



# CHALLENGES AND OPPORTUNITIES FOR SKILLS DEVELOPMENT IN ASIA CHANGING SUPPLY, DEMAND, AND MISMATCHES

Sungsup Ra • Brian Chin • Amy Liu



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# Abbreviations

ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
EBT	enterprise-based training
FDI	foreign direct investment
GDP	gross domestic product
GVC	global value chain
ILO	International Labour Organization
MOE	Ministry of Education
MRA	mutual recognition arrangement
PPP	public–private partnership
PRC	People’s Republic of China
SAARC	South Asian Association for Regional Cooperation
TVET	technical and vocational education and training



# Executive Summary

In the past three decades, economic growth in Asia has been the envy of the world. Asia's rapid economic growth was, in part, propped up by a relatively broad human capital base, in terms of completion of basic education, combined with low wages. The education systems in Asia, including technical and vocational education and training (TVET), were well suited at the time to allow Asia to become the world's assembly line. In simple terms, formal education and on-the-job training were generally able to supply the hard skills (technical skills such as machine operation, welding, etc.) and soft skills (e.g., functional literacy and numeracy) needed to meet the skills needs of the Asian economies to catch up with the rest of the world and capture a growing share of basic industry and service sector production globally.

However, in recent years, the alignment between supply of skills and demand for skills that previously converged in the case of Asia has been increasingly impacted by key global shifts and trends. In particular, this report identifies six key shifts and trends that have had critical implications on either skills supply and/or skills demand in Asia, thereby straining the previous alignment in this regard.

Two of these key shifts and trends have principally affected the supply of skills globally, including Asia. First, labor force participation in the global economy has been dramatically affected by an initial "Great Doubling" in the 1990s, with the entry of the People's Republic of China (PRC), India, and the former Soviet Union into the global economy, effectively doubling the size of the global pool of labor. That Great Doubling depressed wages (particularly for low-skilled labor) and helped Asia capture a larger share of global gross domestic product, but has been followed by a trend of wage escalation in Asia (Freeman 2006). A second key global trend affecting skills supply has been the increased access to education. This has been driven particularly by the universalization of basic education (i.e., primary and lower secondary education), which to varying degrees has also been accompanied globally by a diversification of education, including a modest expansion in TVET. Collectively, these shifts have impacted on both the "quantity" and "quality" of skills in Asia's workforce.

Three other shifts and trends have principally affected the demand for skills globally, including Asia. First, economic and industrial transformation has brought about marked changes globally, particularly in Asia (especially in East Asia), in terms of shifts in the allocation of employment across sectors, shifts in the occupational profile within each sector, and increases in labor productivity. Second, technological advancement has had important impacts on employment, driving up demand for labor with advanced skills globally, including Asia. A third key trend affecting the demand for skills is globalization

and increasing regional integration. Key dimensions of this trend include (i) increased labor mobility; (ii) the rise of offshoring (with firms in a given country relocating in-house production to factories in other countries and/or outsourcing inputs to other companies abroad); and (iii) efforts toward regional integration, removing barriers to free trade and mobilizing resources across borders.

Finally, demographic shifts represent a sixth key global trend, which has impacted both supply and demand for skills globally, including Asia. Following the one-shot increase in the global workforce through the Great Doubling in the 1990s, demographics have exerted increasingly complex and varied influences on the supply of skills, with the expansion of the working-age population continuing at a rapid pace in some countries but decelerating or even contracting in other countries globally, including Asia. As a second key dimension, the aging of the global society has led to shifts in the demand for skills in specific areas, perhaps most notably driving increases in the demand for skilled workers in areas such as health care and elderly care.

The effects of these six key trends and shifts have not been limited to Asia. However, they have had particularly marked impacts on Asia given that these external influences coincided with (and, in some cases, reinforced) Asia's rapid growth and rise out of low-value-added industries into more advanced sectors and industries, which exerted additional influences on skills supply and demand in Asia. Together, the combination of key global shifts and trends as well as Asia's rapid rise up the technological ladder have broken the prior alignment between supply of skills and demand for skills globally, including Asia, leading to skills mismatch, wherein the supply of hard and soft skills being produced is no longer aligned with the rapidly evolving demand for skills in the workplace.

Evidence suggests that the emerging skills mismatch in Asia will not be self-correcting, that is, skills mismatch will likely worsen if Asia continues to rely on the old model of skills supply that aided its economic and technological "catch-up" in recent decades. Looking forward, Asia should shift from catch-up to lead to maintain its past dynamism. If Asia successfully transitions in this regard, there will be dramatically different and evolving demand for skills in countries in the region. However, skills supply in Asia is found wanting.

In the new global economic context—and as a by-product of Asia's own past success—maintaining Asia's economic miracle will require revolutionizing its skills supply. Asia's education systems (defined broadly to include formal academic-track education and TVET provided by institutions and employers) will need to be transformed to ensure that skills supply can rapidly and continually respond to changing skills needs. In the absence of such a transformation, Asia will likely face widening skills mismatch, as skills supply would fail to keep pace with the evolving skills demand. In addition to obstructing Asia's further progress up the technological ladder to that of a leader, worsening skills mismatch will have broad impacts ranging from decreased firm-level productivity to increased unemployment and underemployment of labor, and depressed economic growth in countries in the region.

In the face of potentially widening skills mismatch, governments in Asia need to urgently prioritize policies and investments to transform education and training to better meet current and future needs for a broad array of hard and soft skills. However, doing so successfully will not be easy, and there is no "one-size-fits-all" solution. At the same time,

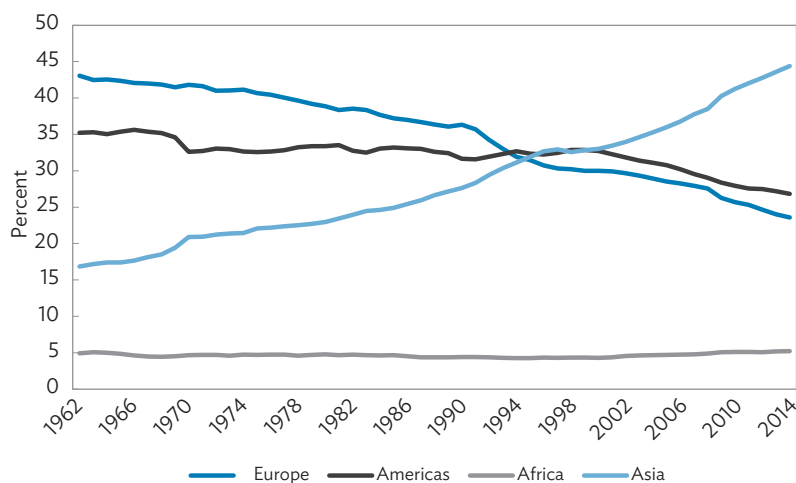
in view of international experience, this study proposes four pillars that may be critical in forging effective national policies to address skills mismatch. As the first and overarching pillar, it is essential that policy makers in Asia develop comprehensive national strategies and planning for skills development (including general-track education and TVET), which place skills development at the epicenter of national plans and strategies for propelling inclusive growth, and are underpinned by strong political commitment. Second, it will be critically important to further prioritize but also rebalance development of education systems, recognizing the fact that skills secured from both TVET and general education are required by the labor market and for economic growth. As a third pillar, governments in Asia need to give particular priority to overdue reforms of TVET aimed at improving the relevance and the quality of TVET. Finally, complementing country-level efforts under the first three pillars, countries in Asia should advance international cooperation to collectively address skills mismatch in the region.



