

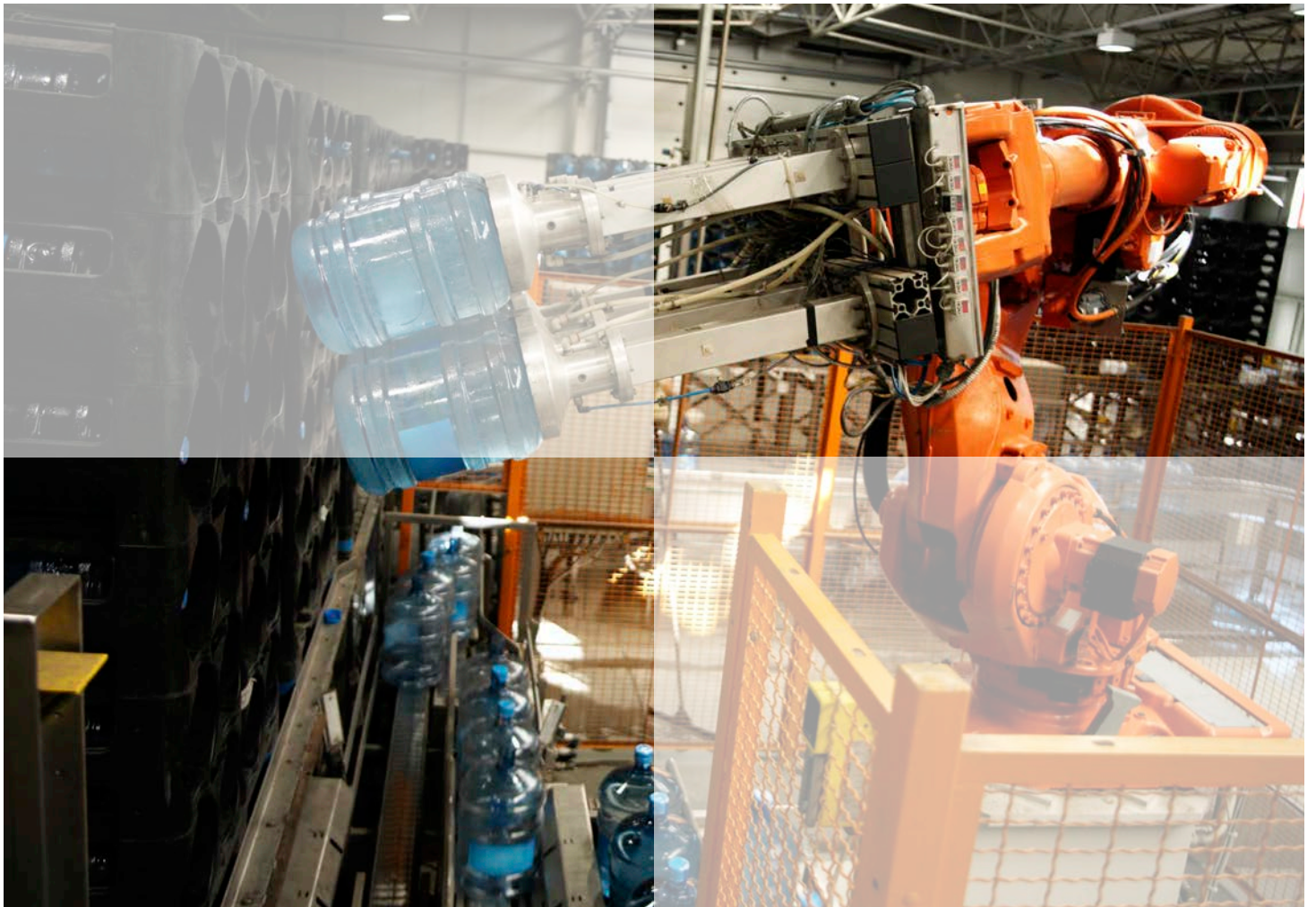
Manufacturing for Growth

Strategies for Driving Growth and Employment

Executive Summary

A World Economic Forum Report

in collaboration with Deloitte Touche Tohmatsu Limited



Disclaimer

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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

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

Maxime Bernard
Senior Manager
World Economic Forum USA

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

Dorothy Powers
Project Manager
Deloitte United States
(Deloitte Consulting LLP)

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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 develop 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 can problem-solve in a team environment.
- 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.

