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World Economic Forum
91-93 route de la Capite
CH-1223 Cologny/Geneva
Switzerland

Tel.: +41 (0) 22 869 1212
Fax: +41 (0) 22 786 2744
contact@weforum.org
www.weforum.org
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Introduction

The Future of Manufacturing report (April 2012) identified a number of factors that will shape the future of competition between countries and companies. Three areas rose to the top as the most critical: human capital and talent development; innovation and technology advancement; and strategic use of public policy emphasizing collaboration between policy-makers and business leaders. This series of Manufacturing for Growth reports addresses these key competitive factors and defines ways to drive economic growth and high-value job creation through manufacturing industry sectors.

The Manufacturing for Growth series comprises three volumes:

- **Volume 1: Globally Competitive Policy** seeks to define the features of effective, comprehensive national industrial policy. This volume focuses on six countries chosen to represent both historic manufacturing giants and new and emerging manufacturing powerhouses. This cross-section was selected as representative of developed and emerging economy nations to showcase the unique aspects of each and, more often than not, the similarities in what manufacturing executives recommend to policy-makers.

  Volume 1 was informed by discussions with over 70 chief executives of multinational manufacturing companies, which resulted in:

  - Policy recommendations common across all interviews conducted in support of this project
  - Specific country policy recommendations for:
    - Emerging economies – China, Brazil and India
    - Developed economies – Germany, Japan and the United States
  - An outline of various policy instruments that are available to policy-makers and significantly influence competitiveness
  - An analysis of some critical policy areas most frequently cited by chief executives around the world as having a direct impact on their companies’ ability to compete

In addition, an appendix comparing tax, energy and environmental policy instruments for the six focus countries discussed in Volume 1 is available for download at www.deloitte.com/us/policyframework.

- **Volume 2: Partnering for Competitiveness** examines case studies of public-private collaboration from around the world that enable innovation and technology advancement and promote talent development.

- **Volume 3: Manufacturing Value Chains Driving Growth** illustrates the value and jobs created by specific industry sectors – aerospace, automotive and chemicals – from a global macro-view as well as a micro-view of the impact that a single product value chain or single production facility can have on a location.

To access the entire series electronically, visit http://wef.ch/mfgla13

Project Methodology

During the World Economic Forum Annual Meeting 2012, the Forum-Deloitte LLP project team presented key findings from The Future of Manufacturing report, the culmination of a one-year project that explores why manufacturing is a key driver of economic growth, how the global manufacturing ecosystem has changed and continues to change, and what the key factors for both companies and countries will be to compete in the future.

In a largely unified response, project stakeholders – senior manufacturing executives, policy-makers and civil society leaders – directed the Forum-Deloitte team to continue the project by defining specific, effective, near-term ways to react to these future competitive factors. The resulting project, Manufacturing for Growth, defines key strategies for driving growth and high-value job creation through manufacturing industry sectors, and provides best practice examples for reacting to universal challenges in the area of talent development and innovation.

The Manufacturing for Growth project brings together extensive primary and secondary research from industry, academic and policy leaders. The extended global project team conducted face-to-face interviews around the world with over 70 chief executives of multinational manufacturing companies. Insights from these interviews were supplemented with input collected during workshops hosting senior manufacturing leaders, including members of the Project Consultative Group, in the following locations:

- World Economic Forum private session in Tokyo, Japan: 24 April 2012
- Manufacturing & Society in the 21st Century, in collaboration with the Aspen Institute, Aspen, USA: 17 August 2012
- World Economic Forum private session in Berlin, Germany: 17 October 2012
- World Economic Forum private session in New Delhi, India: 6 November 2012
- Talent-Driven Innovation Symposium, in collaboration with the Manufacturing Institute and Alcoa Foundation, Washington DC, USA: 28 November 2012
- World Economic Forum private session in Davos, Switzerland: 24 January 2013

The project team also gleaned findings from the Forum’s official sessions on manufacturing during the Annual Meeting of the New Champions in Tianjin, People’s Republic of China, in September 2012 and the World Economic Forum on India in Gurgaon, India, in November 2012.

Additionally, this effort benefited from the invaluable time and content developed with a number of experts in the areas of policy, value chain analysis, human capital and specific manufacturing sectors: Deloitte Tax LLP; Deloitte Consulting’s Energy Practice; the National Association of Manufacturers; Duke’s Center on Globalization, Governance & Competitiveness; The Dow Chemical Company; and Nissan.
Executive Summary

In today’s global economy, government actions and public policy play a critical role in shaping the competitiveness of both nations and the individual companies that operate within their borders. The impact that government policies can have across a number of competitiveness drivers – including trade; financial, monetary, tax and legal systems; infrastructure; education; labour markets; and science and technology – are significant. They can directly create both advantages and disadvantages relative to other nations. As the strategic use of public policy intensifies, collaboration between policy-makers and business leaders to create win-win outcomes becomes more essential.

In Davos in January 2012, business leaders gathered to review and discuss the output of The Future of Manufacturing project, which focused on the question: How are global value chains evolving? The follow-up Manufacturing for Growth initiative focuses on the key question: What should be done? The objective of the Manufacturing for Growth initiative is to foster constructive dialogue and collaboration between business leaders and public policy-makers and, therefore, to facilitate better public policy.