# I. Introduction

**Asia's economic miracle.** Asia has experienced remarkable growth rates over the last three decades, considerably outperforming any other region in the world. In the half-century from 1962 to 2014, the region captured roughly one-fourth of the global real gross domestic product (GDP) in purchasing power parity terms, rising from 16.8% to 44.4% of global GDP (Figure 1). If Asia is able to maintain its dynamism, it is projected to account for more than half of the global GDP (52%) by 2050 (ADB 2011).

**Figure 1: Share of World Real Gross Domestic Product by Regions, 1962–2014**



Source: Global GDP Database, [www.worlddeconomics.com](http://www.worlddeconomics.com) (22 July 2015).

**Is Asia approaching a plateau?** Among other contributing factors, sustained growth in productivity has been a primary engine of Asia's impressive economic growth in the recent decades (ILO 2015a). Looking forward, Asia's future growth potential rests on its ability to sustain (if not accelerate) recent rates of productivity growth (ADB 2011). Both economic theory and the dynamics discussed in Sections II and III suggest that it will not be easy.<sup>1</sup> Having adequate human capital that is aligned with economic needs is becoming

<sup>1</sup> The economic literature, see, for example, Krugman (1994)—*The Myth of Asia's Miracle*—suggests that productivity growth at an economy's early take-off stage is initially driven by reallocation of surplus of low-cost labor with basic education into nonagriculture sectors, such as assembly-line manufacturing. When the economy approaches or passes the so-called Lewis Turning point, the model of relying on surplus low-cost labor supply will no longer be able to accelerate productivity or economic growth.

increasingly crucial for countries seeking to enter or move up the global value chains (GVCs) and transform into knowledge-intensive economies. Having the “right” skills will be crucial for determining winners and losers amid continued globalization and other shifts.

**Conceptualizing “skill” and “skills mismatch.”** In the face of key global trends as well as by-products of Asia’s own success, the region is increasingly encountering challenges related to skills mismatch. Before presenting the evidence for that assertion, it is important to recognize that there is no consensus in the literature on how to conceptualize skills and skills mismatch.<sup>2</sup> In much of the literature, definitions of skill appear to be driven by data limitations. Many existing studies equate “skill” with education qualification, even though academic credential is a very distinct concept that is, in general, only moderately linked with concrete skills actually needed in the workplace. To some extent, this reflects the fact that objective and quantified data on skills in terms of competencies needed by employers are much more limited than data on education qualifications, such as on numbers of youth or workers with specific academic credentials (OECD 2011).<sup>3</sup>

While this study is also forced to rely partly on data for educational attainment and other imperfect proxies for skills, it attempts to focus on skills needed or used in the workplace. For purposes of this study, *skill* is defined, following the European Commission (2015), as *the ability to apply knowledge and use know-how to complete tasks and solve problems*. For simplicity, this study generally groups skills needed in the workforce into two basic categories: hard and soft skills. *Hard skills* (sometimes termed “technical skills”) refer to abilities to perform specific tasks, such as operating a machine and welding. *Soft skills* capture a broader array of applied knowledge and more generic skills needed in the workplace.<sup>4</sup> These, in turn, can be subgrouped into (i) cognitive skills, referring to basic knowledge and the ability to apply it in workplace settings, including functional numeracy and literacy, as well as skills in problem solving, critical thinking, etc.; and (ii) noncognitive skills (sometimes termed “personality traits”) associated with multidimensional and often intangible skills such as discipline, ability to work in teams, and perseverance.<sup>5</sup> Accordingly, “skills development” used herein refers to the development of both hard and soft skills.

Against that backdrop, a huge array of hard and soft skills is needed in a given economy, and such skill demands are likely to constantly evolve. A key question facing policy makers globally, including Asia, is whether the supply of skills (the hard and the soft skills being produced by the current education systems) is able to meet the complex and evolving skills demand. Drawing on Cappelli (2015) and ILO (2011), *skills mismatch* is defined in this publication as *imbalances between the supply of skills and the demand for skills in the world of work*.

<sup>2</sup> See Lolwana (2013), Powell (2013), and Cappelli (2015) for critiques on ambiguity and inconsistency of definitions of skills used in global reports.

<sup>3</sup> As an alternative to educational qualifications, Hanushek and Woessmann (2015) propose a measure based on Programme for International Student Assessment (PISA) performance as an indicator of possessing foundational skills. However, PISA data are not available for most countries in Asia.

<sup>4</sup> Research by Hanushek et al. (2015) suggests that the social rate of return to investment in soft skills may potentially be larger than that for investments in hard skills.

<sup>5</sup> This conceptualization of skills draws on definitions from sources, including World Bank (2010) and ILO (2015a). It is most similar to the definition from the World Bank, except that it treats both cognitive and noncognitive skills as “soft skills.”

The structure of this study is organized as follows. Section II identifies six key shifts and trends in recent decades that have fundamentally reshaped the global labor force as well as skills supply and demand in the workplace globally. Section III then discusses the profound implications of these trends in terms of potential skills mismatch in Asia in particular. Finally, Section IV concludes the study by identifying four strategic pillars attempting to guide national policies and investments for reorienting and rebalancing education systems to meet evolving economic and labor market demands in Asia, with a particular focus on enhancing the role of TVET within national education systems.

## II. Key Global Trends Shaping Skills Supply and Demand

The ability of education systems to meet skills needs and drive growth in Asia has been dramatically affected by broad global shifts and trends that have appeared and evolved in recent decades. The following sections present a series of key global shifts and trends with important implications for employment patterns and workforce skills. The first two of these global shifts and trends principally influenced skills supply, the next three have principally affected skills demand, and the final one has crosscutting impacts affecting both skills supply and demand.