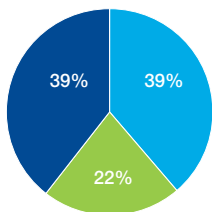
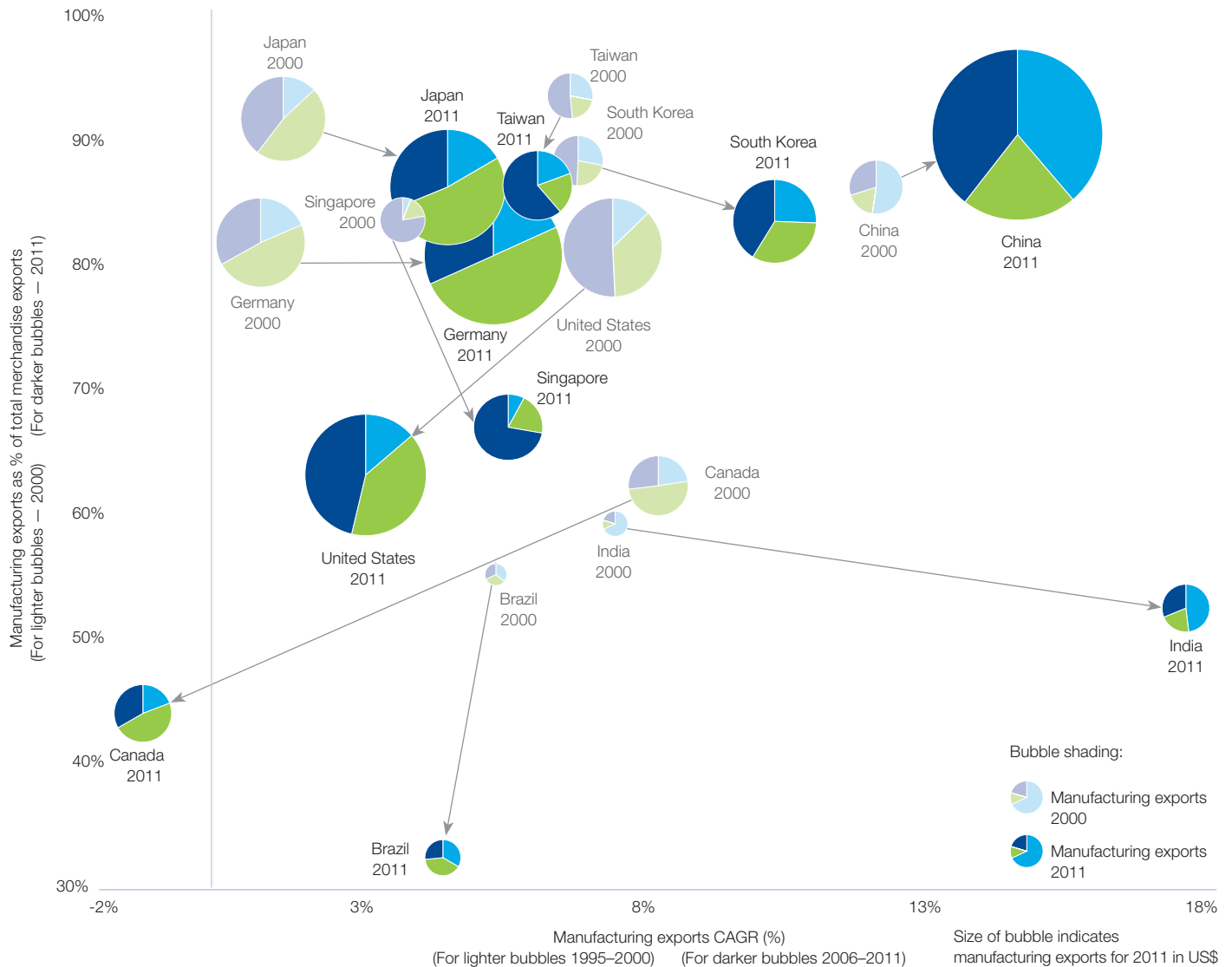
Almost universally, the executives interviewed for this effort expressed concern about attracting, training and retaining the most qualified talent and driving the innovation agendas of their organizations. Business executives emphasized the need for the public and private sectors to collaborate, with 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

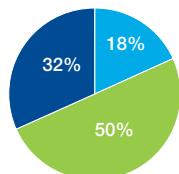
- **Demand-driven and highly responsive to specific needs of industry and society:** The most effective public-private partnership organizations are demand-driven and have a mission focused on specific market needs, both from an industry and societal perspective. These organizations address relevant,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

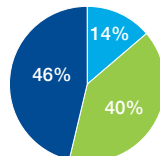
2011 manufacturing export competitiveness by size, skill and technology



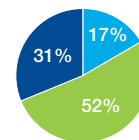
China
\$1,768.5 billion (2011)
\$219.3 billion (2000)



