

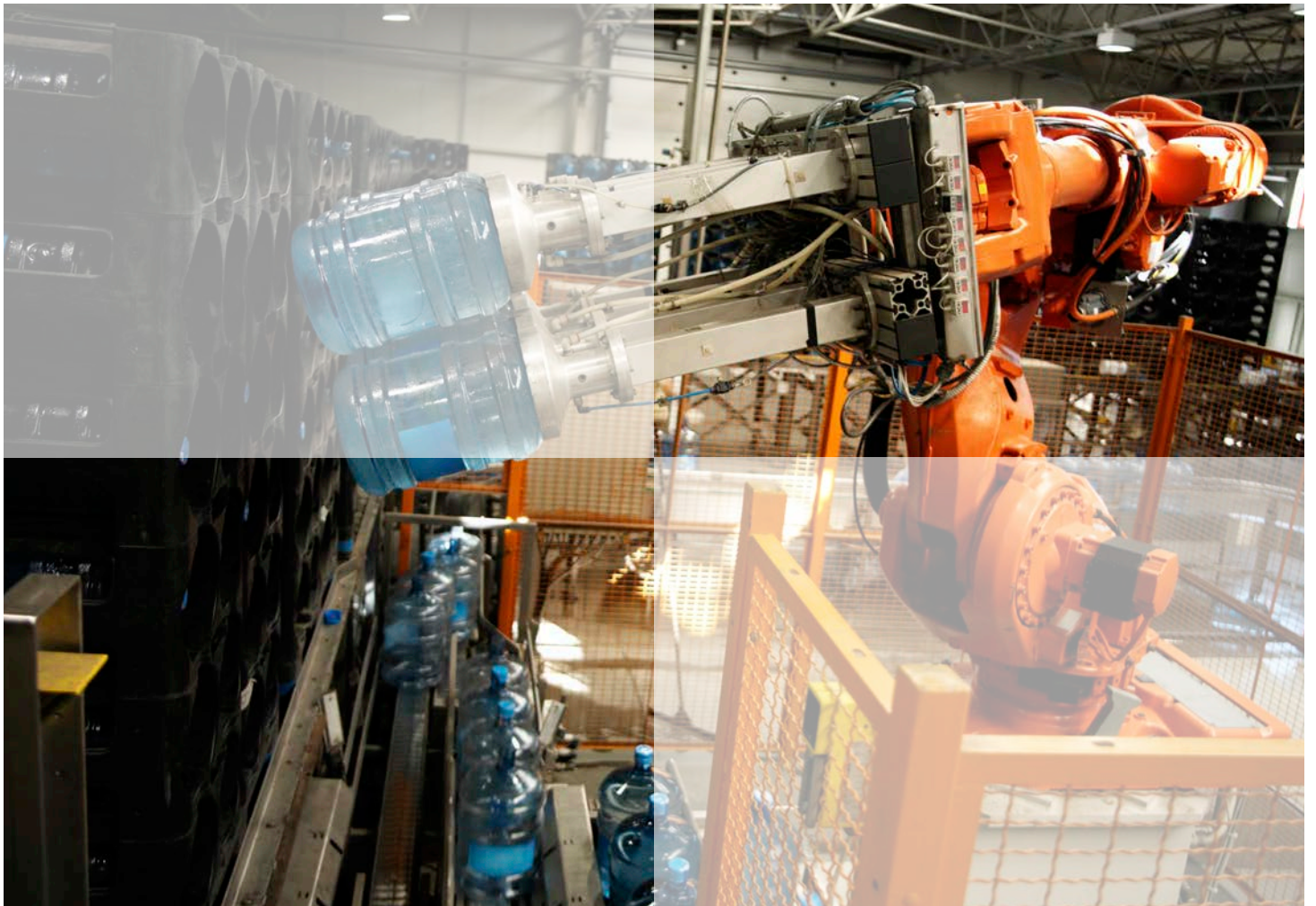
Manufacturing for Growth

Strategies for Driving Growth and Employment

Executive Summary

A World Economic Forum Report

in collaboration with Deloitte Touche Tohmatsu Limited



Disclaimer

The viewpoints expressed in this report attempt to reflect the collective engagement of individuals as Green Growth Action Alliance members and do not necessarily imply an agreed position among them or institutional endorsement by any participating company, institution or organization involved in the Alliance, or of the World Economic Forum.

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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

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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.

