

ADB

Beyond Factory Asia

Fuelling Growth in a Changing World



Asian Development Bank



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Background Paper for the Asian Development Bank
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Asian Development Bank

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Foreword

Factory Asia—these two simple words help define Asia’s phenomenal economic growth over the past 2 decades. A growing population eager to earn more provided relatively cheap and abundant labor in the last decade of the 20th century and the early part of the current century, producing many of the manufactured consumer goods the world needed. East Asia’s exports surged, particularly final goods destined for the United States (US) and eurozone economies. The array of goods produced and traded evolved rapidly—from agricultural to (low-value) manufacturing, and into services in a few cases.

The beginning of East Asia’s remarkable transition in the 1970s and 1980s was initially powered by major Japanese multinational investments, which established subsidiaries across the region. But it was the unprecedented economic reforms unleashed by the People’s Republic of China (PRC) in the late 1980s that provided the fodder for exponential expansion. “Production networks” were born, coupled with a complex web of intermediate goods increasingly produced and traded among developing countries in Asia. The PRC led the charge as final assembler of manufactured goods, with Southeast Asia benefiting considerably from the regional nature of many production processes. Along with this rapid growth came new jobs, higher incomes, and relative prosperity. Millions of people were lifted out of poverty. “Factory Asia” catapulted Asia back on the world map with its share of global output quickly rising. Several recent studies proclaim the Asian Century is upon us, but only if the region can sustain its growth momentum and structural economic transformation continues. Key to its success will be embracing policies that ensure emerging Asia is not caught in the so-called “middle income trap”.

Did the global financial crisis and ensuing Great Recession change that prognosis? Dual track growth—emerging economies expanding above levels in the US and eurozone—appears to be well-entrenched. This is dramatically affecting Asia’s trade patterns. Clearly, there is far more intraregional trade within Asia. But there is also rapidly growing inter-regional and South-South trade, with huge potential for future expansion. These changes pose a myriad interesting and complex questions:

1. Will Factory Asia continue to be the dominant driver of growth in Asia?
2. How will the increase in domestic and regional demand transform Factory Asia?
3. For those firmly embedded in current regional production networks, what adjustments will be needed in the overall growth strategy?
4. It appears that larger firms dominate production networks in Asia. What can be done to encourage small and medium enterprises (SMEs) to join production networks and benefit from greater integration?
5. For the many countries outside Factory Asia—or on its periphery—are there emerging opportunities up for grabs? Will they become new partners and join regional production networks, or will they leapfrog the early stages entirely and enter at higher levels of the value chain?
6. How will regional and global investment flows adjust to the changing roles and importance of agriculture, manufacturing, and services to economic growth?
7. How will countries balance environmental and growth challenges; and how can they ensure growth is more inclusive and equitable as they move beyond the Factory Asia model?
8. And, importantly, should the region build a common, coordinated strategic vision as a guide toward future transformation? Is there sufficient political will? Or is a strategic vision even necessary? Is the whole more than the sum of its parts, or should dominant economies continue learning and competing, drawing others along in their wake?

The bottom line is this: What lies beyond Factory Asia? The region is home to 2.6 billion people; so this is a very important question. As the global economy readjusts, as the region needs to sustain growth and create new jobs, better allocate its large financial resources toward more productive and socially equitable investment, what lies in store?

The 2013 ADB Annual Meeting Governors' Seminar aims to debate these issues. The range of policy, institutional, legal and regulatory reforms needed to drive Asia's economic and social transformation to the next level are all part of the New Factory Asia model.



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SECTION I

Introduction

Asia has shown tremendous dynamism over the last 5 decades, despite wide intraregional diversity. Most of the enviable economic growth has been driven by a relentless focus on exports. In several Asian economies, success in export-led manufacturing took gross domestic product (GDP) per capita to the levels of developed countries. Asia's transformation has run through five phases:¹

1. Japan's ascent in the 1960s, which helped its rapid recovery from post-war destruction.
2. Export driven growth initiated in the 1970s by the original Asian Tigers—Hong Kong, China; the Republic of Korea; Singapore; and Taipei, China.
3. A cooperative approach to development pioneered in the 1980s by the Association of Southeast Asian Nations (ASEAN).
4. Economic liberalization in the People's Republic of China (PRC) beginning in the late 1980s, aided by the rapid development of production networks, creating the moniker “Factory Asia” (**Box 1**).
5. Early reforms in the 1990s gave credence to India's large growth potential, which began to bear fruit in the 2000s.

Throughout these five phases, there was a remarkable transformation in global manufacturing, characterized by the rapid rise of manufacturing in Asia. A recent study showed that in 1970, the United States (US), Germany, and Japan dominated the sector globally, accounting for 52% of total value added in manufacturing.² From 1970 to 2010, the Group of 7 lost 24 percentage points in world share (from 70% to 46%), with 18 of those 24 points lost since 1990.³ The big winner was the PRC, whose share rose 18 percentage points from 1970 to 2010—with 16 of those percentage points coming since 1990. Six other developing nations—including four from Asia (India, Indonesia, the Republic of Korea, and Thailand)⁴—saw each of their shares rise by more than 0.5 percentage

¹ This typology is drawn from Gyohten (2006).

² See Baldwin and Lopez-Gonzalez (2013).

³ The Group of 7 includes Canada, France, Germany, Italy, Japan, the United Kingdom, and the US.

⁴ The other developing nations were Poland and Turkey.

Box 1: What is Factory Asia?

Factory Asia refers to the model of regional production networks connecting factories in different Asian economies, producing parts and components that are then assembled, with the final product shipped largely to advanced economies (see Ando and Kimura 2005). These networks form part of regional and global value chains. While production networks are an important part of manufacturing in Asia, they have generally been confined to East Asia. Physical proximity, ease of trade—and many other factors—shape production networks (see Johnson and Noguera 2012). There are countries with large or emerging manufacturing sectors outside these production networks. Their manufacturing output is primarily aimed at domestic markets, while some countries have been successful in finding a niche in exporting intermediate or final goods directly. The main premise in this monograph is that developing Asia can build on the success of the Factory Asia model, and significantly strengthen manufacturing in general.

Source: ADB staff.

point of the global total. Together, these ‘6 risers’ gained 7 percentage points of global manufacturing; with 5 of these happening since 1990.

Building on this success, Asia is now poised for a possible “Asian Century”. Given its current growth trajectory, by 2050 Asia can expect to attain living standards comparable to that of Europe today. Furthermore, its share of the global economy could swell to more than half (**Box 2**). However, as the Asian Development Bank (ADB) noted in *Asia 2050*, published in 2011, Asia’s continued ascent is not “pre-ordained”. Indeed, Asia must grapple with many issues, not the least of which are regional and global economic crises.

The impact of the 1997 Asian financial crisis lingers, and the aftermath of the 2008 global financial crisis—with the sluggish US recovery and eurozone financial or fiscal restructuring—will be felt for years to come. While Asia has thus far proven its resilience, and its share of the global economy and wealth continue to rise, it may be time for the region to enter a new development phase.

The continued weak economic prospects in advanced economies’ necessitate a rethinking of the Factory Asia model—as traditional demand will likely remain weak. Also, Asian economies face rising labor and factor costs, which gradually erode their price advantage. New technologies and processes could potentially transform manufacturing and leave developing countries at a disadvantage.

Box 2: Asia's Rise

The pace and scale of Asia's rise have been nothing short of staggering. In a region rich in cultural, social, political and economic diversity, peoples' lives have been transformed just as the globe has been transformed. Hundreds of millions of people have been lifted out of poverty, parts of the region have experienced a halving in their infant mortality rates and decades have been added to life expectancy.

Nearly all the high-performing economies in Asia deliberately set out to support prosperity by reforming their policy and institutional settings. Many economies within the region have invested heavily in their people and created a climate that has supported capital investments. With the benefit of a good education, growing shares of young people have found jobs as they have reached prime working age.

Open global trading systems and infrastructure to reduce transport costs have driven regional and global integration. More broadly, a global system of rules has allowed for greater stability and spurred increasing levels of interdependence.

Source: Government of Australia (2012).

This monograph, prepared for the Governors' Seminar at the 2013 ADB Annual Meeting, aims to summarize some recent developments and issues; and pose several strategic questions for senior policy makers. Section II provides an overview of Asian manufacturing, analyzing key trends in production and trade across all economies (both in- and outside Factory Asia). Section III analyzes the key issues and challenges facing Factory Asia, many of which apply to manufacturing as a whole. Section IV offers strategic options for Factory Asia economies and those on the periphery, providing specific policy recommendations to address major challenges. It also examines several issues relevant to advanced economies. Finally, Section V concludes by attempting to answer the questions raised earlier. ADB plans further analytical work and policy consultations based on the discussions and feedback generated at the Governors' Seminar.

SECTION II

Asian Manufacturing and Global Production Networks

Manufacturing will remain an important contributor to wealth in Asia in the near future. What is special about the sector is that its productivity growth generally tends to be higher than other sectors. Most fast growing Asian economies have benefited from shifting labor from low productivity agriculture to higher productivity manufacturing. Yet, as the region becomes richer, manufacturing's share may tend to decline as consumption patterns shift more toward services. Nevertheless, manufacturing's role extends beyond its contribution to GDP—it drives productivity growth and innovation. By its very nature, manufacturing combines assorted intermediate inputs to produce a final product. Hence, it has strong spillover effects on other parts of the economy.

Hausmann et al. (2011) have shown that richer countries tend to manufacture “sophisticated” goods that few other countries produce. This is because they have accumulated knowledge and capabilities that other countries lack. This accumulated knowledge can be leveraged into related areas and achieve higher incomes. Factory Asia's value chain fragmentation allowed the region's economies easier entry into producing more sophisticated manufactures.

Baldwin and Lopez-Gonzalez (2013) argue that the production networks that have been the bedrock of Factory Asia will proliferate further, offering a way for less developed countries to move into manufacturing (**Box 3**). While unable to build entire networks from scratch, several of these countries can join them as they can bypass several critical skill-sets—such as design, engineering, procurement, and distribution. Instead, these countries can concentrate on the processes themselves and leave the rest to other suppliers. This lowers the requirement for joining a value chain, thus allowing countries to more easily gain a foothold in manufacturing.

Asian economies are increasingly important in global manufacturing as measured by value-added (**Table 1**). The rise of the PRC and the Republic of Korea was aided by the growing importance of production networks. The same applies to Indonesia as well to a considerable extent. However, India has also shown impressive

Box 3: Some Key Facts about the Global Supply Chain

Supply chains undoubtedly have given a new meaning to industrialization. That a country could export domestically-designed high value products was a testimony to its rich-nation status. It is no longer true, for exporting a sophisticated manufactured good is no longer the hallmark of having arrived. It may simply reflect a nation's position in an international supply chain.

A few facts related to supply chains are noteworthy.

- The primary fact on manufacturing is that it is astoundingly concentrated. The United States (US), the People's Republic of China (PRC), Germany and Japan—the Giant-4 manufacturers—account for about 60% of all manufacturing output.
- International supply chains are mostly regional rather than global. Most supply chain trade happens within what have been called Factory Asia, Factory Europe, and Factory North America.
- Over the last decade or so, supply-chain trade has shifted heavily towards Factory Asia and away from Factory North America and Factory Europe.
- “Headquarter” economies—those that tend to be technology leaders—tend to be diverse in terms of partners on both the sourcing and sales side. “Factory economies”—those that tend to follow—tend to be heavily reliant on the closest high-technology manufacturing giant—the US, Germany and Japan.
- About half of the world's output of goods and services are sold as intermediate inputs.
- The importance of services trade is not yet appreciated. Intermediate services taken together account for 28% of world supply-chain trade flows (all intermediates). The global pattern for intermediate industrial goods is more regionalized than the pattern for intermediate services. Thus, there remain significant opportunities for economies such as India.
- The world is still more globalised for final goods than it is for intermediates; the domestic-sales-to-export split is about 60–40 for final manufactures while it is about 70–30 for intermediates (70% sold locally and 30% exported).
- Overall, world production remains mostly national. The share of imported intermediates in total world manufacturing is 16%; for the production of all goods and services, it is 8%.