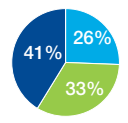
Germany
\$1,226.3 billion (2011)
\$459.2 billion (2000)



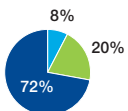
United States
\$952 billion (2011)
\$644.6 billion (2000)



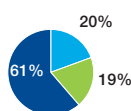
Japan
\$724.8 billion (2011)
\$449.4 billion (2000)



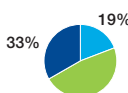
South Korea
\$473.5 billion (2011)
\$154.9 billion (2000)



Singapore
\$279 billion (2011)
\$117.5 billion (2000)



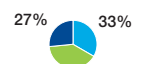
Taiwan
\$270.7 billion (2011)
\$141.0 billion (2000)



Canada
\$202.3 billion (2011)
\$175.4 billion (2000)



India
\$151.7 billion (2011)
\$26.0 billion (2000)



Brazil
\$84.2 billion (2011)
\$31.6 billion (2000)

Source: Deloitte Touche Tohmatsu Limited analysis ^(iv)

Key: Percentages in these bubbles are for 2011

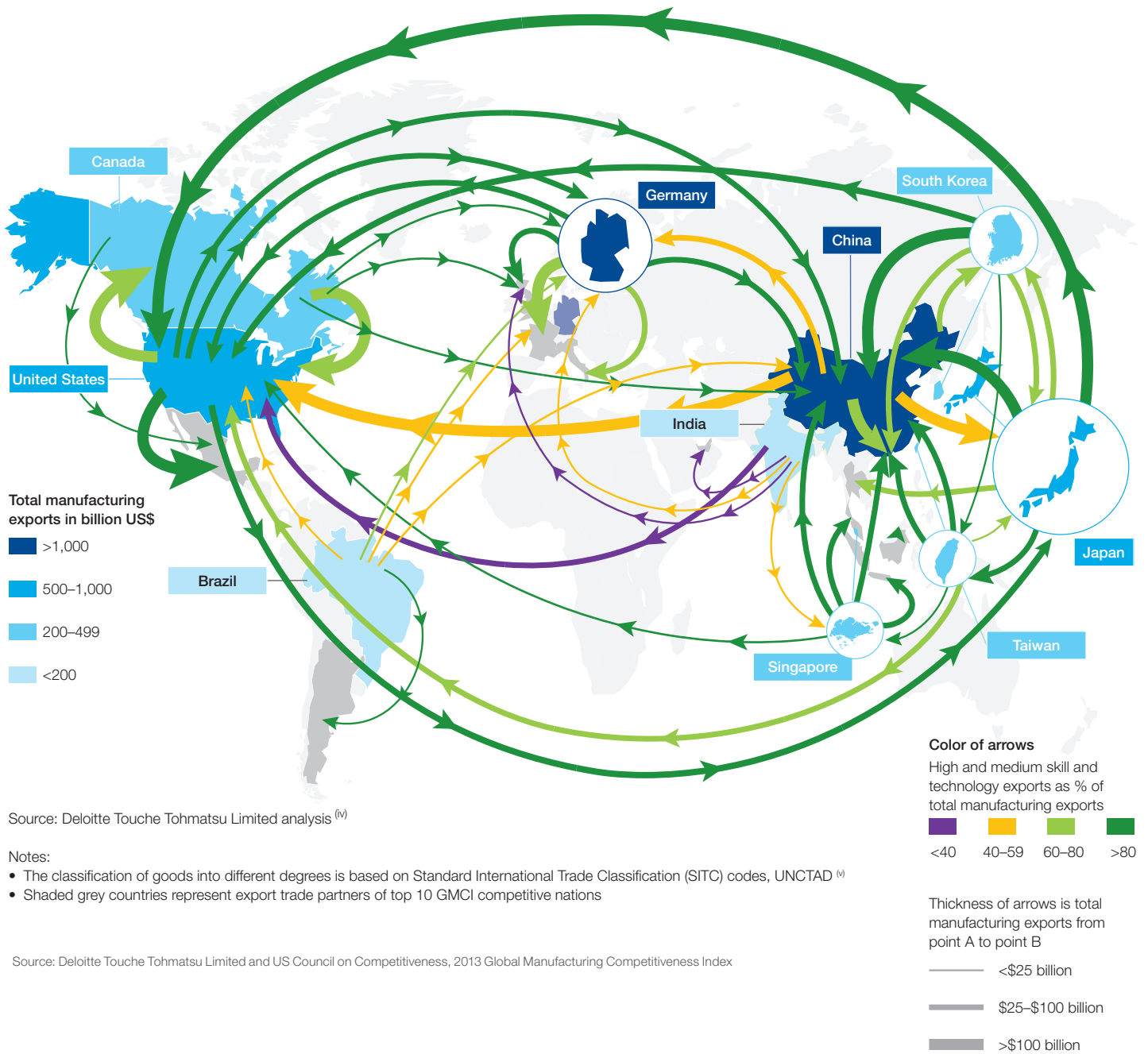
- Exports of manufactured goods with high skill and technology intensity
- Exports of manufactured goods with medium skill and technology intensity
- Exports of manufactured goods with low skill and technology intensity; and labour-intensive and resource-based manufactured goods