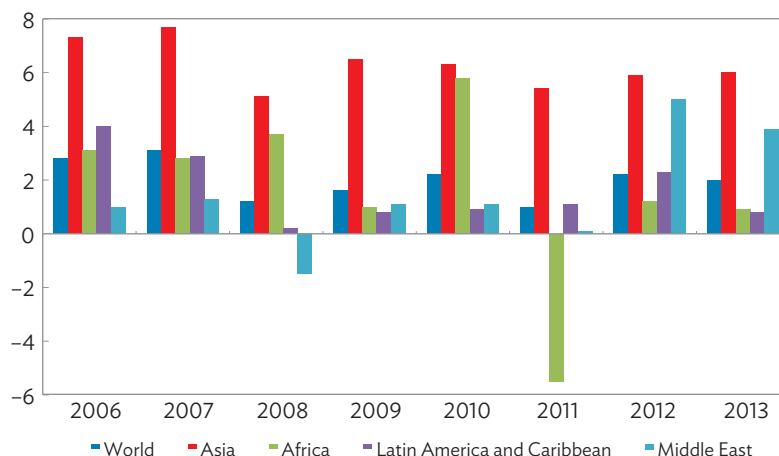
### A. Labor Force Participation in the Global Economy

The past three decades have witnessed dramatic changes in labor force participation in the global economy. This commenced with a dramatic shock in the 1990s, when the entry of the People's Republic of China (PRC), India, and the former Soviet Union into the global economy, contributing 1.47 billion workers, effectively doubled the size of the global pool of labor and depressed wages (particularly for low-skilled labor) globally. More recently, however, Asia in particular has transitioned to a trend of wage escalation alongside shortages of certain types of skills.

**The Great Doubling.** The doubling of the size of the global pool of labor in the 1990s resulted in an explosion in the number of workers, thereby shifting the global balance of power to capital and reducing the ratio of capital to labor in the world economy to 61% of what it would have been had the PRC, India, and the former Soviet Union not joined the world economy (Freeman 2006). More specifically, the massive influx of workers from these countries, more so the PRC and India, injected a huge pool of similar skilled workers with wages only around one-fourth of other developing countries such as Mexico or South Africa. This enabled the PRC and India to capture global production jobs while forcing many developing and developed countries to rethink their growth strategy to produce more value-added products to survive in the new global economy.

**Wage escalation in Asia.** In more recent years, however, the era of abundant supply of low-wage workers has come to an end in much of Asia, including some countries that had fueled the Great Doubling (particularly the PRC). Growth of average real wages in the region has continuously outpaced that in most of the world since the 1990s, particularly in the past decade (Figure 2), raising real wages by a factor of 2.4 times compared with the time period of the Great Doubling (ILO 2014a).



**Figure 2: Growth of Average Real Wages in the World, 2006–2013**

Source: Authors' illustration using data from International Labour Organization (ILO) Global Wage Database.

Wage has been a primary determinant of competitiveness, which is evident in the movement of low-cost manufacturing first to East Asia and later to South Asia (e.g., Bangladesh), Southeast Asia (e.g., Cambodia), and Africa (e.g., Kenya and Nigeria). Fukunishi and Yamagata (2013) confirm that it is hard to maintain competitiveness with rising wages. However, they also find that greater educational attainments of workers and their productivity help offset the negative effects of rising wages to some extent.

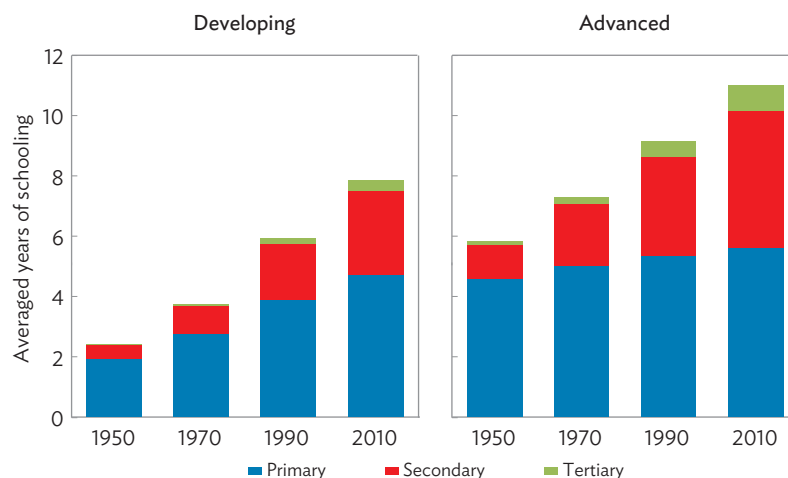
## B. Expansion of Education Access

A second key global trend affecting skills supply has been the expansion of education access. The most prominent feature of this trend has been the dramatic progress toward the universalization of basic education (i.e., primary and lower secondary education) in most countries. As a secondary dimension of this trend, to varying degrees in different countries, the expansion of basic education has been accompanied by a diversification of education, including a modest expansion in TVET.

**Basic education for the masses.** In recent decades, the introduction of mass education has significantly improved access to education, including the developing countries in Asia. This is particularly true in terms of primary schooling: estimates using Barro and Lee (2014) data suggest that average years of primary education attainment have increased dramatically in developing countries and were now nearly on par with that in advanced countries by 2010 (Figure 3).

Data for completion rates show a similar picture. In much of Asia, completion of primary education is nearing universalization and completion of lower secondary education has also expanded rapidly, although with some exceptions. As shown in Figure 4, most countries in East, Southeast, and South Asia have achieved primary completion rates above 90%,

**Figure 3: Trends in Access to Education in Developing and Advanced Countries**



Source: Barro and Lee (2014).

whereas roughly half of the countries had achieved lower secondary completion rates of at least 80%.