Source: Excerpts from Baldwin and Lopez-Gonzalez (2013); except reference to India and implications for technology advances, which were added by the authors.

gains in manufacturing—which has focused more on serving its relatively large domestic markets. The increasing importance of Asian manufacturing can also be seen in the rankings of the top manufacturing exporters (**Table 2**). In 2011,

Table 1: Country Rankings by Manufacturing Nominal Gross Value Added

Rank	1980	1990	2000	2011
1	United States	United States	United States	PRC
2	Japan	Japan	Japan	United States
3	Germany	Germany	PRC	Japan
4	PRC	Italy	Germany	Germany
5	France	France	United Kingdom	Italy
6	Italy	United Kingdom	Italy	Republic of Korea
7	United Kingdom	PRC	France	Brazil
8	Brazil	Russian Federation	Republic of Korea	Russian Federation
9	Spain	Spain	Mexico	France
10	Mexico	Brazil	Canada	India
11	Canada	Canada	Brazil	United Kingdom
12	Australia	Republic of Korea	Spain	Mexico
13	Netherlands	Mexico	India	Indonesia
14	India	Turkey	Turkey	Spain
15	Switzerland	India	Russian Federation	Canada

PRC = People's Republic of China.

Note: The PRC data for 1980, 1990 and 2000 refers to "Mining, Manufacturing and Utilities". Former Union of Soviet Socialist Republics is not included in the rankings.

Source: UN National Accounts Main Aggregate Database.

the PRC edged out both the US and Germany to become top global manufacturing exporter. Similarly, the Republic of Korea has moved from outside the top 10 to rank 5th. Hong Kong, China; and Singapore are also among the top 15 manufacturing exporters; but as major shipping hubs, they handle large amounts of trade for their neighbors.

The rise of Asian manufacturing is also evident in the increased share of value-added in global manufacturing (**Figures 1, 2**). The most spectacular rise has been in the PRC, which overtook Germany, Japan, and then the US to top the list. While impressive, other Asian countries have also been grabbing a larger share of the global manufacturing pie.

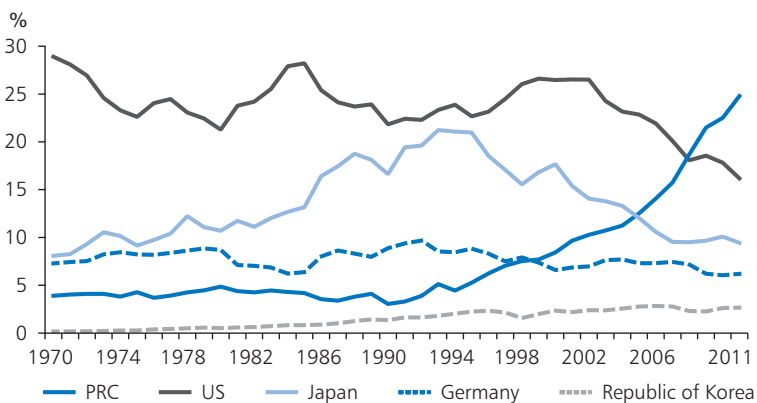
The shift toward Asia both reflects the role of manufacturing as a driver of growth and the move of industries from developed economies to Asia. Most economies in the region continue to industrialize, while many developed economies have seen their manufacturing sectors shrink (**Figures 3, 4**). The region has rapidly

Table 2: Country Rankings by Value of Manufacturing Exports

	1998	2000	2011
China, People's Republic of	7	5	1
Germany	2	2	2
United States	1	1	3
Japan	3	3	4
Korea, Republic of	12	10	5
France	4	4	6
Italy	6	7	7
Netherlands	11	12	8
Hong Kong, China	9	9	9
Belgium	10	11	10
United Kingdom	5	6	11
Singapore	14	14	12
Canada	8	8	13
Mexico	13	13	14
Spain	15	15	15

Note: Data for Belgium in 1998 refer to Belgium–Luxembourg.

Source: UN Comtrade.

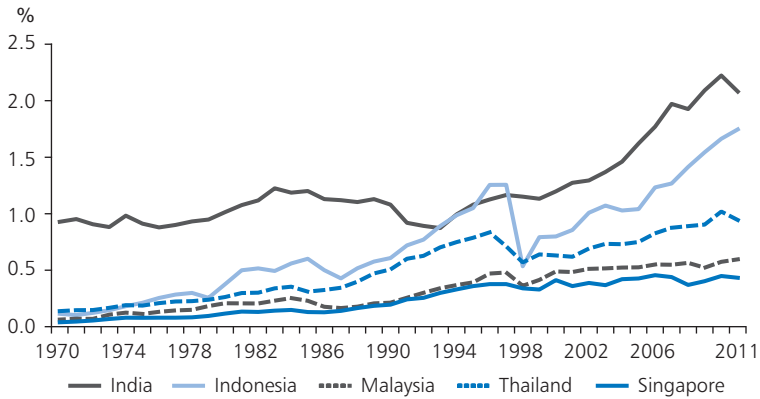
Figure 1: Manufacturing Value Added as Share of Total Value Added—Selected Advanced and Asian Economies

PRC = People's Republic of China, US = United States.

Note: \$ in current prices.

Source: ADB calculations using data from UN National Accounts Main Aggregate Database.

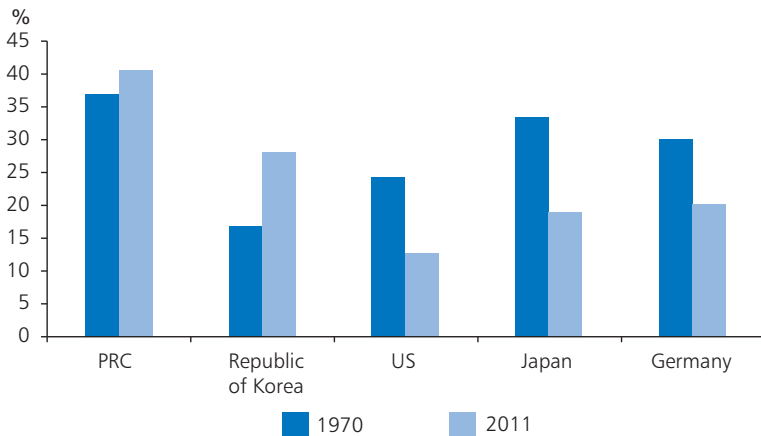
Figure 2: Manufacturing Value Added as Share of Total Value Added—Selected Asian Economies



Note: \$ in current prices.

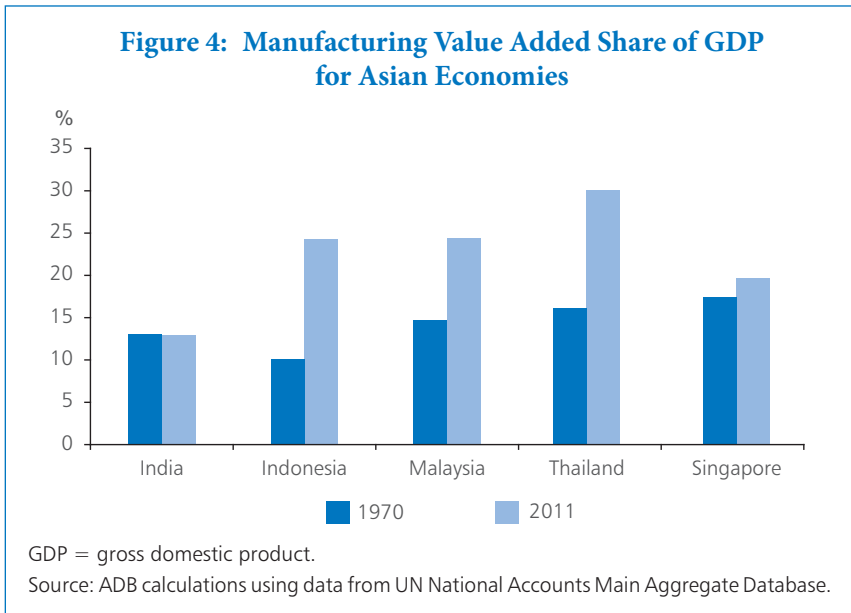
Source: ADB calculations using data from UN National Accounts Main Aggregate Database.

Figure 3: Manufacturing Value Added Share of GDP for Selected Economies



PRC = People's Republic of China, GDP = gross domestic product, US = United States.

Source: ADB calculations using data from UN National Accounts Main Aggregate Database.



become a production base for many global firms. Much manufacturing moved to Asia in search of lower production costs. Over time, they have also become more competitive—and in more technologically advanced industries. Well-known, large emerging Asian brands such as Acer, Lenovo, Huawei, Hyundai, Infosys, Samsung, Tata and scores of others are now challenging the dominance of those previously well-entrenched—from the US, Europe, and Japan.

One way to illustrate the manufacturing dynamism in Asia is to examine the evolving pattern of manufacturing trade balances in the region. Following McKinsey Global Institute (2012), manufacturing output is divided into five different categories (**Table 3**). The types of products produced under the Factory Asia model are more likely, but not exclusively, to fall under the last two categories—global technologies/innovations and labor intensive tradables.

Data are available on value added in the five manufacturing categories for the PRC, India, Indonesia, the Republic of Korea, and Japan (**Table 4**). While there are some variations within countries over time, there is considerable variation across countries. Japan continues as a pioneer in globally innovative products manufactured locally (for example, automobiles). More recently, the Republic of Korea has excelled as a leader in global technology, holding the largest share among the five countries for this category. The PRC leads in energy intensive

Table 3: Categories of Manufacturing

Sector	Key Traits	Examples of Industries
1. Global Innovation for Local Markets	<ul style="list-style-type: none"> • High research and development (R&D) intensity; with competition driven by innovation and quality • High trade intensity, but assembly and production can be regionalized • Geared towards serving customers located near factories 	<ul style="list-style-type: none"> • Chemicals and pharmaceuticals • Transport equipment, including automotive • Machinery, electrical appliances
2. Regional Processing	<ul style="list-style-type: none"> • High local content requirement, and located near sources of raw materials and final demand • Highly complex and costly logistics • Low tradability • Automated production, with little R&D 	<ul style="list-style-type: none"> • Rubber and plastics • Fabricated metals • Food and beverages • Printing and publishing
3. Energy/Resource Intensive Commodities	<ul style="list-style-type: none"> • Intermediate inputs to other sectors; low tradability • Price competition with little product differentiation 	<ul style="list-style-type: none"> • Wood products • Paper and pulp • Basic metals • Minerals-based products • Refined petroleum, coke, and nuclear products
4. Global Technologies/Innovators	<ul style="list-style-type: none"> • High R&D intensity, with competition driven by R&D • Highly tradable, with very high value to weight ratio which makes it economical for the products to be manufactured far from the source of final demand 	<ul style="list-style-type: none"> • Computers and office machinery • Semiconductors and electronics • Medical, optical, and other precision equipment
5. Labor Intensive Tradables	<ul style="list-style-type: none"> • High exposure to price competition • Highly labor intensive • Globally traded, with low proximity needs for production 	<ul style="list-style-type: none"> • Textiles, apparel, leather • Furniture, jewelry, toys, and other manufactured goods

Source: McKinsey Global Institute (2012).