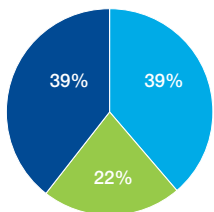
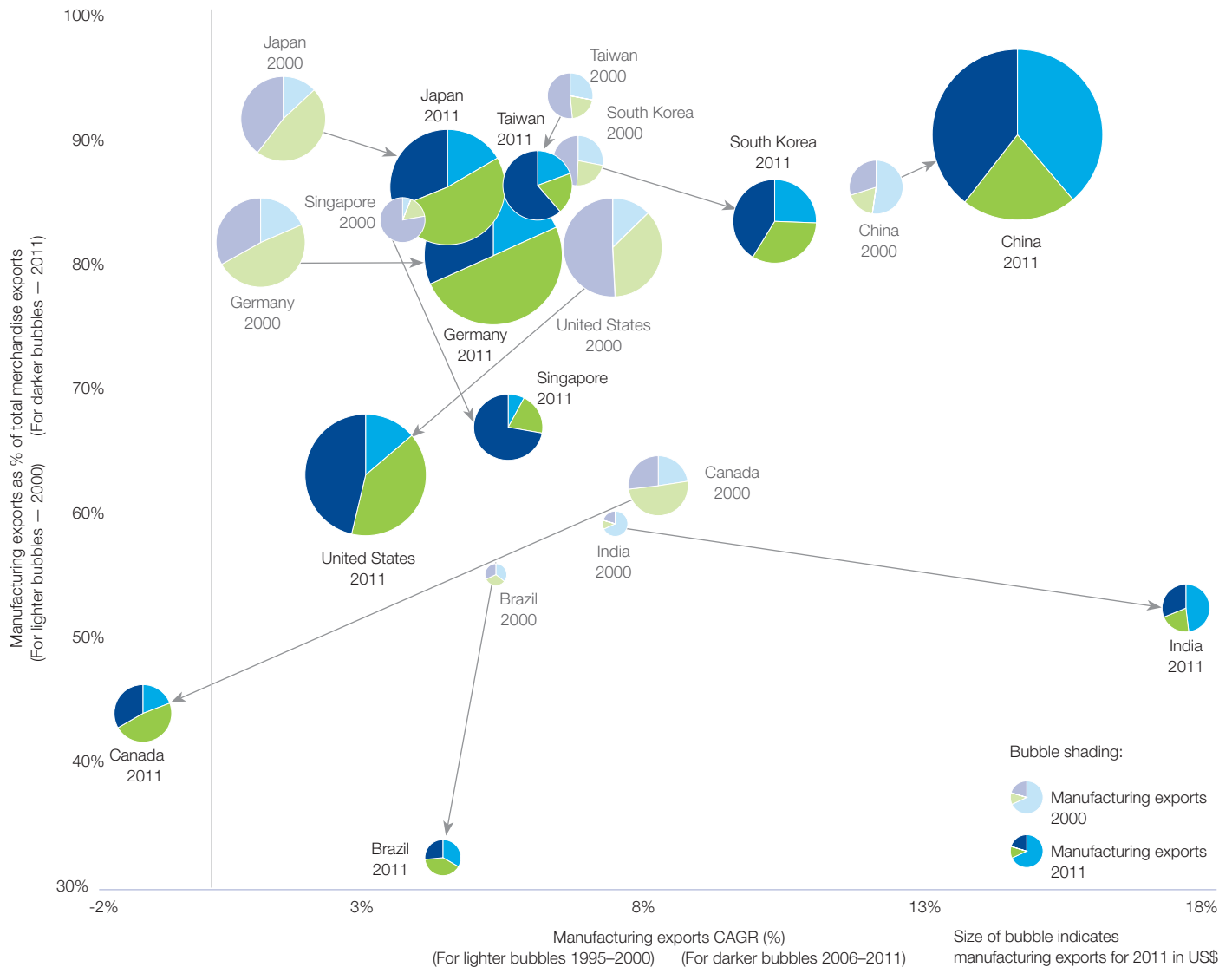
Almost universally, the executives interviewed for this effort expressed concern about attracting, training and retaining the most qualified talent and driving the innovation agendas of their organizations. Business executives emphasized the need for the public and private sectors to collaborate, with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

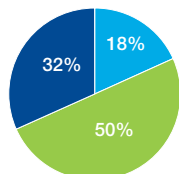
- **Demand-driven and highly responsive to specific needs of industry and society:** The most effective public-private partnership organizations are demand-driven and have a mission focused on specific market needs, both from an industry and societal perspective. These organizations address relevant,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

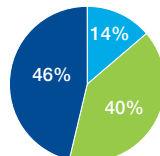
2011 manufacturing export competitiveness by size, skill and technology



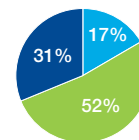
China
\$1,768.5 billion (2011)
\$219.3 billion (2000)



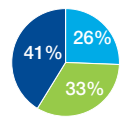
Germany
\$1,226.3 billion (2011)
\$459.2 billion (2000)



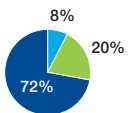
United States
\$952 billion (2011)
\$644.6 billion (2000)