Globally Competitive Public Policy

Face-to-face discussions with more than 70 chief executives and other senior executives around the world were conducted from August 2012 through early January 2013 to collect insights into policy recommendations for six focus countries – three developed economy nations (Germany, Japan and the United States) to serve as surrogates for the developed world, and three emerging economy nations (Brazil, China and India) to serve as surrogates for the emerging world.

In addition, workshops were conducted around the world soliciting additional input from business executives and subject matter experts. Executives participating in the working sessions and one-on-one interviews were both passionate and clear when sharing their perspectives and recommendations on altering key aspects of current government policies to drive manufacturing and economic growth. While the CEO recommendations vary based on industry sector and the unique circumstances of each country, several common and recurring themes emerged regarding what constitutes effective public policy.

Effective public policy characteristics

- Consistency, stability and certainty
- Globally competitive, fair and enforced
- Developed through dialogue and collaboration
- Creates institutional legitimacy, credibility and market confidence
- Harmony and alignment
- Financially prudent; balances costs versus benefits

In addition, there were five specific public policy areas where common messages emerged from executives around the world.
Common Policy Recommendations

1. **Competitive tax policy applied within simplified tax systems**: Executives participating in the discussions consistently expressed concern with both business tax policy and complex national tax systems that negatively impact competitiveness. While specific country tax systems vary from country to country, executives broadly said that the countries that could offer competitive advantages in lowering an organization’s overall effective tax rate, as well as remove resource and cost burdens often associated with compliance, would be the winners.

2. **Policy that promotes and protects free and fair trade**: Trade was frequently and passionately mentioned by almost all of the executives participating in the discussions. Executives consistently called for policy-makers to increase both the number of free trade agreements and the pace at which new agreements are formed and ratified. Business leaders also suggested that policy-makers need to consider non-tariff trade barriers, such as border administration and complex regulatory hurdles.

3. **Energy policy promoting efficiency, security, strong infrastructure and low cost**: Executives broadly expressed that countries that could provide clean and sustainable sources of energy at a competitive cost would offer a significant advantage over other nations. They also said it was incumbent on policy-makers to increase comprehensive national energy policies that effectively and responsibly build a portfolio of strategic sources of energy, ensure efficient delivery through world-class infrastructure, and support appropriate R&D efforts in alternative sources of clean energy.

4. **Education and workforce policy that develops superior talent**: The ability to develop and attract the world’s most talented workers was critical to every executive participating in the discussions, regardless of geography. Executives consistently said that their ability to drive innovation is directly linked to their ability to access highly educated workers. While STEM (science, technology, engineering and mathematics) literacy is important, executives consistently said STEM is not, by itself, sufficient. Many commented that creativity and imagination are key ingredients to producing great innovation. As a result, they stressed manufacturers need STEM educated, multidisciplinary thinkers who are also creative and flexible in measuring success.

5. **Science, technology and innovation policy which promotes advanced manufacturing**: Finally, executives conveyed that a talented workforce with strong STEM and creativity skills combined with policies that consistently promote superior science and technology research and development through to commercialization – including the development of advanced manufacturing processes – are essential to national competitiveness.

Partnering for Competitiveness

The reality of today’s global competitiveness environment requires a team effort to succeed. Increasingly, businesses, government and academia are partnering to make strategic choices about how to develop and sustain the knowledge and capabilities necessary to be leaders in the advanced manufacturing economy.

Almost universally, the executives interviewed for this effort expressed concern about attracting, training and retaining the most qualified talent and driving the innovation agendas of their organizations. Business executives emphasized the need for the public and private sectors to collaborate, with each other and with universities, national laboratories, research centres and other non-profits to create environments that breed both talent and innovation. The examples of leading public-private partnership organizations provided by executives varied widely by sector, funding mechanics, tenure, exact focus of mission and geographic reach – from the Agency for Science, Technology and Research in Singapore to Fraunhofer-Gesellschaft in Germany and to the Manufacturing Institute in the United States. Despite differences in location and mission, these leading examples demonstrate a common set of best practices.

Best practices of public-private partnerships

- **Demand-driven and highly responsive to specific needs of industry and society**: The most effective public-private partnership organizations are demand-driven and have a mission focused on specific market needs, both from an industry and societal perspective. These organizations address relevant, timely and current issues while anticipating future demands and trends.

- **Offers a differentiated value proposition that transcends traditional business barriers**: Each of the organizations identified has a distinct and differentiated value proposition essential to its market success. Further, they all excel at creating bridges between groups that would otherwise operate in different spheres, extracting latent value from the collaboration.

- **Long-term horizon and flexible in measuring success**: Like well-managed businesses, leading public-private partnership organizations establish metrics for success and track themselves by those metrics. What differs are the type of metrics and the time horizon for success. A public-private partnership organization is not measured in quarterly earnings and may even use metrics other than monetary value.

- **Seeks revenue streams beyond government or public funding**: Leading organizations derive a much more significant portion of their revenue and funding from private sources than from public sources. In virtually all cases, they have multiple funding sources.