Table 4: Sector Share of Total Manufacturing Value Added (%)

Sector	PRC		India		Indonesia		Japan		Republic of Korea	
	2000	2010	2004	2010	2001	2010	2002	2009	2001	2011
Global innovation for local markets	25.5	29.6	35.5	36.7	28.0	36.0	42.8	41.2	36.3	38.5
Regional Processing	15.5	14.8	17.5	17.7	30.7	35.4	26.9	29.3	18.9	15.4
Energy intensive commodities	46.1	43.6	32.5	32.7	23.4	14.3	14.5	13.0	16.0	15.8
Global innovation for local markets	5.6	4.8	3.8	3.2	3.6	2.6	10.7	11.8	19.0	25.5
Labor intensive tradables	7.2	7.2	10.8	9.7	14.4	11.7	5.0	4.7	9.4	4.8

PRC = People's Republic of China.

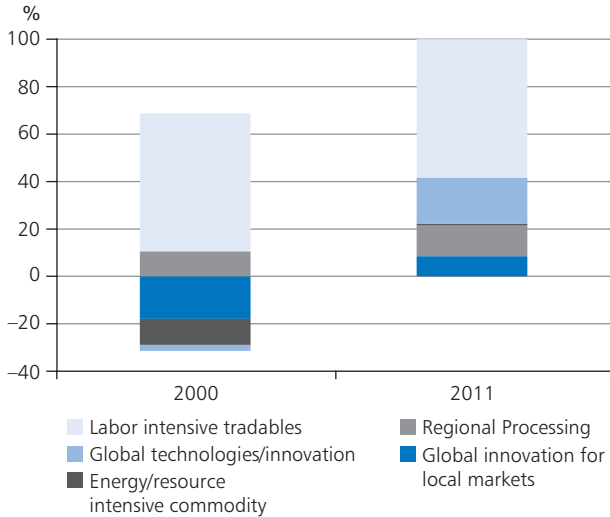
Source: ADB calculations using data from national sources and Industrial Statistics Database 2012, United Nations Industrial Development Organization.

manufacturing, followed by global innovation for local markets. While Indonesia holds the largest share in labor intensive products, during 2001–2010 it also positioned itself as a manufacturer of globally innovative products and regionally processed goods. It has also sharply reduced production of energy intensive commodities. India's manufacturing has shifted toward global innovation for local markets and away from labor intensive tradables.

The changing production structure is also reflected in a country's manufacturing trade balance (**Figures 5–9**). The five countries examined show that a rising trade surplus in any particular category indicates improved competitiveness in the corresponding manufacturing category.

For the PRC, there is a considerable shift in composition of the trade balance between 2000 and 2011 (see Figure 5).⁵ While labor intensive tradables remain important, there has been a huge rise in the share of global technologies and innovation, evident through the increasing importance of electronics. The PRC now has a trade surplus in global innovation for local markets—as it boosts production in machinery and transport equipment. It is interesting that, while the PRC has moved up the value chain into more technologically advanced products, it nonetheless remains competitive in relatively low technology labor intensive tradables.

⁵ Athukorala (2011) maps out the evolution of manufactured trade in several countries, including the PRC, and its rapidly evolving role in parts and components trade.

Figure 5: Manufacturing Trade Balance—People’s Republic of China

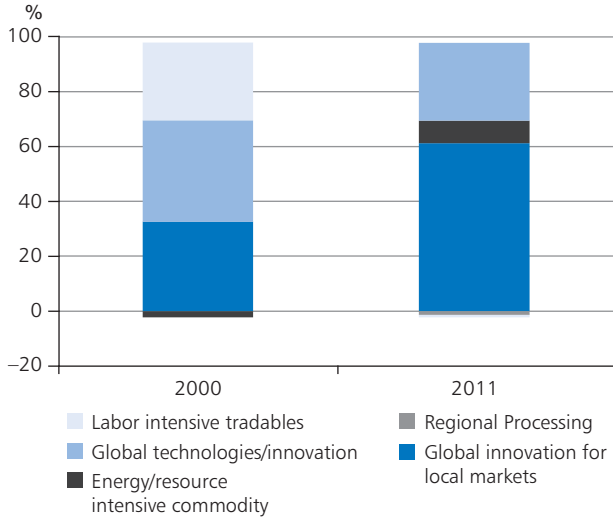
Source: ADB calculations using data from UN Comtrade.

For the Republic of Korea, the change in the pattern of manufactured exports has been equally dramatic (see Figure 6). From having a large trade surplus in labor intensive tradables, it now has slight deficit. This is not surprising as higher wages made labor intensive industries less competitive. Instead, the country has made the transition into more technologically advanced products. It has greatly increased its trade surplus in global innovation for local markets given the large gains made (mainly) in automobile manufacturing. It also sustained its large surplus in global technologies and innovation as it retained its lead in electronics.

As an advanced industrialized country, Japan has shown few shifts in the structure of industrial production (see Figure 7). Nevertheless, there is some impact of Factory Asia’s rise in Japanese manufacturing. In 2000, there was a large trade surplus in global technologies and innovation. However, as much electronics production migrated abroad, the trade surplus in those sectors dropped considerably. Japan still maintains competitiveness in machinery and automobile manufacturing, seen in the larger surplus for the “global innovation for local markets” category.

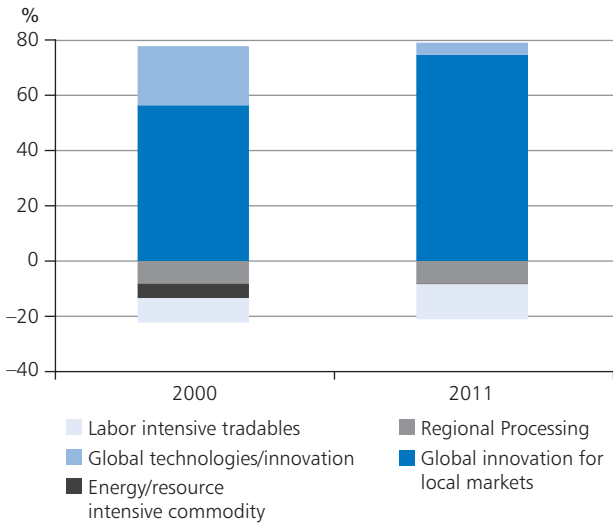
In contrast with the other countries, manufacturing in India is more inward-oriented and caters more to domestic demand (see Figure 8). While the PRC,

Figure 6: Manufacturing Trade Balance—Republic of Korea

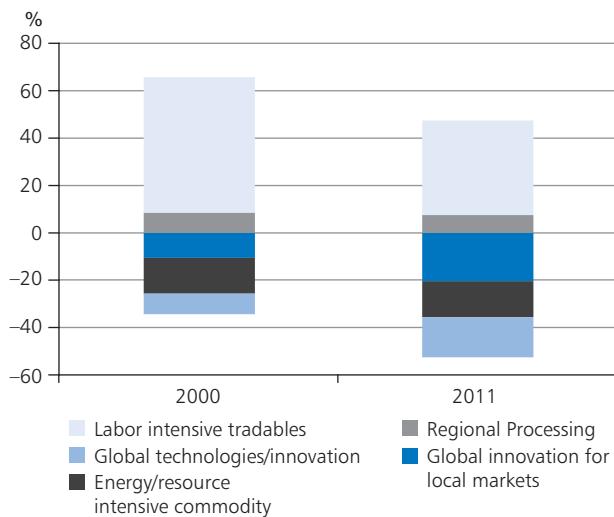


Source: ADB calculations using data from UN Comtrade.

Figure 7: Manufacturing Trade Balance—Japan



Source: ADB calculations using data from UN Comtrade.

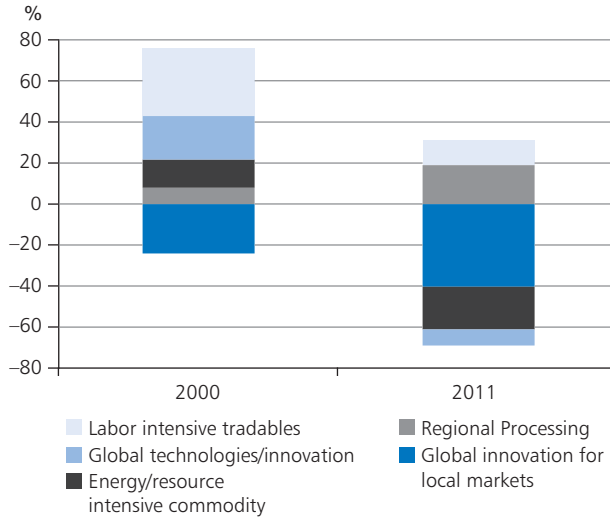
Figure 8: Manufacturing Trade Balance—India

Source: ADB calculations using data from UN Comtrade.

Japan and the Republic of Korea hold large trade surpluses in manufactures, India has a small deficit. There has been little change in the composition of these trade patterns. India continues to hold a surplus in labor intensive tradables, reflecting its low labor costs. This may indicate significant potential for the country should it reorient its trade strategy in the future.

Another domestic-oriented manufacturer is Indonesia (see Figure 9). It had an overall trade surplus in manufactured exports in 2000. However, it now holds a deficit as the economy relies more heavily on commodity exports. Also, the trade deficit likely reflects rapid economic growth, which increased imports of capital goods. Similar to India, Indonesia continues to hold a trade surplus in labor intensive tradables and regional processing.

In sum, it appears that the PRC and the Republic of Korea managed to gain strong and niche positions in the global production networks for high-tech products. However, economies such as India and Indonesia have not shown much shift toward more high-end goods. While the spread of global production networks has drawn in new participants in Factory Asia, this does not guarantee that countries can easily make the shift into manufacturing sophisticated products.

Figure 9: Manufacturing Trade Balance—Indonesia

Source: ADB calculations using data from UN Comtrade.

It is important to note that the share of imported intermediates in global manufacturing output remains quite low—at 16%. This suggests the world is not yet flat and distance has not died—especially when it comes to international production networks (see Box 3). For developing Asia, this may have some critical implications should it embrace new advances in information and communication technology—attempting to reap the gains of emerging technologies such as 3D printing.

Given the potential of global production networks to jumpstart manufacturing in developing economies, several important questions face Asian policy makers. Should nations strive to set up their own international production networks? Which supply chains should they join? What role can government and policy play in helping promote entry into a global production network? What is the optimal technology policy a country should pursue to facilitate knowledge transfer? How important is the size of the domestic market in attracting foreign direct investment? Can smaller nations mimic what the PRC has done in developing manufacturing?

SECTION III

Key Issues and Challenges in Moving Beyond Factory Asia

Asia has thrived under the Factory Asia growth model. However, with changing global trends, the future of manufacturing could look quite different from what it is today. Asia faces a number of issues if it is to transform manufacturing. These can be viewed as challenges as well as opportunities.

The key issues the region is expected to face fall under three main categories (Table 5). The first includes issues that may affect the demand for Factory Asia's products. In particular, the protracted slower growth in advanced economies following the global financial crisis means demand for Factory Asia's output will likely shift to developing markets. In the second category, issues with implications on the cost structure of Factory Asia are examined. Technological changes that affect manufacturing production are discussed under the last category. For each issue, a subjective assessment is given of the impact on manufacturing and probability of its likelihood.

Once again, the analysis must be understood in the context of Asia's vast diversity. Countries are at different levels of development. Some manufacture goods at the frontier of technology, while others are simply trying to gain a foothold in global production networks. Hence, the key issues referred to below may not apply similarly to all countries. However, the issues covered are relevant to most of countries in the region, including those that have not yet adopted the Factory Asia model.