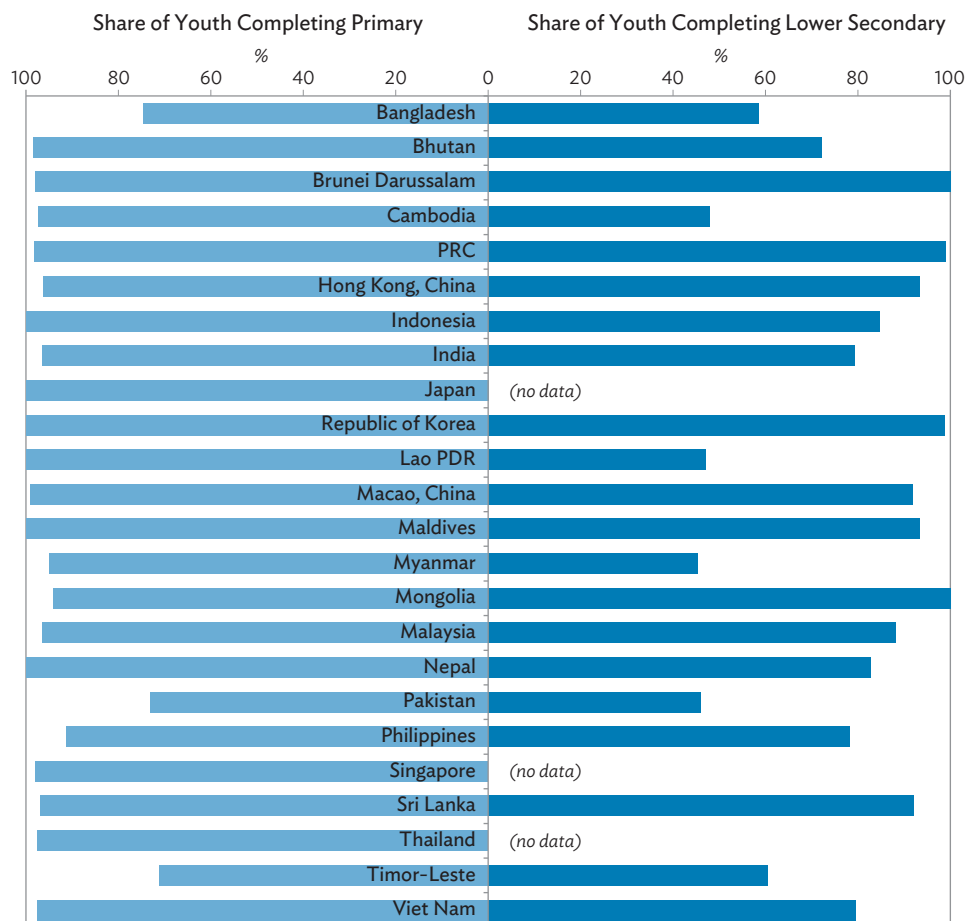
Expanded attainments of at least basic education (primary and lower secondary) have meant that new entrants to Asia's workforce in recent years have been markedly better educated than those who entered the workforce in prior decades in most countries.<sup>6</sup> In turn, this generated a large pool of young workers with at least basic skills (in particular, literacy, numeracy, and other soft skills), making them better prepared to function in a modern workplace, perhaps particularly in mass production industries and basic service sector jobs.<sup>7</sup> Importantly, this expansion of basic education happened in parallel with other shifts, including increasing capital flows (see Section II E), as well as the opening of the PRC, India, and the former Soviet Union and thus the influx of their workers into the global economy: that is, the so-called Great Doubling outlined in Section II A. Particularly, in combination with such shifts, progress toward universal basic education helped countries in Asia capture "production line" industries, as jobs in such industries shifted from advanced countries to factory floors in Asia.<sup>8</sup>

At the same time, two points worth noting are revisited in Section III. First, progress beyond primary education is far from universal: to varying degrees, impressive progress toward universalizing primary education has left challenges in access and quality and relevance of secondary (particularly upper secondary) and/or tertiary education and TVET in many

<sup>6</sup> Although this study principally focuses on education among youth and young adults, it is worth noting that a large share of adults in the workforce (particularly in older cohorts) remains poorly educated. The UNESCO Institute for Statistics (2012) estimates that roughly 775 million adults globally cannot read or write, with half of them residing in South and West Asia.

<sup>7</sup> See Spohr (2003).

<sup>8</sup> See, for example, study by Heckman and Yi (2012) on the PRC.

**Figure 4: Expanded Access to Basic Education in Asia and the Pacific**

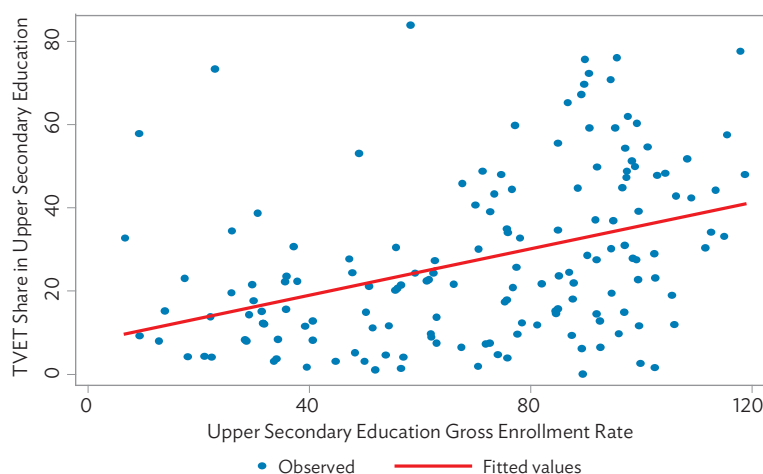
Lao PDR = Lao People's Democratic Republic, PRC = People's Republic of China.

Source: Authors' calculations based on (i) primary and lower secondary completion rates from [www.databank.worldbank.org](http://www.databank.worldbank.org), capping values at 100%; and (ii) for countries where World Bank data are not available, data for 15- to 19-year-olds are calculated using Barro and Lee (2014).

Asian countries. Second, in most of the Asian countries, the education model of the past is no longer capable of fueling continued growth and dynamism. There is an increasing need to shift the focus from “quantity” to “quality,” and to promote innovative education and training at higher levels to cover more advanced skills.

**Emerging diversification of education.** In parallel with the overall expansion of education enrollments globally, there has been at least some trend toward diversification of education programs offered. For example, analysis of available data suggests that the share of upper secondary level students enrolled in TVET-track programs tends to increase with rising gross enrollment rates in upper secondary education (Figure 5). Other examples include a diversification of higher education programs offered within countries, in addition to the fact that increasing numbers of students are accessing programs in other countries.

