends we must all confront is harnessing technological convergence in the face of tremendous, global challenges facing all of us (from climate change, to cyber security). Tackling and solving these global grand challenges demands a concomitant increase in collaboration. No one company—or region or nation, for that matter—can tackle single-handedly these global grand challenges.

One final point front and center at Lockheed Martin is: people. Innovators. Entrepreneurs. Engineers. Doers. Makers...and the need for a diverse talent pool to create the next great thing, the next great product, the next solution set to the global grand challenges we all face.

This diversity imperative is critical. And my CEO, Marilyn Hewson, is placing it at the forefront of our long-term business strategy.

Ms. Hewson was in Tokyo recently—just at the end of August—for the 2015 World Assembly for Women, alongside Japanese Prime Minister Abe—focusing on driving a global conversation to expand opportunities for women in Japan and around the world. In essence, echoing and reinforcing the Prime Minister’s call for a “society in which women shine.”

She shared the story that women have always been a part of Lockheed Martin’s story. When Glenn Martin was building his very first aircraft more than a century ago, it was his mother, Minta Martin, who stood by him in the workshop as he worked into the night. And in the decades that followed, thousands of women served on factory floors and assembly lines to bring his aircraft to life.

The point is simple—we heard it in Kyoto but I want to re-emphasize tonight: When there is more diversity around the table, on the manufacturing floor, in the research laboratory, it inspires more innovation and better breakthroughs, because different backgrounds offer new perspectives. People with different experiences and viewpoints push everyone to be better, to challenge their assumptions, and to think more creatively.

And the way to unlock the potential of everyone in our society for engagement in our increasingly innovation-based economies is to: exercise leadership from the top; engage women and under-represented populations at all levels in our respective organizations; and create an environment that fosters success for all.

So—in conclusion, I want to congratulate everyone around the table for their respective efforts in leadership, engagement and creating environments in which innovation can succeed.

And at the same time, I challenge us all to do even more.

Thank you.

## HOSTS

### Hank McKinnell, Chairman

American Associates of the  
STS *forum*

Chairman

Accordia Global Health  
Foundation

Chairman

Moody's Corporation

Former Chairman and CEO  
Pfizer



Hank McKinnell retired as chairman and CEO of Pfizer Inc, the world's largest research-based pharmaceutical company in 2006.

Hank joined Pfizer in 1971 in Tokyo. Over the years, he held positions of increasing responsibility around the world, including service as president of Pfizer Asia, based in Hong Kong. He also served as Pfizer's country manager-Iran/Afghanistan. In 1984 Hank relocated to New York, where he served as vice president-strategic planning, chief financial officer, president-Pfizer medical device group, president-Pfizer pharmaceuticals group, president and chief operating officer, president and chief executive officer from January 2001 to May 2001, and as chairman and chief executive officer, from May 2001 to August 2006, and chairman to December, 2006.

Hank McKinnell is a member of the Boards of Directors of Pfizer Inc, Moody's Corporation, and ExxonMobil Corporation. Hank is a member of the Academic Alliance and chairman of the Academic Alliance Foundation, which supports infectious diseases prevention, care and treatment in Sub-Saharan Africa. He is also vice chairman of the World Economic Forum and member of the WEF Foundation Board of Trustees, and chairman of the

Connecticut Science Center. Hank is Chairman Emeritus of the Business Roundtable, an association of 170 CEO's of America's largest companies, the Pharmaceutical Research Manufacturers Association, the Food and Drug Law Institute, and the Medical Device Manufacturers Association. Hank is a member of the Massachusetts Institute of Technology (MIT) Corporation, and has served on the President's Advisory Council on HIV/AIDS. He is also a director of the Medal of Honor Foundation, the Business Council, the Royal Shakespeare Company of America, the Japan Society, and a member of the Stanford University Graduate School of Business Advisory Council. He is a member of the Boards of Trustees of the Memorial-Sloan Kettering Cancer Center, the New York City Public Library, and the New York City Police Foundation.

Hank holds a Bachelor's Degree in business from the University of British Columbia, and M.B.A. and Ph.D. degrees from the Stanford University Graduate School of Business.