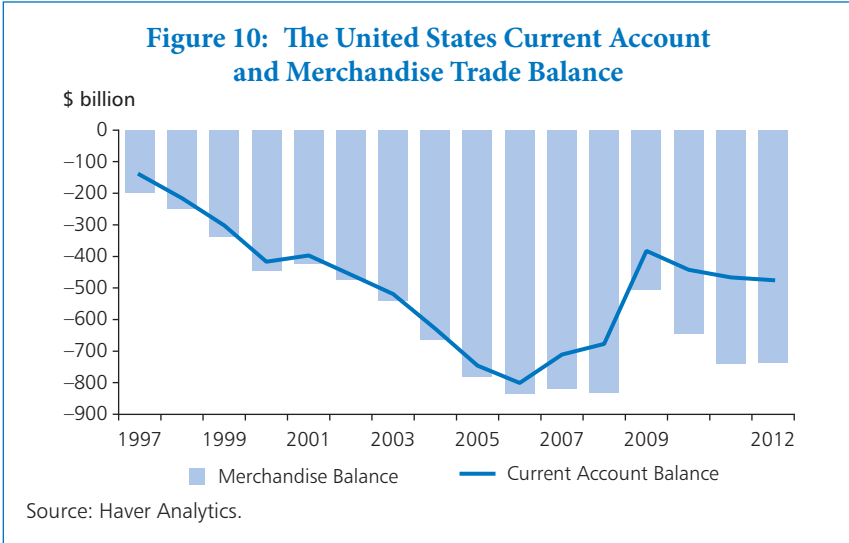
Issue #1. Economic Prospects after the Global Financial Crisis. One key issue is the slow recovery and continued weak outlook in advanced economies after the 2007/08 global economic crisis. For now, most Asian economies run trade surpluses with the US, Europe and Japan. This is possible because the US economy was able to grow despite large trade deficits. However, continued weak economic conditions and high fiscal deficits limit its ability to run large trade deficits in the future (Figure 10). Similarly, the eurozone will also struggle with continuing weak economic prospects. Furthermore, over the medium-term, an ageing population in many advanced economies will also signal significant

Table 5: Trends and Issues Facing Factory Asia

Trends	Issues	Impact	Probability
I. Changing global economic landscape and evolving consumer tastes will affect demand for Factory Asia's products	1. Weaker growth in advanced countries will see demand shifting away from developed markets to emerging economies	High	High
	2. Factory Asia will have to learn to cater to the demand of growing middle class consumers in the region	High	High
	3. Asia's manufacturers need to build strong brand identity to compete globally	Low to High ^a	High
	4. Weak economic growth and high unemployment may give rise to protectionist tendencies in advanced economies	Low	Low
II. Rising production costs gradually erodes traditional Factory Asia advantage	5. Long and complex supply chains are becoming more vulnerable to natural disaster and reputational risks	Medium	Medium
	6. Wages in Asia have been rising faster than developed countries, narrowing the cost differential	Medium	High
	7. Exchange rates have become more volatile, making it harder to manage production networks across several countries	Medium	High
	8. Shortage of skilled workers could hamper the region's drive to produce more sophisticated products	High	High
	9. Changing demographics in some countries will result in a smaller labor pool	High	High
	10. Production has been shifting from high-cost to lower-cost countries	High	High
III. New technologies are changing the nature of manufacturing	11. Software is becoming more important in manufactures and comprise a larger share of value	Medium	High
	12. Advances in robotics and additive manufacturing could herald a new era in manufacturing	Medium	High

^a The impact is likely to be minimal for low-value products, where branding and quality is less important. However, for medium- to high-value products (for example, consumer durables and medium or high technology products), quality and branding are very important. Quality control will become more important even for generic suppliers of brand name products—demonstrated in the garment sector where some countries have lost out in competition with emerging new players.

Source: Analysis by ADB staff.



changes in consumption patterns, resulting in lower demand for manufactured products and greater demand for health and medical services. In addition, the rise of Factory Asia was accompanied by falling trade barriers—both worldwide and regionally—cheaper transportation costs, improved capital mobility, and far more efficient communication. While some of these advantages will remain and perhaps deepen, others may not, leaving the export-led model of Factory Asia facing future headwinds. Asia will have to adapt and take advantage of these changing global trends if it is to reinvent itself.

So, who will buy the products Asian factories are churning out? Asia's income growth will likely continue to outpace that of the developed world in the coming decades. As part of rebalancing the sources of growth, the shift away from exports toward greater domestic demand will intensify. This could redirect some current exports. But this implies some countries will likely run smaller surpluses or even deficits as demand grows for other countries' exports.

Issue #2. Asia's Expanding Middle Class. Demand from the rising middle class could help sustain Factory Asia's output. Asia could reach a point where the majority of its population reaches middle class status. Between 1990 and 2009, the middle class population share rose 38 percentage points, more than doubling from 21% to 59% (**Figures 11a, 11b**). In absolute terms it has risen more than three-fold over the same period—from 563 million to 2 billion. The demand for consumer durables will continue to grow rapidly. Car ownership in the PRC and India has sharply increased. In fact, the PRC now tops the US as the world's

Figure 11a: Change in Middle Class Population Share, 1990–2009
(percentage points)

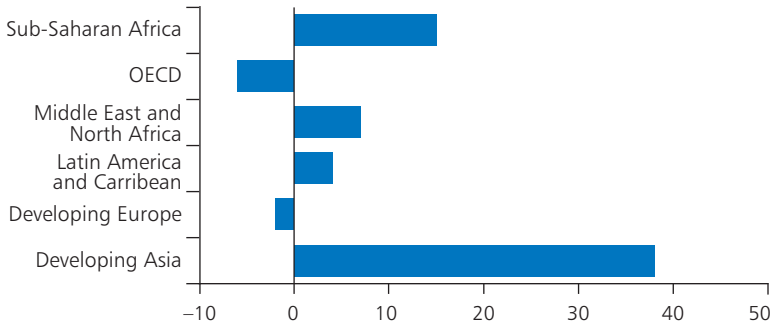
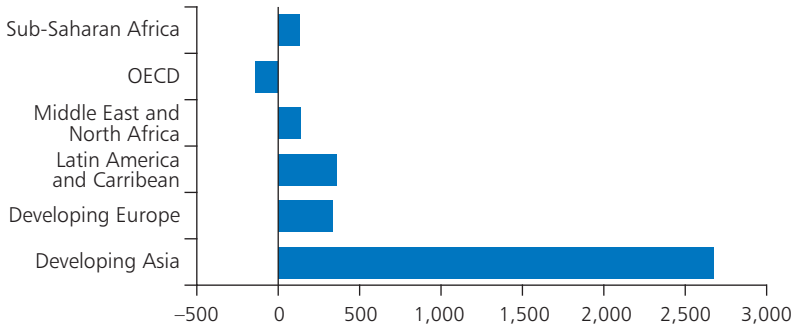


Figure 11b: Change in Middle Class Expenditure, 1990–2009
(\$ billion)



OECD = Organisation for Economic Co-operation and Development.

Notes:

Developing Asia = Armenia, Azerbaijan, Bangladesh, Cambodia, the People's Republic of China, Georgia, India, Indonesia, Kazakhstan, Kyrgyz Republic, the Lao PDR, Malaysia, Mongolia, Nepal, Pakistan, the Philippines, Sri Lanka, Tajikistan, Thailand, Turkmenistan, Uzbekistan, and Viet Nam.

Developing Europe = Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Latvia, Lithuania, Macedonia, Moldova, Poland, Romania, Russian Federation, Turkey, and Ukraine.

Latin America and Caribbean = Argentina, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Peru, Uruguay, and Venezuela.

Middle East and North Africa = Algeria, Djibouti, Egypt, Iran, Jordan, Morocco, Tunisia, and Yemen.

OECD = Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Slovak Republic, Spain, Sweden, the United Kingdom and the United States.

Sub-Saharan Africa = Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Ethiopia, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Rwanda, Senegal, Sierre Leone, South Africa, Swaziland, Tanzania and Uganda.

Source: Chun (2012).

largest automobile market, with annual sales of nearly 12 million, up from just 1 million in 1992 and 2 million in 2000.

Issue #3. Quality and Branding. Firms in Asia thus far have competed mostly on price. However, to sustain and continue growing in the future they will need stronger brand identities. Higher profits and margins can be sustained only through building long lasting, well-acknowledged brands. This means Asian manufacturers will have to focus on longer term reputations for quality and innovation rather than a short-term focus on price. As incomes rise and rebalancing continues, consumers will consider product quality and safety along with cost. Firms will have to adapt to this strategic shift. It is beginning to happen. While Western brands may still carry stronger brand recognition, Asian brands are becoming globally recognized in their own right.

Issue #4. Protectionism. The rise of Factory Asia has been helped by the increasingly liberal global trade regime. Falling tariffs and reduced trade barriers have made it easier to ship products to market—not just for developed economies but for developing Asian economies as well. This helped promote the growth of production networks.

However, this liberal trade regime may be challenged. Governments in advanced economies are facing pressures to protect domestic industries as unemployment remains high or rising. As a result, protectionist sentiments have grown in advanced economies. For instance, hundreds of discriminatory measures have been introduced worldwide since November 2008.⁶ And the sectors most affected by these discriminatory measures have been in manufacturing. Hence, access to developed markets could easily become more difficult, at least until economic conditions in these markets improve considerably.

Issue #5. Rising Complexity in Managing Supply Chains. Trade has boomed on the back of falling transportation costs. However, with these rising and likely to remain elevated, there may be a shift toward shorter supply chains. This is likely to be aggravated by problems in managing long supply chains, related to adherence to safety and core labor standards. Industries with low density value will be more affected by higher transportation costs.

Global value chains are also exposed to disruptions caused by natural disasters, as painfully demonstrated by Japan's 2011 Tohoku earthquake and tsunami, and flooding in Thailand later that year. In the future, manufacturers companies may need to prioritize between economies of scale in concentrating production in one

⁶ See Evenett (2012).

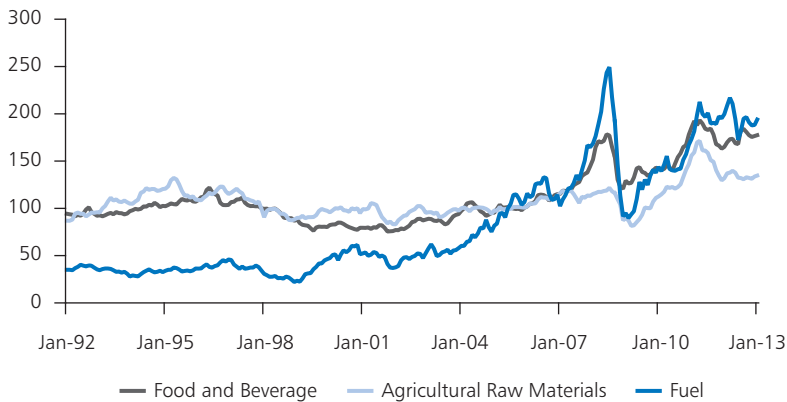
area and spreading production over several locations to ensure greater resilience, given the trade-off between efficiency and risk of disruption.

Throughout the 1990s and 2000s, Asia benefitted from stable commodity prices, particularly fuel. However, commodity price trends in the future may not be as favorable as in the past. Rapid population and income growth globally will raise demand for raw materials. Not only is it likely that commodity prices will rise, but they could also be much more volatile (**Figure 12**). This will pose serious challenges to manufacturers whose products are intensive in commodity inputs. Besides becoming more volatile, commodity price movements have also become more correlated. Price increases in one commodity tend to spread to others.