**Figure 5: Technical and Vocational Education and Training Share in Upper Secondary Education versus Upper Secondary Education Gross Enrollment Rate**



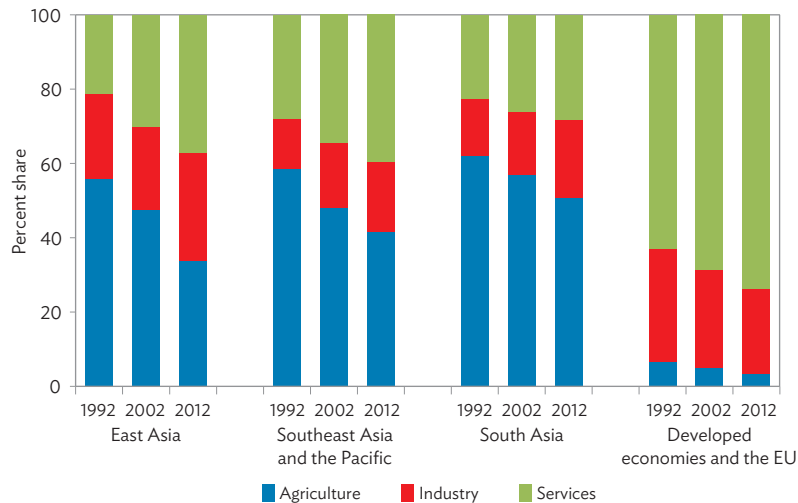
TVET = technical and vocational education and training.

Source: Authors' estimate using World Bank data.

## C. Economic and Industrial Transformation

In parallel with global shifts and trends affecting skills supply, three other global shifts and trends have principally affected the demand for skills globally, including Asia. The first of these has been economic and industrial transformation globally. This has brought about particularly marked changes in Asia (especially in East Asia) in terms of shifts in the allocation of employment across sectors, shifts in the occupational profile of employment within each sector, and increases in worker productivity.

**Shifts in employment by sector.** Typically, as an economy climbs up the development ladder, the agriculture sector loses its primacy as the lead contributor to GDP and employment, giving way to rise in employment in the industry and service sectors, with the service sector eventually predominating. Asian economies, to varying degrees, have exhibited such restructuring toward the industry and service sectors, with the transition occurring most rapidly in East Asia and most gradually in South Asia. The progress is reflected in changes in shares of employment by sector. In 1992, the service sector accounted for a nearly identical share of total employment (just above a one-fifth share) in East and South Asia. In East Asia, during the next two decades, the rapid rise of manufacturing and service industries led to a dramatic expansion in employment shares in these sectors, with the service sector leapfrogging agriculture to become the largest employer (Figure 6). By contrast, shifts in employment shares were much more modest in South Asia, with agriculture still comprising the majority of employment (51%) in 2012. Overall, the pace of shifts in Southeast Asia and the Pacific has been between that for East and South Asia.

**Figure 6: Changing Economic Structure by Share of Employment**

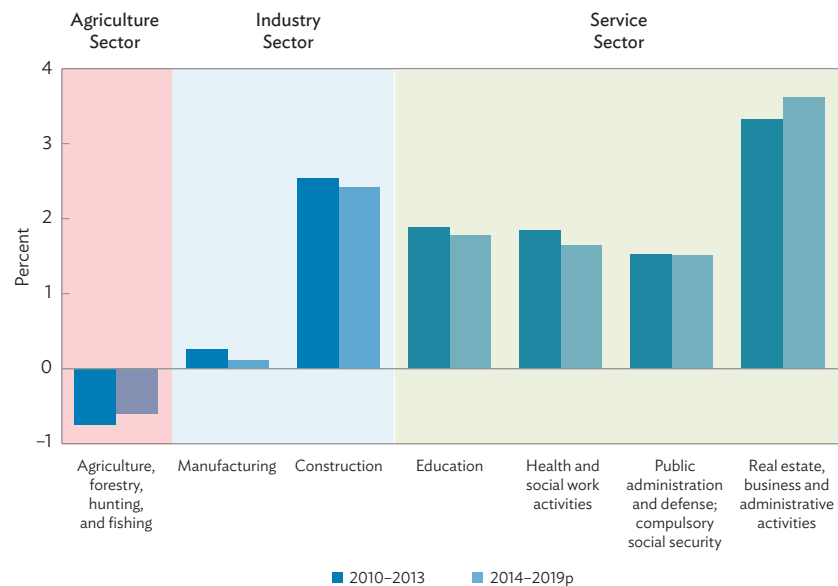
EU = European Union.

Source: Authors' illustration using ILO LABORSTA.

**Intrasector shifts in employment.** In addition to macrolevel shifts in economic activity and employment across sectors (from agriculture to industry and services), economic and industrial transformation has led to shifts in the occupational profile of employment within each sector. This is reflected in the recently projected global employment growth for specific industries or subsectors (Figure 7). Within the industry sector, although manufacturing will remain critically important for both developing and developed countries (in some cases acting as an engine for GDP and employment growth), global employment growth in manufacturing is expected to decelerate, due to productivity growth and increased specialization and automation. By contrast, employment in the construction industry is projected to continue rapid expansion. This is expected to be especially true in developing Asia, partially due to government pledges to invest heavily in public infrastructure in the coming years. Within the service sector, particularly rapid growth in employment is forecasted in private sector services, which are expected to employ more than a third of the global workforce in the coming five years (ILO 2015a). The shares of employment in real estate, business, and administrative activities are projected to rise most dramatically (Figure 7).

**Productivity growth.** Asia's intraregional differences in the degree of economic restructuring are mirrored in disparities in the pace of productivity growth. To some extent, productivity growth at the economy-level reflects the shift from agriculture to the industry and service sectors, where productivity in Asian countries has risen most quickly. At the same time, technology, including the "green revolution" and other factors, has raised labor productivity within the agriculture sector in most Asian countries. Analysis suggests that growth in both nonagriculture and agriculture sectors has been fastest in the PRC, with India among the slowest (Rodrik 2014a).

**Figure 7: Global Sectoral Employment Growth in Selected Industries, 2010–2013 and 2014–2019**



Source: Adapted from Trends Econometric Models (ILO 2014b).

Lower productivity countries could reap productivity gains if these countries attain the right skills and policies enabling them to shift labor toward more productive activities. More generally, the process of economic shifts, especially the development of services, places higher skill demands on labor. At the same time, a broad base of labor with the right mix of skills facilitates the restructuring process in a virtuous cycle. In the process of economic and industrial transformation, new sectors and occupations emerge requiring new skills, although many traditional sectors shrink or vanish, leaving previously needed skills obsolete. Key questions facing policy makers include how to equip workers to make the transition into more productive sectors and emerging industries, and how to ensure workers are continuously upskilled to allow further productivity growth in these new industries. Countries that are able to meet evolving skills needs are more likely to capture opportunities to leapfrog, while others may face growing skills mismatch (Section III).