Recent honors include the Grand Cordon of the Order of the Rising Sun, Japan's highest award to others than members of the Imperial Family, and heads of state; the Islamic Republic of Pakistan's Sitara-i-Eisaar award, Pakistan's highest award for humanitarian relief; the Presidential Distinguished Service Award for contributions to health services in Uganda; the United Nations Association of the United States of America's Global Leadership Award; the Woodrow Wilson Institute Corporate Service Award, Columbia University's Teachers College Cleveland E. Dodge Medal for Distinguished Service to Education; Stanford University's Graduate School of Business/Excellence in Leadership Award; and an honorary doctorate in engineering from Polytechnic University.

**Koji Omi**

Founder and Chairman  
STS *forum*

Koji Omi, born 14 December 1932, is a Japanese politician, served as Minister of Finance in the first Cabinet of Shinz Abe, from 2006 to 2007.



Omi was born in Numata, Gunma Prefecture and graduated with a degree in Commerce from Hitotsubashi University. He joined the Ministry of International Trade and Industry and later served as consul general of Japan in New York City and as Director of the Small Business Administration. He resigned from the bureaucracy in 1982 to run for office, and was elected to the Diet of Japan in 1983.

Omi was appointed as Director of the Economic Planning Agency in 1997 and briefly as a state minister under Junichiro Koizumi in 2001. He was on a mission to the United States during the September 11, 2001 attacks. He was Minister of Science and Technology 2001–2002. He was appointed Minister of Finance on 26 September 2006.

Omi has previously supported increases in the national consumption tax, although Abe has distanced himself from this policy and seeks to achieve much of his budget balancing through spending cuts.

**PARTICIPANTS****Dario Gil**

Vice President, Science and  
Technology  
IBM

Dr. Gil is a leading technologist and senior executive at IBM Research.



As Vice President of Science and Technology, Dr. Gil directs a global organization of ~500 researchers focused on advancing the frontiers of information technology through the physical sciences.

Prior to his current position, Dr. Gil was the Director of Symbiotic Cognitive Systems, where he led a strategy focused on the creation of cognitive environments, highly interactive physical spaces designed to improve the quality of decision-making through always-on ambient intelligence. During his tenure he was responsible for the design and creation of three pioneering laboratories and experiential centers: the Cognitive Environments Laboratory, the IBM Research THINK Lab and the IBM Watson Experience Center.

Dr. Gil was the creator and Founding Director of the Smarter Energy Research Institute, an international collaborative research consortium focused on creating optimized energy systems through the use of Big Data, predictive analytics, optimization and advanced computation.

An expert in the field of nanofabrication, he led the team that built the world's first microprocessor with immersion lithography in 2004.

Dr. Gil is a frequent speaker at business events, international conferences, universities, research institutions and foundations. His research results have appeared in over 20 international journals and conferences and he is the author of numerous patents. Dr. Gil is a member of the Future Trends Forum, the Industrial Advisory Group of the Institute of Photonic Sciences and an elected member of the IBM Academy of Technology. He received his Ph.D. in Electrical Engineering and Computer Science from the Massachusetts Institute of Technology (MIT).

### **Ed Hays**

SVP and CTO  
Coca-Cola

Dr. Ed Hays leads the Technical Function for The Coca-Cola Company. The key areas within Technical are Coca-Cola Freestyle, Commercial Products Supply, Flavor Manufacturing & Supply, Global Sustainable Procurement, Quality, Safety & Environment, Research & Development, Scientific & Regulatory Affairs and Technical Governance.

Hays joined The Coca-Cola Company in 1985 as a scientist in Corporate R&D. During his career, he held positions of increasing responsibility including director Product Development in Corporate R&D, director R&D based in Tokyo, Japan for the Middle and Far East Group and director, Corporate R&D. In 2000, he was elected Vice President, The Coca-Cola Company. In 2001, he assumed responsibility for the Science Function and in 2015 was named Chief Technical Officer.



Hays has served as President for the Flavor and Extract Manufacturers Association (FEMA) and is currently on the Boards of FEMA and the International Federation of Essential Oils and Aromas Trades. Additionally, he has served on the Advisory Board of the Savannah College of Art and Design, the Board of Directors of The Atlanta College of Art, the Science and Technology Museum of Atlanta and committees of the Atlanta Area Council of the Boy Scouts of America.

He holds a B.S.A., M.S. and Ph.D. in Food Science from the University of Georgia.

### **Dr. Ray O. Johnson**

Board Director  
QxBranch

Dr. Ray O. Johnson is a corporate executive with a proven track record of leading large organizations, developing and executing growth strategies, and achieving operational excellence in diverse business environments.