Several global companies faced with the challenge of managing complex supply chains are transferring some of their production operations back to their home countries (the US in many cases) (**Box 4**). It is still too early to say this is a long-term trend. Nonetheless, companies are increasingly recognizing that outsourced relationships can be convoluted and insecure, leaving them vulnerable to reputational risks and supply disruptions.

Issue #6. Narrowing Wage Differentials. One primary driver of manufacturing growth in Asia has been the vast pool of cheap labor. But with incomes rising fast, the wage gap is closing. Asia can no longer solely rely on cheap labor as a source of comparative advantage. Recent trends suggest that while real wages in developed

Figure 12: Long-Term Trends in Commodity Prices (2005 = 100)



Source: International Monetary Fund data on Primary Commodity Prices; accessed 11 March 2013.

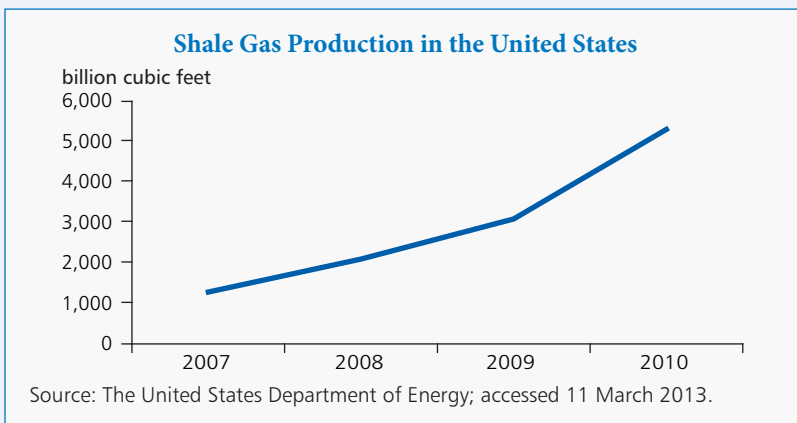
Box 4: “On-shoring”—Trend or Fad?

After years of off-shoring manufacturing by developed economies to Asia, there appears to be a slowdown or reversal in trend. Relocating manufacturing goes by several terms—on-shoring, reshoring or inshoring. Some global companies are planning to transfer to some of their production operations back to the United States (US) from Asia. It is difficult to gauge its extent, and the evidence so far has been mostly anecdotal.

Some of the reasons include narrowing wage differentials, difficulties of managing complex supply chains and volatile shipping costs. Long delivery routes increase costs of holding inventories and leave firms vulnerable to rapidly changing demand. Producing close to consumers allows for faster turn-around time and allows for greater flexibility in meeting demand.

In the traditional model of off-shoring, production is separated from design and research and development. However, as manufactured products grow more sophisticated and development time for new product models is compressed, there may be a need for closer collaboration between design and production. This favors relocating production close to the design base. It can sometimes lead to improving production processes as well. The General Electric Company is reported to have been able to lower costs of manufacturing water heaters by relocating production to the US through redesign (see Fishman 2012).

The US is also benefiting from cheap energy driven by advances in hydraulic fracturing—or fracking. Natural gas production from shale gas has soared in the US, and energy costs have plummeted (Figure). Cheap energy will benefit all industries, but the main beneficiaries will be heavy natural gas users—such as chemical manufacturers.



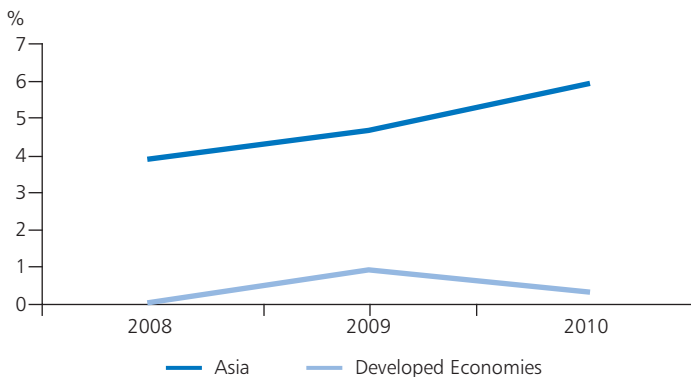
Source: Analysis by ADB staff.

economies have remained stagnant, they continue to climb in Asia (**Figure 13**). Between 2000 and 2010, wages rose by 6% in developed countries but surged 86% in Asia (see International Labor Organization 2012). Rising real wages are a sign of successful development and should be welcomed as they increase the living standards. Yet, if wage growth outpaces productivity gains, it will reduce the cost advantage and may drive companies to relocate manufacturing.

In addition, as the region accelerates the pace of rebalancing toward more regional and domestic demand, wage differentials across Asia will be smaller than wage differentials with advanced economies. Therefore, low wages may no longer be an important source of cost advantage. If their only advantage is low wages, less developed countries will find it difficult to join supply chains. At the same time, the ability of countries to invest and absorb emerging technologies will have major implications on how Asia can position itself in internationalizing production and—more importantly—for job-creation.

Issue #7. Managing Exchange Rate Fluctuations. Prior to the global financial crisis, the region's exchange rates were relatively stable against the US dollar. With the fragility of the US and European banking systems—and interest rate

Figure 13: Real Wage Growth in Asia and Developed Economies



Note: Computed using population weights. Asia includes the People's Republic of China, India, Indonesia, the Republic of Korea, Malaysia, the Philippines, and Thailand. Developed Economies includes Austria, Canada, Czech Republic, Estonia, Germany, Hungary, Italy, Latvia, Lithuania, Poland, Slovak Republic, Spain, Sweden, Switzerland, the United Kingdom, and the United States.

Source: ADB calculations using data from *Global Wage Database 2012*, International Labour Organization.

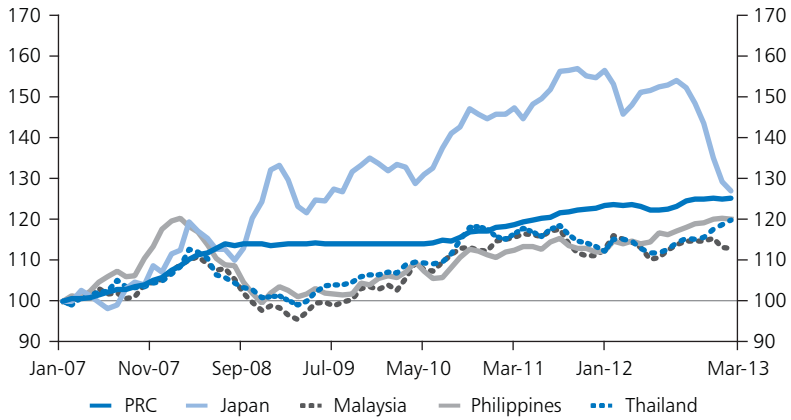
differentials between advanced and emerging markets—the region’s currencies appreciated as capital inflows spiked. However, the trend is not uniform. From the beginning of 2007 to the end of 2012, the Japanese yen gained against the US dollar mainly due to its “safe haven” status. This hurt Japanese manufacturing competitiveness. Japan’s new monetary policy is trying to change that. Others whose currencies have appreciated include the PRC, Malaysia, Thailand, and the Philippines (**Figures 14a, 14b**). Meanwhile, other currencies such as the Vietnamese dong have depreciated against the dollar. The divergence and volatility in exchange rate movements have made it more difficult to plan and manage manufacturing operations across several exchange rate regimes.

Issue #8. Shortage of Skilled Workers. Rising real wages and skills shortages are hurting several developing economies in Asia. As noted earlier, rising real wages have begun to bite as “total landed cost” advantages diminish. The lead time required for upgrading skills is long, and Asian economies may get squeezed from both ends unless concerted efforts are taken to improve technical and vocational skills. The changing nature of manufacturing also means manufacturing jobs will be different in the future. Work will most likely be a lot more skill-intensive. Yet, while much attention is given to producing scientists, engineers and researchers, ensuring the availability of skilled technicians and hands-on shop-floor type talent is equally important in developing advanced manufacturing capabilities.

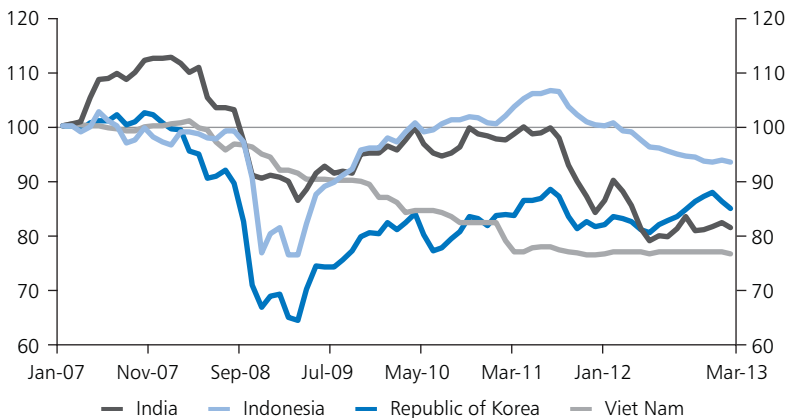
Issue #9. Demographics. Japan and the original “Asian tigers” have birth rates below replacement levels. Their populations are projected to shrink. Even the PRC—which benefits from a large supply of rural labor—faces the prospect of a shrinking labor force. Das and D’Niaye (2013) notes that the PRC’s working age population will soon peak and then sharply decline. In fact, the PRC’s working-age population fell in 2012 and the trend is expected to accelerate. Excess labor supply from rural areas may be drying up, causing manufacturing labor shortages in the future. This could place further upward pressures on wages. Yet other countries in the region—such as India and the Philippines—maintain young and growing populations. Nonetheless, wages are rising in those countries as well.

Issue #10. Taking Domestic Strengths Abroad. In addition to wage and demographic factors, countries also aspire to consistently move up the value chain, also to avoid the middle-income trap. This has begun in the PRC, for example. This portends some major changes. First, there may be geographic shifts within or between countries in producing lower value products. In the PRC, there has been a move to relocate factories to less developed inland provinces where wages are lower. Yet, while the PRC may no longer be considered a low-cost producer, it is also difficult for manufacturers to look elsewhere in the short term given the PRC’s infrastructure and skilled worker advantage. Hence, there may be more emphasis by PRC companies toward targeting the domestic rather

**Figure 14a: Exchange Rate Movements
in Selected Asian Economies**
(\$ against local currency, January 2007 = 100)



**Figure 14b: Exchange Rate Movements
in Selected Asian Economies**
(\$ against local currency, January 2007 = 100)



PRC = People's Republic of China.

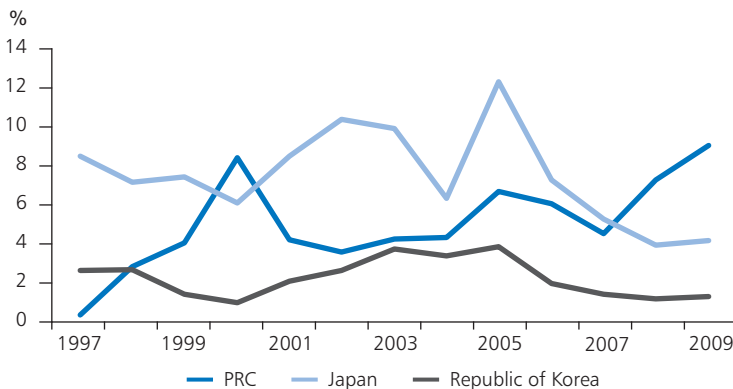
Source: ADB calculations using data from Datastream.

than overseas market. The rising value of the renminbi may further accelerate the trend by making exports less attractive.