Note: The classification of goods into different degrees is based on Standard International Trade Classification (SITC) codes, UNCTAD ^(v)

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



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 Chains*¹), 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.

- **Shifting end markets:** As world trade is bouncing back from the economic crisis of 2008-2009, emerging economy nations are becoming the main growth engine of world economic recovery. Stagnant growth in demand in the global North since the mid-1980s was exacerbated by the recent economic crisis, whereas demand is quickly growing in the global South, particularly in emerging economies like China, India and Brazil. From 2005 to 2010, the merchandise imports of the European Union increased by 27%, while they increased in the US by 14%. Over the same time period, emerging economies expanded their merchandise imports much faster: Brazil, 147%; India, 129%; China, 111%; and South Africa, 51%.

To better inform this dialogue on global value chains, the report illustrates and analyses the value and jobs created in three manufacturing sectors: aerospace, automotive, and chemicals. Each of these sectors is representative of several broader themes: globalization, including shifting consumer and production markets; spread of free trade; rise of the global middle class; increasing use of technology, digitization and advanced processes; and the skilled and talented workforce required in today's manufacturing. An understanding of how manufacturing and value chains work in a globalized world is critical to developing and implementing effective policies to enable the advancement of manufacturing.

Policy recommendations from chief executives and senior business executives, best practices of leading public-private partnerships with an emphasis on talent and innovation, and new perspectives on today's complex global value chains are the key elements of the *Manufacturing for Growth* report. The hope is that this report serves as a primer for informed and spirited dialogue and debate, and that the Manufacturing for Growth effort has helped to provide a foundation for constructive collaboration among business, government and civil society.

¹ Gereffi and Lee. Why the World Suddenly Cares About Global Supply Chains. *Journal of Supply Chain Management*. July 2012. Volume 48, Number 3, pp. 24-32

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 Tarquinio Sardinha Ferro
Chief Executive Officer
Tupy SA
Brazil

José Édison 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. Geißinger
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

Yoshimitsu Kobayashi
President and Chief Executive Officer
Mitsubishi Chemical Holdings Corporation
Japan

Masahiro Koezuka
Executive Vice-President and Director
Fujitsu Ltd
Japan

Kazuhiro Kurihara
Vice-President and Executive Officer
Hitachi Ltd
Japan

Tom Linebarger
Chairman and Chief Executive Officer
Cummins Inc.
USA

Andrew Liveris
Chairman, President and Chief Executive
Officer
The Dow Chemical Company
USA

Geraldo Lopes
Chief Executive Officer
Ferbasa
Brazil

Marcos A. de Marchi
Chief Executive Officer
Elekeiroz SA
Brazil

Sergio Marchionne
Chairman and Chief Executive Officer
Fiat/Chrysler Group
USA

Robert McDonald
Chairman, President and Chief Executive
Officer
The Procter & Gamble Company
USA

John McGlade
Chairman, President and Chief Executive
Officer
Air Products and Chemicals Inc.
USA

Shunichi Miyanaga
Senior Executive Vice-President
Mitsubishi Heavy Industries Ltd
Japan

Alexandre Monteiro
Chief Executive Officer
Lupatech SA
Brazil

Jan Mrosik
Chief Executive Officer Smart Grid
Division Infrastructure and Cities Sector
Siemens AG
Germany

Hiroaki Nakanishi
Representative Executive Officer and
President
Hitachi Ltd
Japan

Atsutoshi Nishida
Chairman
Toshiba Corporation
Japan

Keith Nobusch
Chairman and Chief Executive Officer
Rockwell Automation Inc.
USA

Gregory Page
Chairman and Chief Executive Officer
Cargill Incorporated
USA

Olof Persson
Chief Executive Officer
AB Volvo
Sweden

Nicholas Pinchuk
Chairman, President and Chief Executive
Officer
Snap-on Incorporated
USA