- **Core structural integrity**: Leading public-private partnership organizations display unapproachable integrity when it comes to intellectual property protection and creating trust and credibility. They establish a track record of trust and respect with a nation, with industry and with customers.
Comparative Economic and Related Data

2011 manufacturing export competitiveness by size, skill and technology

Source: Deloitte Touche Tohmatsu Limited and US Council on Competitiveness, 2013 Global Manufacturing Competitiveness Index

Key:
- Exports of manufactured goods with high skill and technology intensity
- Exports of manufactured goods with medium skill and technology intensity
- Exports of manufactured goods with low skill and technology intensity; and labour-intensive and resource-based manufactured goods

Note: The classification of goods into different degrees is based on Standard International Trade Classification (SITC) codes, UNCTAD. Source: Deloitte Touche Tohmatsu Limited and US Council on Competitiveness, 2013 Global Manufacturing Competitiveness Index
Comparative Economic and Related Data
Movement and levels of manufacturing products to and from top manufacturing economies and their trading partners, by product type

Source: Deloitte Touche Tohmatsu Limited and US Council on Competitiveness, 2013 Global Manufacturing Competitiveness Index

Notes:
• The classification of goods into different degrees is based on Standard International Trade Classification (SITC) codes, UNCTAD
• Shaded grey countries represent export trade partners of top 10 GMCI competitive nations

Source: Deloitte Touche Tohmatsu Limited analysis (iv)

Thickness of arrows is total manufacturing exports from point A to point B

Color of arrows
High and medium skill and technology exports as % of total manufacturing exports

<40 40–59 60–80 >80

<25 billion $25–$100 billion >$100 billion

China
Brazil
United States
Total manufacturing exports in billion US$

>1,000
500–1,000
200–499
<200

Thickness of arrows is total manufacturing exports from point A to point B

United States
Canada
Brazil
China
South Korea
Japan
Taiwan
Germany
India
Singapore

Source: Deloitte Touche Tohmatsu Limited analysis (iv)
Manufacturing Value Chains Driving Growth

Today’s manufacturing value chains are complex, highly interconnected, and rapidly changing. Policy-makers and business leaders face competing objectives and challenges to navigate this environment. Policy-makers strive to create more high-value jobs and improve the quality of life for their citizens. Manufacturing leaders are increasingly responding to competitiveness pressures to attract the best from a global pool of talent, along with the capital, capabilities, and the global customers and revenues necessary to maintain their competitiveness and viability. As explained by Gary Gereffi and Joonkoo Lee (in their essay adapted from their article Why the World Suddenly Cares about Global Supply Chains1), the ability of a country to prosper today depends on its participation in the global economy and its role in global supply chains. But understanding its role – much less changing its role – can be complicated at best.

Key concepts and trends in understanding today’s global value chains

- Shift from “trade in goods” to “trade in value-added”: Over the past 20 years, with an emphasis on East Asia, global supply chains have grown exponentially, covering not only finished goods but also sub-assemblies and components. This has resulted in more intermediate goods than finished goods traded across borders, and more parts and components imported for use in exports. In 2009, the world exports of intermediate goods exceeded the combined export values of final and capital goods. This new pattern of global trade is referred to as a shift from “trade in goods” to “trade in value-added” and “trade in tasks”.

While most intermediate goods are still traded within large regional economic blocks such as the European Union rather than across them, Asia’s linkages to the European Union and North America represented the two highest inter-regional import flows of intermediate goods in 2008. Asia imported more intermediate goods than it exported, indicating the region’s high level of integration with global supply chains. Increasingly, China’s ability to excel at scale-driven specialization and develop “supply chain cities” has become a source of persistent competitive advantage.

- Top-down versus bottom-up: The Global Value Chain (GVC) framework analyses “the full range of activities that firms and workers perform to bring a product from its conception to its end use and beyond”. This holistic view provides two contrasting vantage points: a top-down “governance view” of supply chains focuses mainly on lead firms and the organization of global industries, and a bottom-up “upgrading” perspective which focuses on strategies used by countries and regions to maintain or improve their positions in the global economy.

- The new math of value-added: Interestingly, China does not create or capture most of the value generated through its value chain exports. As more types of intermediate goods are traded within global supply chains, the discrepancy is growing between where final goods are produced and exported and where value is created and captured. Domestic content only accounts for about half of China’s manufacturing exports.

CEO Recommendations

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Mary Andringa
Chief Executive Officer
Vermeer Corporation
USA

R. C. Bhargava
Chairman
Maruti Suzuki India Limited
India

Thomas Bauer
Chief Executive Officer
Bauer Aktiengesellschaft
Germany

Rodney Brooks
Chairman, Founder, and Chief Technical Officer
Rethink Robotics
USA

Ronald Bullock
Chairman
Bison Gear and Engineering Corp.
USA

Raul Calfat
Chief Executive Officer
Votorantim
Brazil

Carlos Cardoso
Chairman, President and Chief Executive Officer
Kennametal Inc.
USA