He served as Senior Vice President and Chief Technology Officer of the Lockheed Martin Corporation for 9 years (2006 to 2015), where he oversaw engineering, technology, production operations, global supply chain, program management, and logistics and sustainment. He led more than 70,000 people, working on more than 4,000 programs.



He interacts at the highest level nationally and internationally with officials in government, industry, and academia, and he is frequently sought as an expert in the media and as a speaker on business, strategy, innovation, and education.

Before joining Lockheed Martin, Dr. Johnson was the Chief Operating Officer for Modern Technology Solutions, Inc. of Alexandria, VA, and he held executive positions with Science Applications International Corporation (SAIC), including Senior Vice President and General Manager of the Advanced Concepts Business Unit.

Dr. Johnson is a member of the Board of Directors of QxBranch, an early stage data analytics and quantum computing company, Terrestrial Energy, a next-generation nuclear energy company, and United Sciences, which specializes in 3-D scanning technologies. Dr. Johnson is a member of the Argonne National Laboratory Board of Governors and he serves on the USAF Air University Board of Visitors. He has served on the national Math Science Initiative Board of Directors from 2007- 2015. Other national and international affiliations include: the Indo-US Science and Technology Forum; the International Astronautical Federation and the International Academy of Astronautics; and the American Associates of the STS *forum*. He was a member of the USAF Scientific Advisory Board from 2001-2005.

### **Andreas Kramvis**

Vice Chairman  
Honeywell

Andreas Kramvis is a Vice Chairman of Honeywell focused on enabling the global deployment of HOS Gold, advancing the Company's software initiative through improved software development processes, and driving expansion in High Growth Regions, which are all critical components of Honeywell's 5-year plan.



Prior to this role, Andreas served as the President and Chief Executive Officer of Honeywell Performance Materials and Technologies, a global leader in process technology for the oil and gas industry as well as the development and production of high-purity, high-quality performance chemicals and materials. During his six years in the role from 2008-14, PMT increased sales by about 30 percent to become a \$7 billion business, and operating income increased by more than 75 percent. Andreas has also served as the President of Honeywell's Environmental and Combustion Controls business.

Intimately familiar with key markets and economies around the world, Andreas has managed companies with global scope across five different industries. He is the author of a book titled "Transforming the Corporation: Running a Business in the 21st Century," which demonstrates how to systematically transform a business for high performance. Andreas is a graduate of Cambridge University, where he studied engineering specializing in electronics, and he holds an M.B.A. from Manchester Business School.

**Maciej Kranz**

Vice President  
Corporate Technology Group  
Cisco

Maciej Kranz brings 25 years of business and management experience to his position as Vice President, Corporate Technology Group.

Kranz leads an effort focused on identifying and capitalizing on major technology market disruptions, shaping and amplifying Cisco technology strategy, and conducting technology due diligence for potential investments/acquisitions.

Prior to this role, Kranz drove the vision, strategy and P&L for a new hyper-growth business unit focused on Internet of Things. As General Manager, Connected Industries Group, he built a 220-person team and \$250M business from the ground up in 18 months. He relentlessly evangelized the business across the company to establish the Internet of Things as a major Cisco initiative.

As VP Borderless Networks, Kranz led the efforts across Cisco businesses of defining, prioritizing, and delivering Borderless Network Architecture and roadmaps. Cisco networks enabled enterprises to conduct business and communicate from anywhere, anytime, and in any way they wish—as Borderless Networks.

With his tenure as VP of Marketing for the Wireless Networking Business Unit (WNBU), Kranz drove business and product strategy for business-class indoor and outdoor wireless and mobility offerings.

Kranz also led product management for the stackable Ethernet switching business unit, which



he grew to a multi-billion dollar business across enterprise, small business, and Metro Ethernet networks.

Prior to Cisco, Kranz held various management positions at 3Com Corporation, where he was instrumental in the strategy, development and expansion into new markets of 3Com's \$1B Ethernet network interface cards (NICs) product line. He began his professional career at IBM Corporation in International Marketing.

**Klaus Lindpaintner**

Chief Scientific Officer  
Analytical Technologies  
Thermo Fisher Scientific

Dr. Lindpaintner holds Bachelor of Science and Medical Doctorate degrees from the University of Innsbruck in Austria, and a Master of Public Health degree from Harvard University.