## D. Technological Advancement

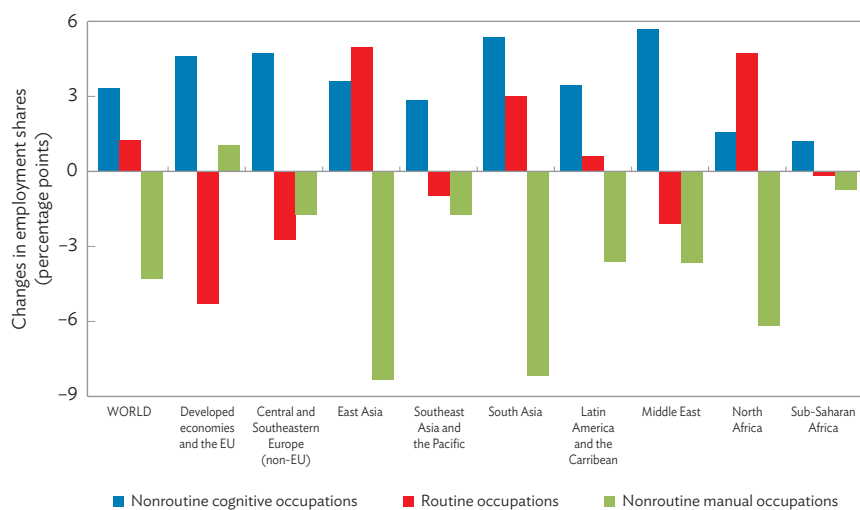
Alongside and closely linked to economic and industrial transformation, technological advancement globally has also had important impacts on employment, driving up the demand for workers with advanced skills globally, including Asia.

**Technology-driven shifts in employment.** Globally, technological progress has been tightly interlinked with, and has directly enabled, productivity growth and the economic

and industrial shifts. In addition to these macrolevel effects on employment through economic and industrial transformation, technological advancement has also had more microlevel effects on employment and types of occupations within specific industries and companies. On the one hand, technological advancement has driven the development of new products and services that did not previously exist, and thus new occupations. On the other hand, technology has also dramatically affected labor demand through automation of processes that used to be labor-intensive. For example, in the manufacturing sector, increasingly sophisticated automation and robotics have revolutionized assembly lines and decreased the need for manual laborers for routine tasks, although potentially creating increased needs for other types of labor. Similar shifts have happened in the service sector. The invention and diffusion of the automated teller machine has had dramatic implications for employment in the banking industry, by reducing the need for labor in handling routine banking transactions. Overall, as illustrated in Figure 8, these shifts have contributed to (i) shrinking employment globally in occupations involving principally manual tasks; (ii) increases in occupations involving principally nonroutine cognitive tasks; and (iii) an exodus of routine occupations (manual and cognitive), to varying degrees, from industrialized to developing economies.

Such trends are projected to continue (ILO 2015a). In particular, although technological advancement will likely continue to decrease demand for certain types of occupations and skills, it is expected to create other types of occupations and increase the demand for workers with advanced skills that are complementary to new technology. Quantitative analysis of firm-level data from eight Asian countries by Lee and Mehrotra (2015) find a strong positive effect of technological changes on demand for skilled workers.

**Figure 8: Development of Employment by Type of Occupation, 2000–2013**



EU = European Union.

Source: Trends Econometric Models (ILO 2014b).

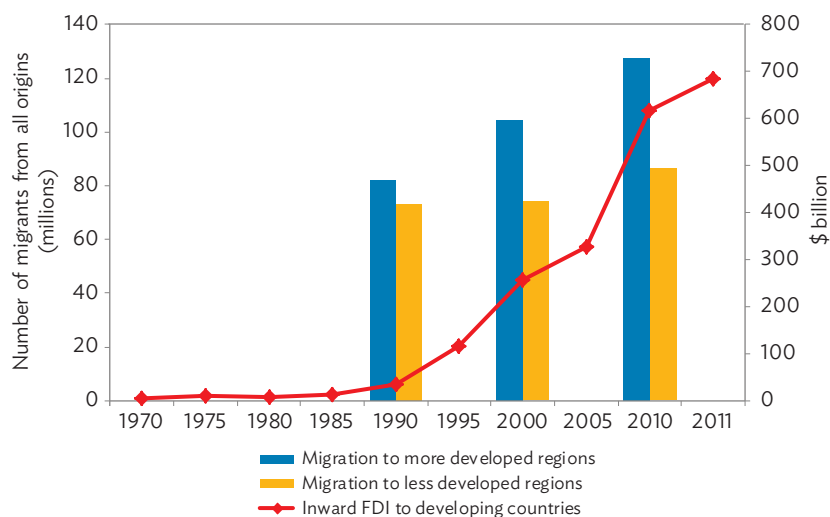
## E. Globalization and Regional Integration

A third key trend affecting skills demand has been globalization and increasing regional integration. Key dimensions of this trend include (i) increased labor mobility; (ii) the rise of offshoring (with firms in a given country relocating in-house production to factories in other countries and/or outsourcing inputs to other companies abroad); and (iii) efforts toward regional integration, removing barriers to free trade and mobilizing resources across borders.

Globalization has reshaped the global economic landscape and dynamics of world trade by mobilizing labor, capital, and services; however, at the same time, it has posed as a double-edged sword. Although some countries (e.g., East Asian economies) have seized on globalization as a potential driver for catch-up growth, successfully leveraging globalization to increase the demand for goods and services via exports as well as promote the inward transfer of technology, there are also countries that have been less successful in taking advantage of globalization, and have suffered some negative effects (e.g., reinforcing their dependence on natural resource exploitation and low-productivity industries).

**Labor mobility.** The past two decades have witnessed a substantial increase in international labor migration, particularly in migration from developing to developed regions (45% of total migratory flow), followed by South–South migration (35%), North–North migration (17%), and North–South migration (3%), according to World Migration Report (IOM 2013). The huge net out-migration from developing to developed regions in large part reflects movements in search of better economic opportunities (Figure 9). The

**Figure 9: Trends in Labor Mobility and Foreign Direct Investment**



FDI = foreign direct investment.