Faced with rising labor costs, the PRC will also move away from labor-intensive production, transferring it to lower cost countries—the “leading dragon phenomenon” (Chandra, Lin and Wang 2013). This holds the potential of creating jobs in other countries in the region. There is already a rising trend of foreign direct investment by the PRC within Asia, similar to Japan in the 1980s (**Figure 15**). In addition, Japanese corporations also appear to be investing in mergers and acquisitions, estimated at \$65 billion in 2011, a record high (see Iinuma 2012).

Lower cost manufacturing will continue as firms migrate to countries like Viet Nam and Bangladesh. But infrastructure bottlenecks may limit the type of manufacturing that could be transferred, and the level of product sophistication. Also, many countries have recently enacted minimum wage increases. Viet Nam raised its minimum wage by up to 18%, Thailand 35% and Indonesia by an average 40%. Malaysia recently introduced a minimum wage for the first time. While this may be good from a welfare perspective, it could hurt competitiveness in industries with a high proportion of labor costs. There are several competing factors that will influence the industry and product configuration.

Figure 15: Share of the PRC, Japan, and the Republic of Korea FDI in Total Asian FDI Inflows



PRC = People's Republic of China, FDI = foreign direct investments.

Note: ADB calculation using the Asia Regional Integration Center (ARIC) Database on FDI. <http://www.aric.adb.org/indicator.php>. Accessed on 12 March 2013.

Source: ARIC, ADB.

Issue #11. Growing Importance of Software. The frequency of hardware replacements (for example, computers and mobile phones) will likely slow in developed countries, with software and applications gradually defining the market. Another future trend is a potential backlash against built-in obsolescence and product upgrade cycles. Currently, electronics consumers appear locked into 2 year upgrade cycle. The region's manufacturers have benefitted from the shortening of product cycles. However, as hardware becomes more powerful, it may eventually reach a point where consumers are satisfied with the hardware they have and will simply upgrade software. As a result, margins for hardware manufacturers will get squeezed. A good example is the iPhone, which typically retails for \$600. Out of that, it has been reported that about \$200 goes to hardware manufacturers, while \$400 goes to Apple for design and software (**Table 6**).

Table 6: Estimated Cost of iPhone 5 (16 GB) Components (\$)

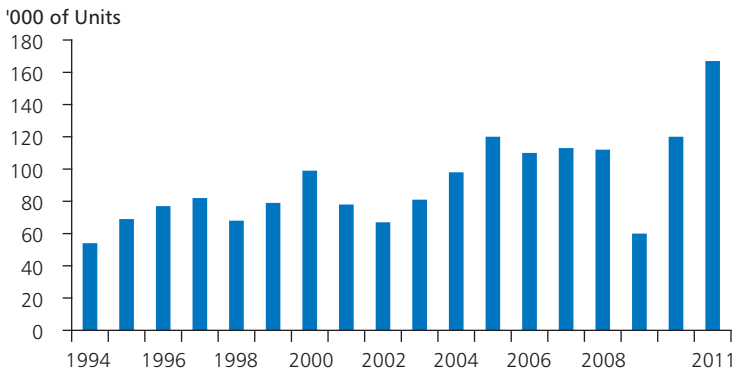
Retail Price	649.00
Cost of Components	199.00
Manufacturing Cost	8.00
Components and Manufacturing Cost	207.00
Estimated Cost of Components	
Memory	
NAND Flash	10.40
DRAM	10.45
Display and Touchscreen	44.00
Processor	17.50
Camera(s)	18.00
Wireless Section	34.00
User Interface and Sensors	6.50
Bluetooth and Wi-Fi	5.00
Power Management	8.50
Battery	4.50
Mechanical/Electromechanical	33.00
Box Contents	7.00

Source: Rassweiler, Andrew (2012). Accessed on 9 April 2013.

Also, as consumers become more affluent, a greater premium is placed on design and customized products. Thus, there could be a shift away from the mass-produced products where Asia does so well. In addition, electronic chips or sensors are increasingly embedded into a vast array of products. In the automobile industry, for example, there is growing dependence on electronics and software to enhance safety and efficiency. Vehicles with automated parking systems are already available while self-driving cars have been extensively tested and could become the wave of the future. Contemporary cars such as the Chevy Volt holds around 10 million lines of code—more than a Boeing 787 airliner (see Paur 2010).

Issue #12: New Technologies—Robotics, Additive Manufacturing, Designer Pharmaceuticals and...What Else? There is clearly a move toward greater efficiency and productivity of factor inputs, shaped by the pressure to produce goods at the lowest possible price while meeting consumer demand. Greater use of advanced techniques—including robots—will gain momentum. Adjustments to rising wages and changing demographics have increased factory automation in Asia. For example, the Foxconn Technology Group recently announced its plans to use more robots in its plants in the PRC (see He 2013). Estimates from the International Federation of Robotics show there has been a steady increase in industrial and professional robots over the last 20 years (**Figure 16**). Asia has become the largest market for industrial robotics, led by Japan, the Republic of Korea, and the PRC, with the latter growing fastest over the past 5 years (**Box 5**).

Figure 16: Worldwide Shipments of Industrial Robots



Source: International Federation of Robotics Statistical Department.

Ever since the dawn of the Industrial Age, manufacturing has been equated with factory production using large machinery and an ample workforce for economies of scale. But additive manufacturing processes—such as 3D printing—allow for customized production at low cost. This means production could potentially take place without large machine tools or assembly lines. Long and complex supply chains may no longer be necessary as the entire products can be built from scratch without the assembly of different components (**Box 6**).

Box 5: Emergence of Industrial Robots

There was a strong increase in the shipment of industrial robots in 2011, driven mainly by strong demand from automotive and metal industries. Asia is now the largest market for robots, accounting for more than half of shipments globally. Japan and the Republic of Korea are the largest markets. But the People's Republic of China (PRC) is fast catching up, with robot shipments growing 51%. The rapid growth reflects growing sophistication in manufacturing. Most of the robots are destined for the automotive and electronics industries, areas in which the PRC continues to target. The increased use of robots could be a way for the PRC to maintain its competitiveness as labor costs rise.

As they have for decades, robots are becoming ever-more sophisticated, able to handle increasingly complex tasks. In the near future, robots could become more ubiquitous in Asia's manufacturing as demand for higher precision can no longer be met by humans. This could pose challenges for new entrants to value chains if low labor cost will no longer be an advantage.

Source: ADB staff, based on information from Industrial Federation of Robotics and other materials.

Box 6: Three Dimensional Printing—One Example of Additive Manufacturing

It is analogous to the inkjet printer, which squirts minute particles of ink onto paper. In manufacturing, a 3D printer creates a solid object from tiny particles of raw materials—currently mostly polymers. It is an additive rather than a subtractive process, which consumes less raw materials. The proliferation of inkjet and laser printing brought printing technology to homes. 3D printing is now doing this for rudimentary manufacturing.

Traditional 3D printing has been used for making prototypes, but it may soon become inexpensive enough for making custom products. Initially it will likely be limited to making high-cost components, but it could eventually be used

continued on next page

Box 6 *continued*

for producing for the mass market. Additive manufacturing has the potential to transform the industry by increasing flexibility, reducing turnaround time, and cutting back on excess inventories. It can also reduce raw material wastage compared with the traditional subtractive processes

A key advantage of 3D printing is the variety of products produced by a single machine. This compares with traditional processes where a production line must be retooled (at high cost) to produce another product. So 3D printing offers much greater flexibility. It may also make it much easier for new entrants to jump into the market, as several steps in the supply chain such as sourcing and warehousing can be eliminated.

3D printing remains relatively new, but could herald an era of significant production decentralization. Key inputs would be the design—which would be fed into the printer's computer—and the products produced. Factories could become obsolete. Customized products could be built on demand. The revolution could be similar to that of on-demand book printing, where there is no longer a need for a large print run to justify the cost of setting up the printing machine.

Further hurdles must be overcome before additive manufacturing is widely adopted. At the moment, the technology is not cost effective and raw material costs remain prohibitive: the cost of raw plastic needed for 3D printing is around 30 to 100 times the cost of material used in injection molding.

While the exact impact of additive manufacturing is hard to predict, several scenarios are possible. First, it is likely that the time-lag between product design and delivery will be considerably reduced. Customers will also demand products customized to their tastes and preferences. 3D printing allows for additional batches to be produced at minimal additional cost. Most relevantly for Asia, 3D printing has the potential to challenge the low cost production model by allowing for just-in-time manufacturing near the point of sale. These features will likely revamp the supply chain.

A key question is: will 3D printing and other additive manufacturing solutions take away or add new jobs? There may be short-term redundancies, but over the medium-term, skills will have to adjust to meet the design and printing needs. Worker productivity could skyrocket, as it did when the vast army of newly computer-literate workers joined the labor force. Countries and companies need to continually invest in skills upgrading. There is no short-cut.

Source: ADB staff, based on various materials.

SECTION IV

Beyond Factory Asia

A. Strategic Options for Developing Asian Economies

Asian manufacturing is at a critical juncture. Factory Asia has brought large dividends for parts of the region and helped secure Asia on the global economic landscape. The gains made will be a major contributor to the potential “Asian Century”, just as the Industrial Revolution shifted the balance of economic power to the Western world. Yet, the global financial crisis has been a loud wake-up call for the region to adjust, just as the Asian financial crisis was a turning point in addressing financial distortions and macroeconomic restructuring. In the immediate future, rebalancing toward domestic and regional demand—which is already well underway—will be supported by the newly emerging middle class. However, the region’s economic growth—and hence that of the middle class—is far from pre-ordained. Unless all countries in the region—large and small—address the myriad challenges facing them, the Asian Century may become a pipedream. The issues considered in this paper are among those challenges.

In this subsection, several strategic options are posited in order for countries and economies to move beyond Factory Asia. Options have been classified for five different country categories (**Table 7**). Investment in education and training, infrastructure, and strengthening links between services and manufacturing will be crucial for all in moving beyond the Factory Asia model. For countries already a part of Factory Asia, their main goal is to further move up the value chain and expand markets. Meanwhile, for countries currently outside the model, there may be advantages in joining production networks. Manufacturing remains a key driver of growth, and being part of a production network enables countries to obtain access to technology and new markets. Countries with large domestically-oriented manufacturing could leverage their strengths to leapfrog traditional technologies and move up the value chain by joining the production network.