Marcelo Strufaldi Castelli
Chief Executive Officer
Fibria Celulose SA
Brazil

Wolfgang Colberg
Chief Financial Officer
Evonik Industries AG
Germany

Frederico Pinheiro Fleury Curado
Chief Executive Officer
Embraer SA
Brazil

Vinod K. Dasari
Managing Director
Ashok Leyland Limited
India

Luiz Tarquínio Sardinha Ferro
Chief Executive Officer
Tupy SA
Brazil

José Edson Barros Franco
Chief Executive Officer
InterCement Brasil S/A
Brazil

Ralf-Michael Franke
Chief Executive Officer
Drive Technology Division Industry Sector
Siemens AG
Germany

Wu Gang
Chairman and Chief Executive Officer
Goldwind Science & Technology Co. Ltd
China

Jürgen M. Giessinger
Chief Executive Officer
Schaeffler Technologies AG & Co. KG
Germany

Carlos Ghosn
Chairman and Chief Executive Officer
Renault-Nissan Alliance
France

S. Gopalakrishnan
Executive Co-Chairman
Infosys Technologies Limited
India

José Carlos Grubisich
Chief Executive Officer
Eldorado Brazil Celulose
Brazil

Liang Haishan
Executive Vice-President
Haier Group Company
China

Masaki Imai
Senior Vice-President and Executive Officer, General Executive of Strategic Corporate Planning Division
JVC Kenwood Corporation
Japan

Noriyuki Inoue
Chairman and Chief Executive Officer
Daikin Industries Ltd
Japan

V. G. Jaganathan
President
Sundaram
India

Kellie Johnson
President and Chief Executive Officer
Ace Clearwater Enterprises Inc.
USA

Dirk Kaliebe
Chief Financial Officer
Heidelberger Druckmaschinen AG
Germany

Kazuaki Kama
President and Chief Executive Officer
IHI Corporation
Japan

Neeraj Kanwar
Vice-Chairman and Managing Director
Apollo Tyres Limited
India

Taro Kato
President
NGK Insulators Ltd
Japan

Haruo Kawahara
Chairman
JVC Kenwood Corporation
Japan

Makoto Kimura
President
Nikon Corporation
Japan

Klaus Kleinfeld
Chairman and Chief Executive Officer
Alcoa Inc.
USA
<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Company</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yoshimitsu Kobayashi</td>
<td>President and Chief Executive Officer</td>
<td>Mitsubishi Chemical Holdings Corporation</td>
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<td>Masahiro Koezuka</td>
<td>Executive Vice-President and Director</td>
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<td>Chairman, President and Chief Executive Officer</td>
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<td>Lupatech SA</td>
<td>Brazil</td>
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<td>Jan Mrosik</td>
<td>Chief Executive Officer Smart Grid</td>
<td>Division Infrastructure and Cities Sector</td>
<td>Siemens AG</td>
</tr>
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<td>Hiromichi Nakamichi</td>
<td>Representative Executive Officer and President</td>
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<td>Gregory Page</td>
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<td>Olof Persson</td>
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<tr>
<td>Gordon Riske</td>
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<td>KION Group GmbH</td>
<td>Germany</td>
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<td>Siegfried Russwurm</td>
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<td>Industry Sector</td>
<td>Siemens AG</td>
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<td>Harry Schmelzer Jr</td>
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<tr>
<td>Winfried Seitz</td>
<td>Chief Technology Officer</td>
<td>BSH Bosch und Siemens Hausgeräte GmbH</td>
<td>Germany</td>
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<tr>
<td>Hideaki Shindo</td>
<td>General Manager, Corporate Strategy</td>
<td>NGK Insulators Ltd</td>
<td>Japan</td>
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<tr>
<td>Mohsen Sohi</td>
<td>Chief Executive Officer</td>
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<td>Michael Splinter</td>
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<td>John Surma</td>
<td>Chairman and Chief Executive Officer</td>
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<td>Kazuhiko Takechi</td>
<td>General Manager, Corporate Planning</td>
<td>Center, Management Planning Office</td>
<td>Hitachi Ltd</td>
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<td>Luiz Eduardo Taliberti</td>
<td>Chief Executive Officer</td>
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<tr>
<td>Stephan B. Tanda</td>
<td>Member of the Board</td>
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<td>Todd Teske</td>
<td>Chairman and Chief Executive Officer</td>
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</tr>
<tr>
<td>Atsushi Tsurumi</td>
<td>General Manager, Financing Department,</td>
<td>Financing and Accounting Headquarters</td>
<td>Nikon Corporation</td>
</tr>
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<td>Harry Schmelzer Jr</td>
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<td>President and Chief Executive Officer</td>
<td>Remy International Inc.</td>
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<td>Jin Wei</td>
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<tr>
<td>Roger Wood</td>
<td>President and Chief Executive Officer</td>
<td>Dana Holding Corporation</td>
<td>USA</td>
</tr>
<tr>
<td>Yoshitake Yamaguchi</td>
<td>Senior Manager, Executive Support Office,</td>
<td>Corporate Government and External Relations</td>
<td>Toshiba Corporation</td>
</tr>
<tr>
<td>Junji Yasui</td>
<td>Senior Executive Vice-President and Chief Supply Chain Officer</td>
<td>NEC Corporation</td>
<td>Japan</td>
</tr>
</tbody>
</table>
Project Consultative Group

The Project Consultative Group comprises members of the project task force (senior executives from Forum Partner companies) as well as Members of the Forum’s Global Agenda Council on Advanced Manufacturing, who served in an advisory role to this project by providing their input through calls, interviews and various Forum workshops. The World Economic Forum would like to express its gratitude to the members of the Project Consultative Group.