He served as a Roche Distinguished Scientist and director of the Roche Center for Medical Genomics, as well as global head of molecular medicine policy and external affairs for F. Hoffman-La Roche AG. Most recently, Dr. Lindpaintner was the chief scientific officer and vice president of research and development at Strategic Diagnostics Inc.

His numerous academic appointments include positions at Jiao-Tong University in Shanghai, Stanford University, Harvard University and the University of London. He is also a Fellow of the American College of Physicians and a Fellow of the American College of Medical Genetics.



**J. Michael McQuade**

Senior Vice President for  
Science and Technology  
United Technologies  
Corporation

J. Michael McQuade is Senior Vice President for Science & Technology at United Technologies Corporation.

His responsibilities include providing strategic oversight and guidance for research, engineering and development activities throughout the business units of the corporation and at the United Technologies Research Center, focused on a broad range of high-technology products and services to the global aerospace and building systems industries.

Dr. McQuade held senior positions with technology development and business oversight at 3M, Imation and Eastman Kodak. Prior to joining UTC in 2006, he served as Vice President of 3M's Medical Division. Previously, he was President of Eastman Kodak's Health Imaging Business. His early career at 3M was focused on research and development of high-end acquisition, processing and display systems for health care, industrial imaging and remote sensing. He has broad experience managing basic technology development and the conversion of early stage research into business growth.

Dr. McQuade holds Ph.D., M.S. and B.S. degrees in physics from Carnegie Mellon University. He received his Ph.D. in experimental high-energy physics for research on charm quark production performed at the Fermi National Accelerator Laboratory.

Dr. McQuade currently serves as a member of the Secretary of Energy Advisory Board and the President's Council of Advisors on Science and Technology.



Dr. McQuade is a member of the Board of Trustees for Carnegie Mellon University, the Board of Directors of Project HOPE and the Board of Trustees for Miss Porter's School. He serves on advisory and visiting boards for a number of university science and engineering schools.

**Rodney A. Makoske**

Senior Vice President of  
Corporate Engineering  
Technology and Operations  
Lockheed Martin

Rodney (Rod) A. Makoske is senior vice president of Corporate Engineering, Technology and Operations

(CETO) at Lockheed Martin. As the principal engineering and operational leader for the corporation, he oversees the recruitment, retention and development of a more than 65,000-person engineering and operations workforce, and he is responsible for ensuring engineering, technical and operational excellence across the enterprise.

Previously, Mr. Makoske served as the vice president of Technical Operations for Lockheed Martin's Mission Systems and Training (MST) business area, where he led an organization of more than 6,000 engineers in the development of maritime, surveillance, sensor system and training programs for the U.S. military and international countries.

Throughout his 27 years at Lockheed Martin, Mr. Makoske has held several leadership positions for large-scale programs and international assignments, including serving as the UK vice president and group managing director for Lockheed Martin UK Integrated Systems. Previously, he served



as vice president of Modernization, Sustainment and Advanced Programs for Lockheed Martin Mission Systems and Sensors, vice president of Technical Operations for Lockheed Martin Systems Integration and director of development and test for Multi-Mission Solutions supporting the U.S. Navy helicopter programs.

Mr. Makoske received a bachelor's degree in mechanical engineering from Virginia Polytechnic Institute and State University in 1986. He is a member of the advisory board of the School of Systems and Enterprises at Stevens Institute of Technology, the largest Department of Defense sponsored research center for systems engineering. He is also the executive sponsor for the strategic partnership between Lockheed Martin and the University of Maryland.

**The Honorable Deborah L. Wince-Smith**

President and CEO  
Council on Competitiveness

Deborah L. Wince-Smith is the President & CEO of the U.S. Council on Competitiveness, a coalition of CEOs, University Presidents, National Laboratory Directions and Labor Leaders committed to driving U.S. productivity and prosperity. She is the Founder and President of the Global Federation of Competitiveness Councils (GFCC)



a network of global competitiveness organizations from around the world. Ms. Wince-Smith is frequently called upon to testify in front of the U.S. Congress and appears regularly on global television news networks including Bloomberg, BBC, CNBC, CNN and Fox News.

With more than 20 years of experience as a senior U.S. government official, she served in the Reagan White House Office of Science and Technology Policy, and as the first Senate-confirmed Assistant Secretary for Technology Policy in the Commerce Department in the administration of President George H.W. Bush.