Regional cooperation is vital to the continued success and evolution of Factory Asia, given its complex challenges. The smooth flow of goods and investment throughout the region—a necessary part of Factory Asia—has been underpinned

Table 7: Strategic Options Beyond Factory Asia

	Large Domestic Markets	Small Domestic Markets
Countries Already Within Factory Asia Model	<p>Group 1 (Notable Examples: People’s Republic of China and Indonesia)</p> <ul style="list-style-type: none"> • Move up the value chain to produce higher value-added and sophisticated products to supply both domestic and global markets • Leverage knowledge gained to develop home grown technologies • Support small and medium enterprises (SMEs) for investing in new technology • Build up domestic brands that can be expanded to other markets • Invest in education to upgrade the quality of the workforce 	<p>Group 2 (Notable Examples: All Newly Industrialized Economies)</p> <ul style="list-style-type: none"> • Shift from production to knowledge economy^a • Invest in research and development, innovation, and strive to be a technology leader • Expand to new emerging markets <p>Group 3 (Notable Examples: Cambodia; Malaysia; Philippines; Thailand; Viet Nam; and to some extent, Bangladesh and Sri Lanka)</p> <ul style="list-style-type: none"> • Solidify current position in production networks (for middle income) • Aim to move up on value chain (for middle income) • Aim to carve out a niche in lower value manufacturing as other countries progress up the value chain (for lower income) • Improve investment climate, and attract foreign direct investment to further strengthen and expand the industrial base • Improve skills and training for workers to increase productivity
	<p>Group 4 (Notable Examples: India and Pakistan)</p> <ul style="list-style-type: none"> • Use large domestic market potential to attract manufacturing investment and technology, by continuously improving the investment climate • Leverage knowledge and experience in domestic manufacturing to leapfrog to higher value chain levels • Support small and medium sized manufacturers in joining production networks 	<p>Group 5 (Notable Examples: All Central Asian Republics; and Pacific Island and other economies)</p> <ul style="list-style-type: none"> • Identify constraints to joining production networks • Improve infrastructure and logistics to reduce transportation costs. • Strengthen existing manufacturing sectors while diversifying into new areas
Countries That Are Outside Factory Asia Model		

^a See Asian Development Bank (2013).

by enhanced regional cooperation, resulting in trade liberalization and the opening of markets. If anything, this momentum will have to be deepened in the future.

B. Specific Policy Recommendations for Developing Asian Economies

Building on the strategic options for the different country groups, one can summarize the challenges and offer some indicative policy measures to move beyond Factory Asia (**Table 8**).

For reasons outlined earlier, markets within the region will have to be a strong target for the region's manufacturers. There will need to be a change in mindset from producing for western to eastern markets. Given the diversity in conditions, income, tastes, and cultures across countries in Asia, the importance of design and customized products will grow in importance.

At the same time, the region will have to ensure that the benefits from future growth will be more evenly shared. As the region transforms itself, countries need to ensure training and skills upgrading for existing workers intensifies so they can compete in the new environment. Small and medium scale enterprises should be encouraged to participate in production networks that have been traditionally dominated large multinationals.

Global trends will continue to have a major impact on manufacturing in the region. In the past, policies have generally focused on making the region an attractive low-cost base for global manufacturing firms. In the future, however, there may be a shift toward locating production sites closer to future consumers. In this sense, Asia is likely to benefit as a growing source of demand for its own manufactured output.

Policymakers will also have to change their mindset and view other developing Asian economies as potential customers. While the private sector—as it has done thus far—will lead economic ties through investments, major economies need to boost regional cooperation. Beyond generalities, countries may need to adopt specific measures—such as policy and financial incentives for firms to venture into nontraditional markets within the region. Governments may also help manufacturers build connections in fast-growing markets. Addressing behind-the-border challenges and making trade freer at regionally and globally should be among the priority government efforts in the region.

Table 8: Policy Recommendations for Moving Beyond Factory Asia

Issues	Policy Recommendations
1. Weaker growth in advanced countries will see demand shifting from developed markets to emerging economies	<ul style="list-style-type: none"> • Support domestic demand • Forge effective regional and south-south cooperation, while multilateralizing free trade • Provide smart incentives for targeting regional markets
2. Factory Asia must cater to growing middle class consumer demand in the region	<ul style="list-style-type: none"> • Ensure investment is adequate, as consumption demand rises • Support inclusive and environmentally sustainable growth
3. Asia's manufacturers need to build strong brand identity to compete globally	<ul style="list-style-type: none"> • Ensure country labor and safety standards comply with international norms, and invest in "lumpy" facilities (standards laboratories) for quality testing and assurance • Facilitate public-private dialogue to boost country and product identity (through sector or industry promotion facilities)
4. Weak economic growth and high unemployment may lead to protectionism in developed countries	<ul style="list-style-type: none"> • Regional (ASEAN; SAARC) and global groups (G20) to cooperate to keep protectionist tendencies in check
5. Long and complex supply chains are becoming more vulnerable to natural disasters and reputational risk	<ul style="list-style-type: none"> • Private sector to adopt effective "+1" strategies to diversify risk away from single country focus, and public sector to adopt enabling policies to both attract and promote regional FDI
6. Wages in Asia have been rising faster than developed countries narrowing the cost differential	<ul style="list-style-type: none"> • Adopt accommodative policies to support private sector efforts to move up the value chain
7. Exchange rates have become more volatile making it harder to manage production networks across countries	<ul style="list-style-type: none"> • Develop financial markets and products to help private sector manage risk
8. Shortage of skilled workers could hamper move toward producing more sophisticated products	<ul style="list-style-type: none"> • Adopt public sector measures to support skills development, directly through education as well as enabling private sector to continuously re-skill workers
9. Changing demographics in some countries will result in a smaller labor pool	<ul style="list-style-type: none"> • Countries in the region to cooperate among themselves and facilitate private sector efforts to align skills to boost competitiveness

continued on next page

Table 8 *continued*

Issues	Policy Recommendations
10. Production has been shifting from high cost countries to lower cost countries	<ul style="list-style-type: none"> • Support the entry of small and medium enterprises into production networks • Governments to launch public-private dialogue to facilitate private sector positioning of investments or industries in appropriate lower cost locations in the region
11. Software is becoming more important in manufactures and absorbing greater share of value	<ul style="list-style-type: none"> • Support continuous skills upgrading to facilitate value chain and product sophistication
12. Advances in robotics and additive manufacturing technologies could herald a new era in manufacturing	<ul style="list-style-type: none"> • Countries to invest directly in research and development as well as absorption of new technology

ASEAN = Association of Southeast Asian Nations, FDI = foreign direct investment, SAARC = South Asian Association for Regional Cooperation.

As the labor cost advantage—the most important for the region in the last 25 years—narrows, countries will have to find and build other advantages. While demographics are shifting in a few major economies, there is abundant labor in others. Future manufacturing will be more skill-dependent—ensuring the supply of highly-skilled workers will be key to its success (ADB 2013). Besides higher education in science and technology, technical and vocational education must be prioritized to ensure school-leavers are well-equipped to join modern manufacturing industries. With advances in information and communication technology, students must be shown the trends and opportunities that can steer them toward subjects that will be in great demand in the future. Countries faced with the prospects of losing jobs to other, more cost-effective locations, should invest more in education and infrastructure to move up the value chain. Manufacturing jobs have traditionally been seen as less “prestigious”—the higher skills required in the future should negate those preconceptions. The private sector also needs to invest in continuous skills upgrading. Faced with evolving technologies, continuous and strategic support for skills development can help the region to be more flexible and adaptable to an uncertain future. Regional cooperation will help facilitate skills mobility. The ASEAN Economic Community 2015 framework provides for this, and these efforts must be nurtured by policymakers.

World-class infrastructure is crucial to attract manufacturing giants. The PRC in particular has made tremendous strides in improving infrastructure. With declining tariffs in the region and the world, the private sector has shifted its focus from tariffs to reducing transport and transaction costs, along with other

nontariff barriers such as border procedures and logistics services. These are critical for sustaining manufacturing growth in the future. Asia has indeed made progress in providing infrastructure, but remaining gaps and financing needs are huge. Logistics, so vital for manufacturing, remain far behind that of North America or Europe, for example. Investing in infrastructure and logistics facilities is critical for the smaller Southeast Asian economies and almost all South Asian economies, as they strive to redefine their manufacturing landscape. Unless addressed, the short-term wage and cost advantages these economies have will dissipate with low value manufacturing production moving to Latin America or Africa.

While this Monograph has focused on Factory Asia, there is a strong nexus between manufacturing and services. There are many critical service functions required for successful manufacturing. In addition, Asia must develop what kind of balance between manufacturing and services it believes will suit it best in 2020–2030. As noted in ADB’s 2012 Asian Development Outlook Update, one strategy is to create domestic demand and expand intraregional trade.⁷ This is already happening. The other is to strengthen the relatively underdeveloped service sector across the region. Asia clearly put its best foot forward by transforming itself into Factory Asia. Now the region’s hidden backward leg—services—requires exercise to restore symmetry and enable the region to stand on its own two feet. There is still considerable room for growth. Between 1990 and 2010, developing Asia’s services share of GDP grew only marginally—from 45.2% to 48.5%—the slowest shift in comparison with other regions in the world. As logistics and information and communication technology-related services become more vital to boost manufacturing, Asian economies have much work ahead to strengthen services (**Appendix**).

C. Policy Implications for Developed Economies

The current shifts in the Factory Asia model will inevitably have implications for developed countries as well. In the short-run, adjustments will affect consumers in those countries as domestic and regional demand builds up. While the PRC’s manufacturing value-added surpassed the US for the first time in 2010, at \$1.9 trillion, there are major compositional differences. The US, Japan, and several European countries clearly lead in advanced research and development. Thus far, the division of manufacturing has been generally thought of as Asia producing mostly lower value goods, while the developed world exports more sophisticated products. There have been prominent examples of Asian manufacturers driving innovation and moving up the value chain. In the medium-term, there will be

⁷ See ADB (2012).

intense competition as manufacturing shifts in Asia. Developed economies will need the markets that developing Asia (and other regions of the world) offer, while competing with it on several fronts. At the same time, both developed and developing economies generally realize they need to cooperate and promote financial and trade flows. The next generation of changes in regional and global architecture will also need to become as sophisticated as the world of manufacturing.

SECTION V

Conclusion

There were seven questions posed in the Foreword to this monograph. Some answers are posited here—no means definitive, given the complexity of the issues and challenges, and the policy choices countries will have to make. Progress also hinges considerably on how effective public and private sectors dialogue and work together, and how countries will cooperate within the region and beyond.

1. Will Factory Asia continue to be the dominant driver of growth in Asia?

While changing global trends will have an impact on Factory Asia, it is likely to continue as an important source of growth for the region. Asia can sustain its position as manufacturing powerhouse if it adapts to the trends and transforms itself. A considerable part of the region remains outside Factory Asia and could benefit from joining. As early participants of Factory Asia move up the value chain, there are opportunities for other economies to fill the gap.

2. How will the increase in domestic and regional demand transform Factory Asia?

Traditionally, Factory Asia focused on manufactured products exported to developed economies. However, consumer demand from the West will likely be weaker with slower growth in advanced economies. Hence, the new Factory Asia will have to evolve toward serving customers within the region—without appearing to become Fortress Asia. Asia's growing middle class is a large potential market. To succeed, the region's manufacturers must continue to invest and improve quality, design, marketing, and branding.

3. For those firmly embedded in current regional production networks, what adjustments will be needed in the overall growth strategy?

Economies that are part of production networks should use the skills and experience acquired to move up the value chain and produce higher value-added products. The Republic of Korea has succeeded in becoming a technological leader in electronics, while the PRC is also making impressive headway. Japan's technology dominance will continue. Together, these three are likely to define the future landscape. The new growth strategy will be more knowledge-intensive and require more investment in human capital and R&D.

- 4. It appears that larger firms dominate production networks in Asia. What can be done to encourage small and medium enterprises (SMEs) to join production networks and benefit from greater integration?**

SMEs are typically bypassed in public-private sector dialogues. Special mechanisms—and not necessarily subsidies—are needed to boost SME access to regional production networks. Well-tried recipes—such as common facility clusters that support SMEs—may need to be revisited with the specific goal of helping them join global value chains. Dedicated support for value chain financing will help. The evidence shows transport corridors work, and thus need to become more integrated within overall economic planning. That way SMEs can play a larger role in producing intermediate goods or providing logistics and other supporting services.