Sources: United Nations, Department of Economic and Social Affairs (2012a). *Trends in International Migrant Stock: Migrants by Destination and Origin*. New York; United Nations Conference on Trade and Development (2013). *Inward and Outward Foreign Direct Investment Stock, Annual, 1980–2013*. <http://unctadstat.unctad.org/wds/TableView/tableView.aspx?ReportId=89>



large share of South–South and North–North movements is partially influenced by better match in employment. In many cases, sizable inward immigration into developing countries reflects, in part, skill shortages in the domestic labor force. Asia has experienced sizable labor flows outward, inward, and within the region. India provides a case in point: 14.2 million Indian nationals emigrated (largely for work) in 2013—with one-third (4.2 million) migrating to developed regions—whereas India simultaneously received 5.4 million immigrants that year.<sup>9</sup>

**The rise of offshoring via foreign direct investment and outsourcing.** Globalization has made fundamental changes in corporations’ production and distribution strategies, leading to the emergence of GVCs. To lower costs, improve efficiency, and to meet skills needs, multinational companies have increasingly moved away from old production models and shifted to offshoring.<sup>10</sup> As evidenced in the marked rise in foreign direct investment (FDI), as shown in Figure 9, one component of offshoring has been firms’ relocation of in-house production to other countries. As a second component of offshoring, firms have also increasingly outsourced inputs to other companies abroad. In the case of the Toyota Motor Corporation, different combinations of FDI and outsourcing have allowed firms in complex assembly industries (e.g., autos and electronics) to narrow their focus on product development and highly advanced segments of the value chain while outsourcing components to external suppliers based on comparative advantage, such as electronic parts from Europe, raw materials from Asia and the Pacific, and assembled products from North and South America.

**Regional integration.** To varying degrees, countries and groups of countries globally have been pursuing regional integration, removing barriers to free trade, and mobilizing resources across borders, to raise efficiency and to create a larger regional market for trade and investment. Among a range of regional integration initiatives in Asia, the Association of Southeast Asian Nations (ASEAN) and the Greater Mekong Subregion are generally perceived as relatively advanced. The South Asian Association for Regional Cooperation (SAARC) bloc is generally viewed as least integrated, despite its considerable potential in terms of geographical position and certain comparative advantages that could support a highly integrated trade, investment, and production space (Tewari 2008). Overall, regional integration in Asia has established regional production networks, contributed to participation in GVCs and job creation, and increased specialization to help Asian economies realize their evolving comparative advantage (ADB, OECD, and ILO 2014).

Not all countries in Asia have benefited equally from globalization or have been equally successful in creating or bringing their firms into GVCs to drive growth. Similarly, not all have benefited from regional integration. There are a number of key factors affecting countries’ abilities to capture opportunities from these shifts, ranging from tangible (such as infrastructure) to intangible (including institution and human capital) assets. Development economists point out that initially industrial revolution was largely driven by intangible assets, and long-term growth ultimately depends on the accumulation of the intangible

<sup>9</sup> As part of its efforts to promote emigration of skilled labor force, the Government of India conducted a Labor Market Assessment study with the objective of investigating and providing skills in demand in destination countries taking into account India’s competitive advantages (ADB and ADBI 2014).

<sup>10</sup> A survey of global employers reported in the Economist Intelligence Unit (2012) found that roughly equal shares of respondents cited lower labor costs (37%) and access to greater numbers of workers with required skills (36%) as the main reasons for offshoring.

assets—human capital to continuously improve institution (Rodrik 2014b). Human capital (i.e., labor force skills) is a key determinant of incoming FDI as well as potential for transfer of technology for catch-up growth. It also underpins a given economy's evolving comparative advantage within the global economy as well as GVCs and production networks. Countries with stronger skills bases may benefit more from shifting terms of trade and are likely to reach more technologically advanced positions in GVCs.<sup>11</sup> They are also likely better able to cope with continued global and regional industrial transformation.

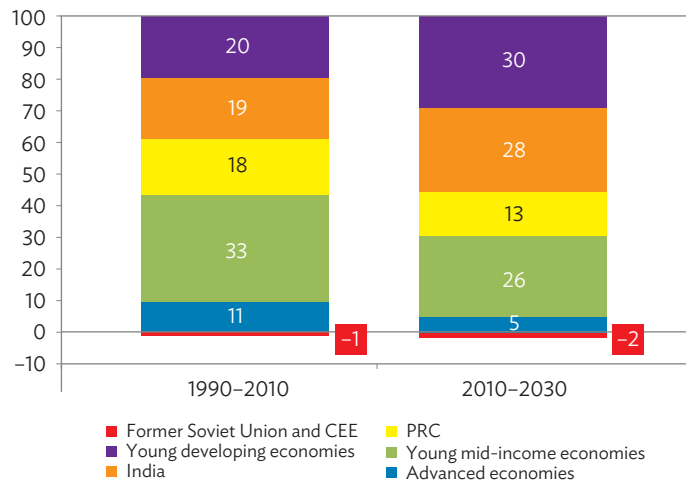
## F. Demographic Shifts

Finally, in parallel with shifts principally affecting skills supply or demand, demographic shifts have exerted impacts on both the supply and demand for skills globally, including Asia. Demographic trends have at least two key dimensions with implications for skills, although the precise dynamics have varied markedly across countries globally. First, following the one-shot increase in the global workforce through the noted Great Doubling in the 1990s, demographic shifts have exerted varied influences on the supply of skills, with the expansion of the working-age population continuing at a rapid pace in some countries but decelerating or even contracting in certain other countries globally, including Asia. As a second key dimension, the aging of the global society has led to shifts in the demand for skills in specific areas, perhaps most notably driving increases in the demand for skilled workers in areas such as health care and elderly care.

**The future global workforce: An increasingly complex picture.** While the Great Doubling represented a dramatic one-shot increase in the global workforce, the global picture is now becoming increasingly complex. It is widely recognized that workforces in many advanced economies have begun to stagnate or even decline, despite a continually growing global population. Additionally, the rate of workforce expansion in many middle-income economies has also dramatically slowed, principally reflecting demographic shifts due to declining fertility rates and/or rapid population aging. This is true even for the PRC and the former Soviet Union, the economies at the epicenter of the former Great Doubling. Projections by McKinsey Global Institute (2012) in Figure 10 and most other sources suggest that although working-age population in India and many developing countries with young populations in South Asia, Africa, and Latin America will continue to rapidly rise, those in Central and Eastern Europe will contract, with growth of the PRC's working-age population decelerating or even reversing. In fact, estimates from the PRC National Bureau of Statistics indicate that the PRC's workforce has begun to shrink in absolute terms since 2013. This has implications for both the "quantity" and "quality" of the workforce (i.e., skills); for example, positions vacated by the experienced retirees will need to be filled, raising demands for certain types of skills.

Decelerating growth and actual shrinkage in some economies may potentially represent decreases in labor supply in these countries, whereas in other countries, this may mean a net increase in the demand for labor and skills. For example, Figure 10 suggests that India and the young developing economies will dramatically increase their contribution to the

<sup>11</sup> Empirical evidence supports trade theories (such as Heckscher–Ohlin model) underlining the critical role of skills in determining comparative advantage.