### Manufacturing for Growth Task Force

- Peter Bosch
  - Head of Strategy, Production and Logistics
  - Volkswagen AG
- Frederic Daubas
  - Chief Marketing Officer
  - Safran Group
- Michael Hildinger
  - Head of Corporate Strategy
  - Schaeffler AG
- Vijay Kaira
  - Head of Manufacturing, Automotive
  - Mahindra & Mahindra Ltd
- Michael Kamel
  - Director, Strategy and Business Development
  - Bombardier Aerospace
- Sanjay Jalona
  - Senior Vice-President and US Head of Manufacturing
  - Infosys Ltd
- Jock-Mendoza Wilson
  - Director, International and Investor Relations
  - System Capital Management
- Trevor Mann
  - Head of Supply Chain and Chairman of the Operating Committee for Africa, Middle East and India
  - Renault-Nissan BV
- Edward Rogers
  - Global Strategy Manager, Corporate Strategy
  - UPS
- Rodolfo Sabonge
  - Vice-President, Market Research and Analysis
  - Panama Canal Authority
- Lisa Schroeter
  - Director, International Policy
  - The Dow Chemical Company
- Francisco Soares Neto
  - Vice-President, Manufacturing Engineering
  - Embraer SA

### Subodh Tandale
- Executive Director, Head of International Business
  - Bharat Forge Ltd

### Andrew Weinberg
- Chairman, Strategy
  - Brightstar Corp.

### Urban Wass
- Director, Head of Product and Road Safety
  - AB Volvo

### Jeff Wilcox
- Vice-President, Engineering, Corporate Engineering and Technology
  - Lockheed Martin Corporation

### Serge Yoccoz
- Vice-President, Corporate and Strategic Planning
  - Renault

### Global Agenda Council on Advanced Manufacturing

- Arindam Bhattacharya
  - Partner and Managing Director
  - The Boston Consulting Group

- Fadi Farra
  - Adviser to the Prime Minister of Kazakhstan

- João Carlos Ferraz
  - Vice-President
  - Brazilian Development Bank (BNDES)

- Gary Gereffi
  - Professor of Sociology and Director, Center on Globalization, Governance & Competitiveness
  - Duke University

- Llyr Jones
  - Head, Group Strategy
  - BAE Systems Plc

- Kevin Kolevar
  - Vice-President, International Government Affairs and Public Policy
  - The Dow Chemical Company

- Yasushi Konno
  - General Manager and Senior Consultant
  - Nomura Research Institute Ltd
Jennifer McNelly
President
The Manufacturing Institute

Atul Mehta
Director, Global Manufacturing,
Agribusiness and Services
International Finance Corporation (IFC)

Jun Ni
Shien-Ming Wu Collegiate Professor of
Manufacturing Science and Dean,
University of Michigan, Shanghai Jiao
Tong University Joint Institute
University of Michigan

Alok Paliskar
Global Head, Manufacturing
Mahindra Satyam Limited

Gary Pisano
Harry E. Figgie Jr Professor of Business Administration
Harvard Business School

Jean-Paul Rodrigue
Professor, Global Studies and Geography
Hofstra University

Vikas Sehgal
Managing Director and Global Head,
Automotive
NM Rothschild & Sons Ltd

Daniel Viederman
Chief Executive Officer
Verité
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- Paul Ballonoff, Energy Policy and Regulatory Specialist, Deloitte United States (Deloitte Consulting LLP)
- André Argenton, Global Senior R&D Director of Corporate Research, Dow Chemical
- Ken Dewoskin, Chairman, Deloitte China Research and Insight Centre (CRIC), Deloitte China
- Gary Gereffi, Center on Globalization, Governance & Competitiveness, Duke University
- Doug Gish, Principal, Deloitte United States (Deloitte Consulting LLP)
- Michael Goldbas, Principal, Deloitte United States (Deloitte Consulting LLP)
- Kevin Kolevar, Vice-President, International Government Affairs and Public Policy, The Dow Chemical Company
- Ellen MacNeil, Partner, Deloitte United States (Deloitte Tax LLP)
- Rebecca Ranich, Director, Deloitte United States (Deloitte Consulting LLP)
- Lisa M. Schroeter, Director of International Policy, The Dow Chemical Company
- Guy W. Wagner, Director, Purchasing Administration, Strategy and Cost Management, Nissan, North America
- Priscilla Zhang, R&D Tax and Government Incentives Expert, Deloitte United States (Deloitte Tax LLP)

Advanced Materials Systems
- Tom Aldred, Senior Manager, Deloitte United States (Deloitte Consulting LLP)
- Jeff Carbeck, Massachusetts Institute of Technology, Materials Science and Engineering
- Duane Dickson, Principal, Deloitte United States (Deloitte Consulting LLP)