Wolfgang Reitzle
Chief Executive Officer
Linde AG
Germany

Gordon Riske
Chief Executive Officer
KION Group GmbH
Germany

Siegfried Russwurm
Chief Executive Officer
Industry Sector
Siemens AG
Germany

Harry Schmelzer Jr
Chief Executive Officer
WEG Indústrias SA
Brazil

Winfried Seitz
Chief Technology Officer
BSH Bosch und Siemens Hausgeräte
GmbH
Germany

Hideaki Shindo
General Manager, Corporate Strategy
NGK Insulators Ltd
Japan

Mohsen Sohi
Chief Executive Officer
Freudenberg & Co. KG
Germany

Carlos José Fadigas de Souza Filho
Chief Executive Officer
Braskem SA
Brazil

Michael Splinter
Chairman and Chief Executive Officer
Applied Materials Inc.
USA

K. Sridharan
Chief Financial Officer
Ashok Leyland Limited
India

John Surma
Chairman and Chief Executive Officer
United States Steel Corporation
USA

Kazuhiko Takechi
General Manager, Corporate Planning
Center, Management Planning Office
Hitachi Ltd
Japan

Luiz Eduardo Taliberti
Chief Executive Officer
Ecoverdi Participacoes S/A
Brazil

Stephan B. Tanda
Member of the Board
Royal DSM NV
Netherlands

Todd Teske
Chairman and Chief Executive Officer
Briggs & Stratton Corporation
USA

Atsushi Tsurumi
General Manager, Financing Department,
Financing and Accounting Headquarters
Nikon Corporation
Japan

K. Venkataraman
Chief Executive Officer and Managing
Director
Larsen and Toubro Limited
India

John Weber
President and Chief Executive Officer
Remy International Inc.
USA

Jin Wei
Chief Executive Officer
Suntech Power Holdings Co. Ltd
China

Roger Wood
President and Chief Executive Officer
Dana Holding Corporation
USA

Yoshitake Yamaguchi
Senior Manager, Executive Support
Office, Corporate Government and
External Relations Division
Toshiba Corporation
Japan

Junji Yasui
Senior Executive Vice-President and
Chief Supply Chain Officer
NEC Corporation
Japan

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 Kalra
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

Aloke 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 and 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 States (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,
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. Giffi,
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 Sower,
Partner, Deloitte United States (Deloitte & Touche LLP)

National Association of Manufacturers – Public policy subject matter experts

Robyn Boerstling,
Director, Transportation and
Infrastructure Policy

Gardner A. Carrick,
Vice-President, Strategic Initiatives

Carolyn Holmes Lee,
Senior Director, Tax Policy

Jessica Lemos,
Director, International Trade Policy

Alicia Meads,
Director, Energy and Resources Policy

Chad Moutray,
Chief Economist

Rosario Palmieri,
Vice-President, Infrastructure, Legal and
Regulatory Policy

Brian Raymond,
Director, Technology and Domestic
Economic Policy

Christine Scullion,
Director, Human Resources Policy

Jay Timmons,
President and Chief Executive Officer

Amanda Wood,
Director of Labor and Employment
Policy

Chip Yost,
Assistant Vice-President, Energy and
Resources Policy

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Forum event panellists 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)

Drew Greenblatt,
President, Marlin Steel Wire Products,
LLC

Lawrence D. Kingsley,
President and Chief Executive Officer,
Pall Corporation

Lawrence Ladin,
Chairman Emeritus, Compressor
Controls Corporation

Michael C. Maibach,
President and Chief Executive Officer,
European-American Business Council

Steven H. McKnight,
Director, Civil, Mechanical and
Manufacturing Innovation Division
(CMMI), National Science Foundation

Keith D. Nosbusch,
Chairman, President and Chief
Executive Officer, Rockwell Automation
Inc.

Timothy H. Powers,
Chairman, President and Chief
Executive Officer, Hubbell Incorporated

Timothy T. Tevens,
President and Chief Executive Officer,
Columbus McKinnon Corporation

Jay Timmons,
President and Chief Executive Officer,
National Association of Manufacturers

Franklin J. Vargo,
Former Vice-President, International
Economic Affairs, National Association
of Manufacturers

Jane L. Warner,
Executive Vice-President, Illinois Tool
Works

John H. Weber,
President and Chief Executive Officer,
Remy International Inc.

Tim Welsh,
Senior Vice-President, National Industry
Strategy Group, University of Phoenix

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 Tohmatsu
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

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 Zielke,
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,
Deloitte United States (Deloitte Services LP)

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)

Melodie Munoz-Sidun,
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)

Production

From Deloitte LLP

Editor and Creative Design: Steve
Schmith, Deloitte United States (Deloitte
Services LP)



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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