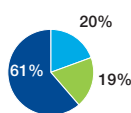
Japan
\$724.8 billion (2011)
\$449.4 billion (2000)



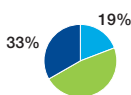
South Korea
\$473.5 billion (2011)
\$154.9 billion (2000)



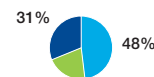
Singapore
\$279 billion (2011)
\$117.5 billion (2000)



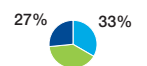
Taiwan
\$270.7 billion (2011)
\$141.0 billion (2000)



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: Exports of manufactured goods with high skill and technology intensity

Exports of manufactured goods with medium skill and technology intensity

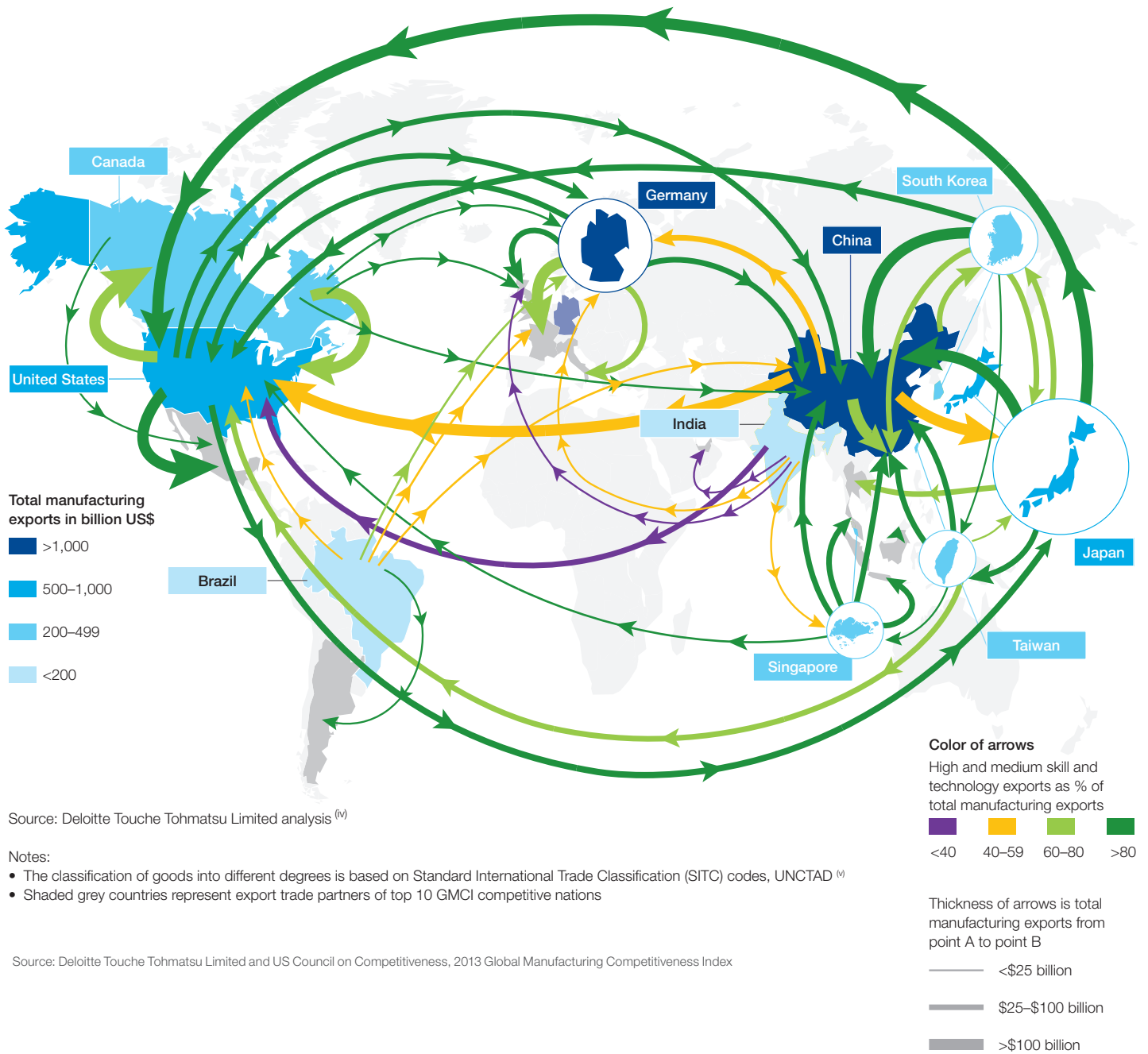
Exports of manufactured goods with low skill and technology intensity; and labour-intensive and resource-based manufactured goods

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

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