Global Aerospace and Defence Outlook
- Pauline Biddle, Partner, Deloitte UK
- Tom Captain, Global A&D Sector Leader, Deloitte Touche Tohmatsu Limited
- Gianluca Di Cicco, Partner, Deloitte Italy
- Gilbert Fayol, Partner, Deloitte France
- Nidhi Goyal, Director, Deloitte India
- Dan Haynes, Principal, Deloitte United States (Deloitte Consulting LLP)
- Michael Hessenbruch, Partner, Deloitte Germany
- John Hung, Partner, Deloitte China
Kevin McFarlane,
Managing Director, Deloitte United State
(Deloitte Corporate Finance LLC)
Frank Milano, Partner, Deloitte United States
(Deloitte & Touche LLP)
Koji Miwa, Partner, Deloitte Japan
Martin Vezina, Partner, Deloitte Canada
Charles Wald, Director and Senior Advisor, Deloitte United States (Deloitte Services LP)

Chief executive officers and executive interviewers

Brazil
José Othon Tavares de Almeida,
Partner, Brazil Manufacturing Leader, Deloitte Brazil
Suellen Yuri Higashi,
Senior, Brazil Manufacturing Practice, Deloitte Brazil

China
Ricky Tung,
Partner, China Manufacturing Leader, Deloitte China

Tracy Wang,
Senior Manager, National Industry Program, Deloitte China

Rosa Yang,
Partner, China Manufacturing Leader, Deloitte China

Germany
Alexander Börsch,
Director, Clients & Markets – Research, Deloitte Germany

Susan Schleicher,
Senior Manager, Clients & Markets, Industry Manufacturing, Deloitte Germany

Jan Stratmann,
Managing Partner, Clients & Markets, Deloitte Germany

Thomas Döbler,
Partner, Manufacturing Industry Leader, Deloitte Germany

India
Alka Gupta,
Senior Manager, Strategic Targets Group, Clients and Markets, Deloitte India

Lolita Joseph,
Manager, Strategic Targets Group, Clients and Markets, Deloitte India

Kumar Kandaswami,
Senior Director, Deloitte India

Harsh Srivastava,
Manager, Strategic Clients Group, Clients & Markets, Deloitte India

Japan
Kyoko Fujikawa,
Chief Staff, General Administration Group, Deloitte Japan

Yasutoki Ishiguro,
Partner, Process Sector Leader, Deloitte Japan

Akira Kondo,
Managing Partner, Deloitte Japan

Yuki Kuboshima,
Partner, Asia Pacific Manufacturing Leader, Deloitte Japan; Executive Director, South East Asia Deloitte Consulting Pte Ltd

Koichi Kuse,
Partner, Clients & Industries, Deloitte Japan

Toshifumi Kusunoki,
Partner, Industrial Products & Electronics Sector Leader, Deloitte Japan

Tomoko Matsumoto,
Manager, Research & Knowledge Management, Manufacturing, Deloitte Japan

Koji Miwa,
Partner, Aerospace & Defense Sector Leader, Deloitte Japan

Yoichiro Ogawa,
Vice-Chairman of Global Board, Deloitte Touche Tohmatsu Limited; Managing Partner, Practice Development & International Affairs, Deloitte Japan

Masato Sase,
Partner, Automotive Sector Leader, Deloitte Japan

Joe Vitale,
Global Automotive Sector Leader, Deloitte Touche Tohmatsu Limited

Tomonori Yako,
Partner, Technology, Media & Telecommunications Leader, Deloitte Japan

United States
Jodi Benkarski,
Principal, Deloitte United States (Deloitte Services LP)

Lilly Chung,
Principal, Deloitte United States (Deloitte Consulting LLP)

Michelle Collins,
Partner, Deloitte United States (Deloitte & Touche LLP)

Bob Denove,
Partner, Deloitte United States (Deloitte & Touche LLP)

Duane Dickson,
Principal, Deloitte United States (Deloitte Consulting LLP)

Craig A. Gifti,
Vice-Chairman and US Leader, Consumer & Industrial Products, Deloitte United States LLP (Deloitte LLP)

Tim Hanley,
Global Manufacturing Leader, Deloitte Touche Tohmatsu Limited

Sharafat Khan,
Principal, Deloitte United States (Deloitte Consulting LLP)

Paul Maynard,
Partner, Deloitte United States (Deloitte & Touche LLP)

John Moavenzadeh,
Senior Director, Head of Mobility Industries, World Economic Forum USA

Sarita Nayyar,
Managing Director, Head of Consumer Industries, World Economic Forum USA

Rob Parkins,
Director, Deloitte United States (Deloitte Services LP)

Dorothy Powers,
Manager and Project Manager, Manufacturing for Growth, Deloitte United States (Deloitte Consulting LLP)

John Rhodes,
Partner, Deloitte United States (Deloitte & Touche LLP)

Jack Russi,
Management Partner, Deloitte United States (Deloitte LLP)

Dmitri Shiry,
Deloitte United States (Deloitte Tax LLP)