- 5. For the many countries outside Factory Asia—or on its periphery—are there emerging opportunities up for grabs? Will they become new partners and join regional production networks, or will they leapfrog the early stages entirely and enter at higher levels of the value chain?**

These countries should look for ways to participate in networked production via the Factory Asia model. Those who dominate early have the potential to direct their investments and technology into other economies (in Group 4 or 5). To facilitate the process, governments must improve infrastructure and liberalize trade to facilitate flows of goods and services across borders. Greater inter-regional (South-South) cooperation could help countries learn from others' experience in production networking. Countries joining production networks afresh would not necessarily have to start at the bottom of the value chain. They can leverage existing strengths and experience to start higher up on the value chain.

- 6. How will regional and global investment flows adjust to the changing roles and importance of agriculture, manufacturing, and services to economic growth?**

Labor mobility will continue from agriculture to manufacturing to take advantage of the higher productivity. As countries further develop, services will grow in importance. Factory Asia got its start when Japanese manufacturers (and others) invested and set up factories abroad—as they were faced with rising labor costs. Today, global and regional investments are heading toward emerging economies with competitive cost structures. Services can play an important complementary role in helping develop manufacturing capabilities. Countries in Groups 3, 4 and 5 need to continuously improve their investment climates and address the behind-the-border barriers to investment, production, and trade.

7. **How will countries balance environmental and growth challenges; and how can they ensure growth is more inclusive and equitable as they move beyond the Factory Asia model?**

While the factory-driven growth model thus far has helped lift millions out of poverty, it has also had an adverse environmental impact. The looming threat of climate change has already begun to encourage countries to seek a greener path for manufacturing. Technological advances have made manufacturing more environmentally friendly, and Asia is already a leader in green technologies such as solar and wind power. If countries were to embrace these comparative advantages, the region could set itself on the path to sustainable manufacturing growth. At the same time, countries will also have to ensure the benefits from the new Factory Asia model are evenly spread. One way is to help support the participation of small and medium enterprises in regional production networks that have mostly been the province of multinationals. In short, the future should be guided by the goal of achieving growth that is inclusive as well as environmentally sustainable.

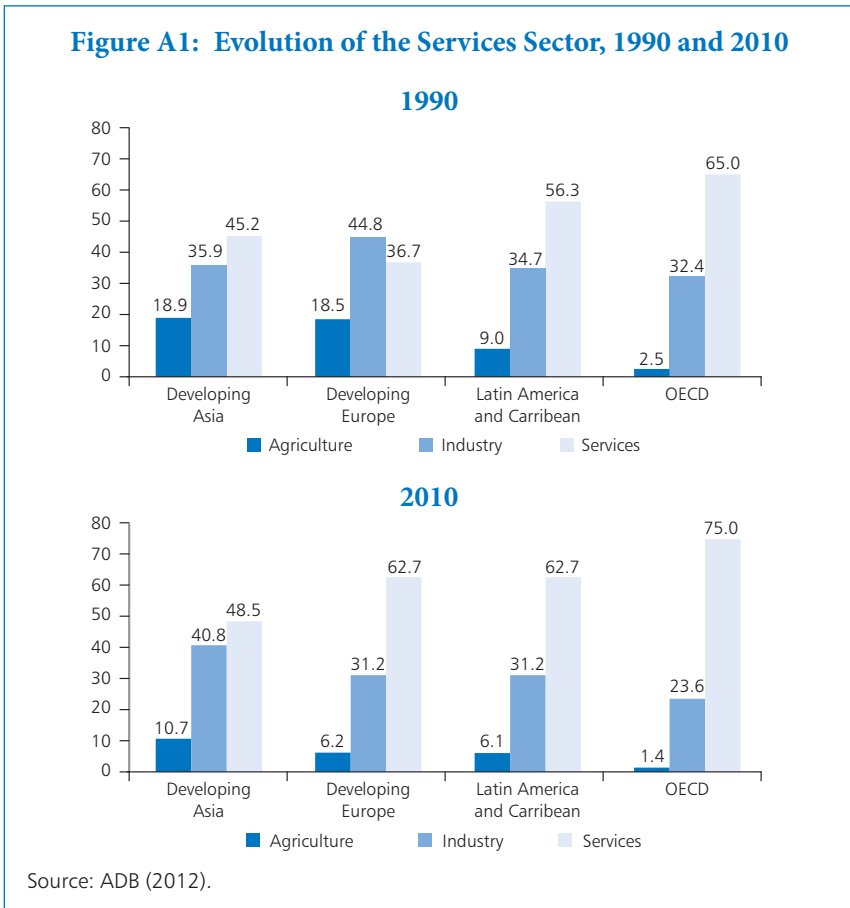
8. **Should the region build a common, coordinated strategic vision as a guide toward future transformation? Is there sufficient political will? Or is a strategic vision even necessary? Is the whole more than the sum of its parts, or should dominant economies continue learning and competing, drawing others along in their wake?**

Continuous learning and intense competition are essential to increase as well as sustain Asia's growth in the future. At the same time, the region does need to enhance cooperation at various levels to maintain its overall competitiveness vis-à-vis other parts of the world. Despite the complexities in forging a common vision (see Baldwin 2008), what the sub-regions and the region overall need is just that. Otherwise, given the fairly strong supply-side integration in parts of Asia (such as East Asia), the risks of the region as a whole losing its competitiveness are high. There are several steps to forge regional cooperation that are positive and in the right direction. Trade and financial integration is improving, and risk sharing arrangements are in place. The various sub-regions can build on the initiatives of the past two or more decades, and look to a brighter and sustainable future.

APPENDIX

Role of the Services Sector

As noted in the main text of this monograph, the services sector has generally lagged behind in developing Asia in comparison with the rest of the world, as shown in Figure A1.



Given the strong linkage between services and manufacturing, focus on strengthening services sector will help the region build a stronger manufacturing sector, besides providing a sound alternative venue for job creation and growth. There is a whole range of issues that the policy makers in the region need to take into account in strengthening the services sector and rebalancing between manufacturing and services (**Box A1**). The gains can be concrete and significant.

Box A1: Rising Importance of Services for Asia's Future Growth

Services play a critical role in developing Asia's growth. The sector is already large, accounting for almost half of the region's GDP in 2010. Services contribute substantially to economic growth across Asia, providing 66% of India's growth from 2000 to 2010 and 43% of growth in the manufacturing-oriented People's Republic of China (PRC) in the same period.

- **Structural changes in the region's economies will further expand the role of services.** Developing Asia is following the same path travelled in the past by the advanced economies, with agriculture's dominance giving way to industry, and then industry being supplanted by services. Rising incomes and rapid urbanization are boosting demand for services domestically. As manufacturing sees wages rise and labor intensity fall, Asia will look even more to services to create jobs for the millions who join the workforce every year.
- **A vibrant service sector has broad benefits for the economy.** Four key factors highlight the urgent need to foster the development of the service sector:
 - **Positive spillovers to other sectors.** Vibrant business services, such as information and communication technology (ICT), industrial design, and marketing, may facilitate investment and the development of new products. The cross-benefits work both ways, as a dynamic industry sector creates demand for more business services. This synergy between services and industry can raise the productivity of the economy as a whole.
 - **Support for greater inclusiveness.** Job creation is central to inclusive growth, and services tend to be labor-intensive. The sector's share of total employment in the region is large—employing 34% of all workers in 2009—and growing. Empirical evidence suggests that service sector growth helps reduce poverty. More directly, services such as health care and education enable individuals to be more productive and enhance their quality of life.
 - **Diversified production for stability.** The extended slowdown in the major industrial countries is weighing heavily on merchandise exports from the region. Developing the service sector can diversify the production base, which will enhance the resilience of the economy and boost its growth momentum.
 - **New opportunities for foreign trade.** Technological progress has enabled the rise of cross-border trade in services. For example, the advent of ICT has catalyzed the global exchange of outsourced business processes. India and the Philippines have established themselves as world leaders in the export of such services. Asia accounts for a large share of this trade already, but greater openness can support a more competitive and productive service sector.

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Box 6 *continued**Trapped in traditional services*

- **Labor productivity in developing Asia's service sector lags far behind that of advanced economies.** For most economies in the region, labor productivity is less than 20% of the figure in advanced economies. It languishes at around 10% in the PRC and India. In the worst cases, it may take up to 30 years to reach 20%.
- **Low productivity partly reflects the dominant role of traditional service industries.** These services—such as wholesale and retail trade, real estate, transport, personal services, and public administration—still account for the bulk of the sector's output. In contrast, modern services such as ICT, finance, and professional business services occupy less than 10% of Asia's service economy, well below the 20%–25% in advanced economies.
- **Enabling the shift to modern services and modernizing traditional services are essential to close the productivity gap with advanced economies.** Modern services enjoy higher productivity, have greater potential for synergies with other sectors, and are more amenable to cross-border trade. They also strengthen the link between services and inclusive growth by generating high-quality, high-wage jobs. Traditional services too can reap considerable productivity gains by updating their practices using modern tools.
- **Regulatory, infrastructure, and human capital bottlenecks are holding back service sector productivity.** Infrastructure for services, such as ICT, still lags advanced economies. The highly skilled workers that are required for modern services, such as scientists and bankers, are in short supply. And above all, excessive regulation that protects incumbent firms and other vested interests keeps markets less competitive and thus undercuts prospects for improved productivity and efficiency.

Policy priorities for competitive services

- **Regulatory reform is needed to foster a more competitive service sector.** The burden of heavy regulation is the single tightest bottleneck constraining the sector. A slew of regulations and restrictions currently protect incumbent firms, stifling competition and innovation in services. In India, for instance, a staggering 13 official bodies regulate higher education. Trade barriers in the PRC, the Philippines, Thailand, and others are higher than those in countries with similar incomes. International experience shows that regulatory reform can catalyze competition and deliver significant economic benefits. It must be a top priority for policy makers.
- **Investment in infrastructure for services needs to be ramped up.** ICT infrastructure, for example, has large positive spillover effects for the whole economy. Examples of the benefits of such investments are the world-class Indian and Philippine service industries in ICT and outsourced business processes. While Asia has invested in ICT infrastructure at a furious pace, it still lags advanced economies.
- **Education reform is vital to easing the shortage of highly skilled workers.** While education attainment has risen rapidly in Asia overall, the region still suffers acute shortages of some skills. Modern high-productivity services require highly skilled workers. The shortage is especially evident in professional groups: accountants, business managers, engineers, lawyers, medical doctors, scientists, and software specialists.

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Box 6 *continued*

- The region must improve its collection and publication of service sector data. The lack of high-quality and timely data on services limits understanding of the sector, which constrains the ability of Asia's policy makers to formulate and implement appropriate policies. To foster evidence-based policy analysis, the strengthening of service sector statistics needs to be pursued in tandem with other reforms.
- Policy makers must create a more competitive environment for services. Regulatory barriers—including domestic obstacles and foreign trade restrictions—protect vested interests from new market entrants. Dismantling such barriers is critical to unleash competition. Easing constraints on infrastructure for services, and training workers in the skills demanded by modern services, will provide the means to move to modern high-productivity services. A more competitive, dynamic service industry can boost overall productivity to support the region's future growth.

Source: ADB (2012).

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Beyond Factory Asia Fuelling Growth in a Changing World

Asia's phenomenal growth over the past few decades has been driven by the rise of Factory Asia. However, the global financial crisis and uncertain growth prospects in the United States and the eurozone have dampened demand for Asian exports. At the same time, rising wages threaten to erode the cost advantage that the region once had, managing supply chains has become more complex, and new technologies are transforming manufacturing. How can regional economies move beyond Factory Asia? What strategies can Asian economies pursue to meet these challenges?

This monograph will examine a range of policy, institutional, legal, and regulatory issues relating to reforms that will drive Asia's economic and social transformation in its quest for a new Factory Asia model.

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