Ms. Wince-Smith serves as a Corporate Director and Board Member of National and International organizations, U.S. Government Policy Advisory Committees, Charitable Organizations, and as a University Trustee. Currently, she is a member of the Smithsonian National Board, the Secretary of State's Advisory Committee on International Economic Policy and the U.S. Naval Academy Foundation Board. She also serves as Vice-Chairman of Women Corporate Directors. She formerly served as a Trustee of Lehigh University. She is a member of the Commission on the Theft of American Intellectual Property, co-chaired by former Governor Jon Huntsman and former U.S. Director of National Intelligence, Admiral Dennis Blair. Ms. Wince-Smith is a member of the Board of Directors of the American Associates of Japan's prestigious Science and Technology in Society Forum and the Qatar Foundation's R&D Advisory Board. Ms. Wince-Smith also serves as Vice Chair of the World Economic

Forum's Global Agenda Council on Competitiveness. From 2005-2012, Ms. Wince-Smith served as a public Director of NASDAQ-OMX. From 2006-2013 she served as a Senate-confirmed member of the Oversight Board of the Internal Revenue Service. Ms. Wince-Smith currently serves as a member of the Scientific Advisory Committee of Lawrence Livermore National Laboratory.

An expert in national innovation policy and technology commercialization, Ms. Wince-Smith is a Director of NanoMech, Inc., a leading innovator in industrial nanomaterials, and Aerolase, a company at the forefront of portable laser medical devices. She also serves on the Advisory Board of Delos Living, LLC.

A Phi Beta Kappa graduate of Vassar College, Ms. Wince-Smith earned her Master's Degree in Classical Archaeology from King's College, Cambridge. She received an Honorary Doctorate in Humanities from Michigan State University and an Honorary Doctorate in Public Administration from the University of Toledo.

Her two sons are graduates of the U.S. Naval Academy and are currently serving as officers in the U.S. Navy and Marines Corp. She resides in McLean, Virginia.

## **JAPANESE MINISTRY OF INTERNAL AFFAIRS AND COMMUNICATIONS**

### **Shun Sakurai**

Vice Minister for Policy Coordination

### **Shigeki Suzuki**

Director-General  
Global ICT Bureau

## **JAPANESE MINISTRY OF FINANCE**

### **Kazuho Tanaka**

Administrative Vice Minister

### **Masatsugu Asakawa**

Vice Minister of Finance for International Affairs

## **JAPANESE MINISTRY OF EDUCATION, CULTURE, SPORTS, SCIENCE AND TECHNOLOGY**

### **Sadayuki Tsuchiya**

Administrative Vice Minister

### **Kihei Maekawa**

Deputy Minister

## **JAPANESE MINISTRY OF HEALTH, LABOR AND WELFARE**

### **Yasuhiro Suzuki**

Assistant Minister for Technical Affairs

## **JAPANESE MINISTRY OF ECONOMY, TRADE AND INDUSTRY**

### **Ikuro Sugawara**

Vice Minister of Economy, Trade and Industry

### **Hirohumi Katase**

Director General, Trade Policy Bureau

## **JAPANESE FINANCIAL SERVICES AGENCY**

### **Nobuchika Mori**

Commissioner



**Compete.**

Council on  
Competitiveness

# About the Council on Competitiveness

## WHO WE ARE

The Council's mission is to set an action agenda to drive U.S. competitiveness, productivity and leadership in world markets to raise the standard of living of all Americans.

The Council on Competitiveness is the only group of corporate CEOs, university presidents, labor leaders and national laboratory directors committed to ensuring the future prosperity of all Americans and enhanced U.S. competitiveness in the global economy through the creation of high-value economic activity in the United States.

### **Council on Competitiveness**

900 17th Street, NW  
Suite 700  
Washington, DC 20006  
T 202-682-4292  
Compete.org

## HOW WE OPERATE

The key to U.S. prosperity in a global economy is to develop the most innovative workforce, educational system and businesses that will maintain the United States' position as the global economic leader.

The Council achieves its mission by:

- Identifying and understanding emerging challenges to competitiveness
- Generating new policy ideas and concepts to shape the competitiveness debate
- Forging public and private partnerships to drive consensus
- Galvanizing stakeholders to translate policy into action and change