Nick Sowar,
Partner, Deloitte United States (Deloitte & Touche LLP)
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**Forum event panelists and discussion leaders**
Soumen Basu, Executive Adviser, ManpowerGroup, India
Peter Bosch, Head of Strategy, Production and Logistics, Volkswagen
Dilip Chenoy, Chief Executive Officer and Managing Director, National Skills Development Corporation (NSDC)
Gary Coleman, Managing Director, Global Industries, Deloitte Touche Tohmatsu Limited
Fadi Farra, Adviser to the Prime Minister of Kazakhstan; Global Agenda Council on Advanced Manufacturing
Anil Gupta, Michael Dingman Chair in Global Strategy and Entrepreneurship, University of Maryland
Baba N. Kalyani, Chairman and Managing Director, Bharat Forge
Hartmut Kühne, Department Head, Federal Ministry of Economics and Technology of Germany
Nihal G. Kulkarni, Managing Director, Kirloskar Oil Engines, India
Yasushi Konno, General Manager and Senior Consultant, Nomura Research Institute Ltd
Arun Maira, Member, Planning Commission, India
Sarita Nayyar, Managing Director, Head of Consumer Industries, World Economic Forum USA
Dhruv M. Sawhney, Chairman and Managing Director, Triveni Engineering & Industries, India
Ni Jun, Shien-Ming Wu Collegiate Professor of Manufacturing Science and Dean, UM-SJTU Joint Institute, University of Michigan
Arjun Nohwar, Planning Commission of India

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Chris Conrardy, Chief Technology Officer and Vice-President, Technology and Innovation, EWI
Ryan Costella, Director of Strategic Initiatives, Click Bond Inc.
Chip Cotton, Program Manager, Energy Research and Development, General Electric
Peter Fischer, Minister (Economics), Embassy of the Federal Republic of Germany to the United States
Kumar Garg, Senior Advisor to the Deputy Director, White House Office of Science and Technology Policy
Mary Gershwin, President, US-Brazil Connect
Craig A. Giffi, Vice-Chairman and US Leader, Consumer & Industrial Products, Deloitte United States (Deloitte LLP)
Johney Green, Director, Energy and Transportation Science Division, Oak Ridge National Lab
William Hartman, Executive Vice-President, Fraunhofer USA Inc.
Scott Hudson, Principal Manager, International Social Responsibility and Community Outreach, Alcoa Foundation
Amy Kaslow, Senior Fellow, Council on Competitiveness
Robert I. Lerman, Institute Fellow, Urban Institute
Glenn Marshall, Program Manager, Supply Chain Quality at Newport News Shipbuilding, a Division of Huntington Ingalls Industries
Jennifer McNelly, President, Manufacturing Institute
Alexei Monsarrat, Director, Global Business and Economics Program, Atlantic Council
Jane Oates, Assistant Secretary, Employment and Training, US Department of Labor
Dennis Dio Parker,  
Assistant Manager, Toyota North  
American Production Support Center.

Bob Paton,  
Chief Executive Officer, Manufacturing  
Skills Australia.

Joseph M. Pietrantonio,  
Vice-President, Environmental, Health,  
Safety and Quality, and Corporate Chief  
Engineer, Air Products and Chemicals  
Inc.

Dan Swinney,  
Executive Director, Chicago  
Manufacturing Renaissance Council.

Peter Zierhut,  
Vice-President, European Operations,  
Haas Automation.

The Aspen Institute – Manufacturing  
& Society in the 21st Century:  
Presenters and participants

Rodney Brooks,  
Chairman, Founder and Chief Technical  
Officer, Rethink Robotics Inc.

William D. Budinger,  
Founder, Former Chairman and Chief  
Executive Officer, Rodel Inc.

Ronald D. Bullock,  
Chairman and Chief Executive Officer,  
Bison Gear and Manufacturing  
Corporation; Chairman, Board of  
Trustees, The Manufacturing Institute.

Gregory W. Cappelli,  
Co-Chief Executive Officer, The Apollo  
Group.

Carlos M. Cardoso,  
Chairman, President and Chief  
Executive Officer, Kennametal Inc.

David Chavern,  
Executive Vice-President and Chief,  
Operating Officer, US Chamber of  
Commerce.

Thomas J. Duesterberg,  
Executive Director, Manufacturing &  
Society in the 21st Century, The Aspen  
Institute.

John F. Fiedler,  
Chairman of the Board (Emeritus),  
BorgWarner Inc.

Craig A. Giffi,  
Vice-Chairman and US Leader,  
Consumer & Industrial Products,  
Deloitte United States (Deloitte LLP).

Stephen V. Gold,  
President and Chief Executive Officer,  
Manufacturers Alliance for Productivity  
and, Innovation (MAPI).

The project team would like to thank all  
workshop, call and interview participants  
for contributing their insights and time.  
These individuals are (in alphabetical  
order):

Philippe Advani,  
Vice-President, Global Sourcing  
Network, EADS.

Vineet Agarwal,  
Joint Managing Director, Transport  
Corporation of India Ltd.

Sachin Arolkar,  
Vice-President, Commercial and  
Business Planning and International  
Operations, Mahindra & Mahindra Ltd.

Yogesh Bangur,  
Director, LNB Group.

Rajeev Batra,  
Group Head, Corporate Affairs,  
Hindustan Unilever Ltd.

Ankur Bhatnagar,  
Vice-President, Reputation.com.

Robin Braeutigam,  
Director, Technical Representative,  
Volkswagen Group Japan Kk.

Antonio Campello,  
Vice-President, Corporate Strategy and  
New Business Development, EMBRAER.

Marcelo O. Cerqueira,  
Vice-President, Vinyls, Braskem.

Christian Charnaux,  
Vice-President Strategy and Innovation,  
Hilton Worldwide.

Atul Dhawan,  
Partner, National Leader Clients and  
Markets, Deloitte Touche Toh-matsu  
India Private Limited.

Frederic Daubas,  
Chief Marketing Officer, Safran.

Christopher Emerson,  
Senior Vice-President, Future  
Programmes and Market Strategy,  
Airbus.

Kyouji Funatsumaru,  
Senior Vice-President, Group Truck Technology  
APAC Cab and Vehicle Assembly, Volvo  
Nippon KK.

Anshoo Gaur,  
Head, Amdocs India.

Mark A. Gottfredson,  
Partner, Bain & Company.

Magnus Granström,  
Director Research and Public Funding  
EU, Advanced Technology and  
Research, Volvo.
Manufacturing for Growth Strategies for Driving Growth and Employment

Peter Hanna,
Manager, Strategy and Business Development, Bombardier Aerospace

Peter Haynes,
Senior Director, Advanced Strategies and Research, Microsoft Corporation

Michael Hildinger,
Head of Corporate Strategy, Schaeffler AG

Hidetoshi Imazu,
Member of the Board, Executive Vice-President, Nissan Motor Co. Limited

Christian Koitzsch,
Corporate Affairs, Technical Planning, Robert Bosch, Germany

Carsten Larsen,
New Business Development Director, DOW DEUTSCHLAND INC.

Takahisa Miyauchi,
Executive Vice-President and Group Chief Executive Officer, Chemicals, Mitsubishi Corporation

Jan Mueller,
Senior Vice-President, Communications Strategy and PR Programmes, Deutsche Post DHL

S. Ananda Murali,
Sales Director, HCL Japan Ltd

Keisuke Nishimura,
Director, Kirin Holdings Company Limited

Ralf Oehl,
Senior Vice-President, Corporate Strategy and Development, M+W Group

Henning Oeltjenbruns,
Head of Strategy Daimler Trucks, Buses and Vans, Daimler

Devdip Purkayastha,
President, CHEP India

Jackson Schneider,
Executive Vice-President of People, Institutional Relations and Sustainability, Embraer

Seo Bo Shin,
Managing Director and Chief Executive Officer, Hyundai Motor India Ltd, India

Antônio Cesar da Silva,
Marketing Director, WEG

Yo Takeuchi,
Chief Financial Officer, Development Bank of Japan Inc.

Urban Wass,
Director, Volvo

Elisabeth Werner,
Head of Unit, European Commission

Serge Yoccoz,
Vice-President, Corporate and Strategic Planning, Renault SAS

Ulhas Yargop,
President, IT Sector, Group Chief Technology Officer and Member, Group Executive Board, Mahindra & Mahindra Ltd

Judith Zeihe,
Head of Division, Enterprise Connect, Department of Industry, Innovation, Science, Research and Tertiary Education, Australia

Core project team
From the World Economic Forum (in alphabetical order)

Stefano Ammirati,
Associate Director, Head of Automotive Industry, World Economic Forum

Maxime Bernard,
Senior Manager, Aviation & Travel Services Industries, Global Leadership Fellow, World Economic Forum USA; Project Manager, Manufacturing for Growth

John Moavenzadeh,
Senior Director, Head of Mobility Industries, World Economic Forum USA

Dorothy Powers,
Manager and Project Manager, Manufacturing for Growth, Deloitte United States (Deloitte Consulting LLP)

From Deloitte LLP (in alphabetical order)

Jodi Benkarski,
Deloitte United States (Deloitte Services LP)

Michelle Drew,
Principal, Deloitte United States (Deloitte Consulting LLP)

Bharath Gangula,
Deloitte United States (Deloitte Services LP)

Jonathan Holdowsky,
Deloitte United States (Deloitte Services LP)

Craig A. Giffi,
Vice-Chairman and US Leader, Consumer & Industrial Products, Deloitte United States (Deloitte LLP)

Pandarinath Illinda,
Deloitte United States (Deloitte Services LP)

Jonathan Holdowsky,
Deloitte United States (Deloitte Services LP)

Tripp Parran,
Deloitte United States (Deloitte Consulting LLP)

Khushi Shah,
Deloitte United States (Deloitte Services LP)

Contributors
From Deloitte LLP (in alphabetical order)

Mimi Lee,
Deloitte Touche Tohmatsu Limited

Scott Sopher,
Principal, Deloitte United States (Deloitte Consulting LLP)

Special thanks also to Jeffrey Callahan, Justin Howard, Mike Lui, John Martin, Nic Perfetti, and Amish Thakker, Deloitte United States (Deloitte Consulting LLP)

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