**Figure 10: Global Labor Force Composition, 1990–2010 and 2010–2030**

CEE = Central and Eastern Europe, PRC = People's Republic of China.

Source: Adapted from McKinsey Global Institute (2012).

global workforce as workforces in the former Soviet Union, countries in Central and Eastern Europe, and many advanced economies contract.

**New skill demands for an aging global society.** In addition to the size of total supply and demand for labor globally and in different countries, demographics also have implications for the occupational mix. In particular, aging societies (particularly in advanced countries, but also markedly in the PRC, for example) lead to a rise in the dependency ratio within those countries and demand for health care and other social services. Given increasing globalization, this rise in the demand for health care and other social services suggests that such industries will expand rapidly, including in developing countries. For example, the health sector is a major employer in the European Union, estimated to represent approximately 10% of total employment in 2013, and expected to provide 1.8 million additional jobs between 2013 and 2025, which in turn would create a shortfall in supply of labor in the sector (European Union Skills Panorama 2014). As with the other labor supply- and demand-related shifts, these trends will have important implications for countries in Asia, posing benefits for some and challenges for others.

# III. Implications for Potential Skills Mismatch in Asia

All the key shifts and trends have important implications in terms of the amount and array of hard and soft skills available and needed in economies globally. At the same time, the extent to which specific countries benefit or suffer from these global shifts and trends will depend heavily on the extent to which these economies are able to align skills supply with demand facing which they face widening skills mismatch.

Research by McKinsey Global Institute (2012) of skills mismatch globally relies largely on educational qualifications but suggests that mismatches tend to vary by levels of development. In general,

- (i) **Low-income countries** tend to have employment concentrated in low-skill jobs overall but face a surplus of workers with low-level skills alongside a shortage of workers to fill critical (if relatively limited) jobs requiring mid-level skills;<sup>12</sup>
- (ii) **Mid-income countries** tend to have roughly balanced supply and demand for workers with low-level and mid-level skills but face significant shortages of highly skilled workers to fill emerging occupations requiring advanced skills; and
- (iii) **Advanced countries** tend to principally face skills mismatch characterized by having a surplus of workers with mid-level skills alongside a shortage of workers with advanced skills.

Overall, the study predicts that by 2020, there will be global shortages of high-skilled (advanced) and medium-skilled workers, and a surplus of low-skilled workers.

## A. Prospects for Widening Skills Mismatch in Asia

### (i) *In Need of a New Model*

**Asia's transition.** As discussed in Section II, the economic boom experienced in many Asian countries in the past three decades was driven partly by a large supply of young workers with relatively high levels of basic education but limited levels of advanced education and skills. Combined with low wages, this endowment of basic human capital was well suited to help Asian countries capture production line industries and basic

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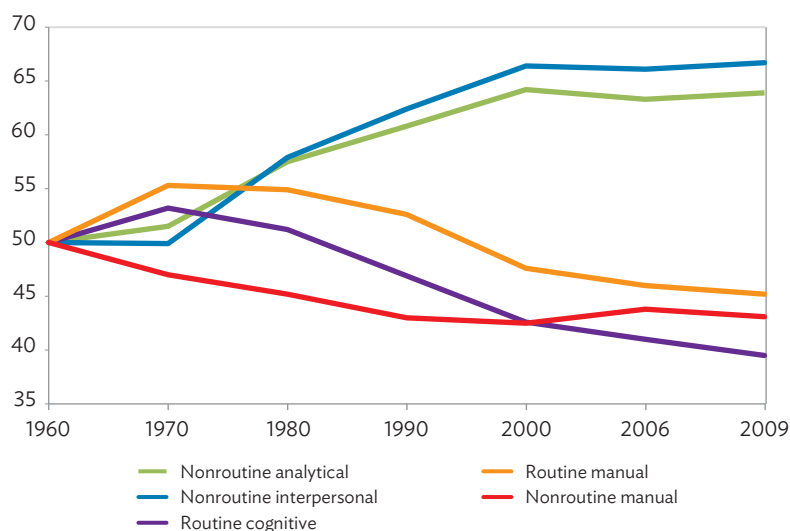
<sup>12</sup> In general, such economies face neither shortage nor surplus of advanced skills, as total demand for such skills is low.

services, seizing new opportunities brought about by globalization. In turn, during this period of “catch-up,” Asia’s education systems were well suited to produce workers with the skills needed to support the expansion of employment in basic industry and service sector jobs. In particular, young workers were relatively well equipped with the knowledge and basic skills (including literacy, numeracy, and discipline) needed to spur productivity growth in industries focused on adoption of technologies from more advanced countries. In other words, supply of skills and demand for skills were relatively well aligned. However, Section II also suggests that the “old model” of catch-up by providing basic goods and services more quickly and at a lower cost will no longer work to sustain rapid growth in many parts of Asia in the decades ahead.

## (ii) *Evolving Demand for Skills in Asia*

**By-products of global trends and Asia’s success.** In many Asian countries, demand for skills has changed in response to global trends as well as internal progress (e.g., rising domestic wages and aspirations to scale up to more advanced industries and positions in GVCs). The evolution of occupations since 2000 (Figure 7) discussed in Section II D suggests that the evolution of demand for skills in Asia may mirror that observed in the United States. Figure 11 illustrates that the demand for skills in the United States (i) initially rose for both routine and cognitive skills; (ii) showed an increase in nonroutine cognitive skills (including analytical and interactive skills) in the 1970s; and (iii) from the 1980s onward, exhibited an acceleration in the demand for nonroutine cognitive skills as well as a sustained decline in the demand for all types of manual skills.<sup>13</sup>

**Figure 11: Changing Demand for Skills in the United States**



Source: D. H. Autor and B. M. Price. 2013. The Changing Task Composition of the US Labor Market: An Update of Autor, Levy, and Murnane (2003). MIT Monograph.

<sup>13</sup> The definition of various types of skills follows Autor, Levy and Murnane (2003).

The possibility that Asia will follow a similar path in terms of shifting demand for skills appears particularly likely given broader trends identified in Section II. In an increasingly globalized economy, technological progress has increased relative demand for nonroutine tasks that requires problem-solving skills and creativity, with characteristics of professional, managerial, technical, and creative occupations while leading to displacement of manual and routine jobs (ILO 2015a). It thus places a premium on workers' ability to adapt to new challenges and master skills that complement, rather than compete with, computers and automation, such as idea generation, complex communication, and product diversification.

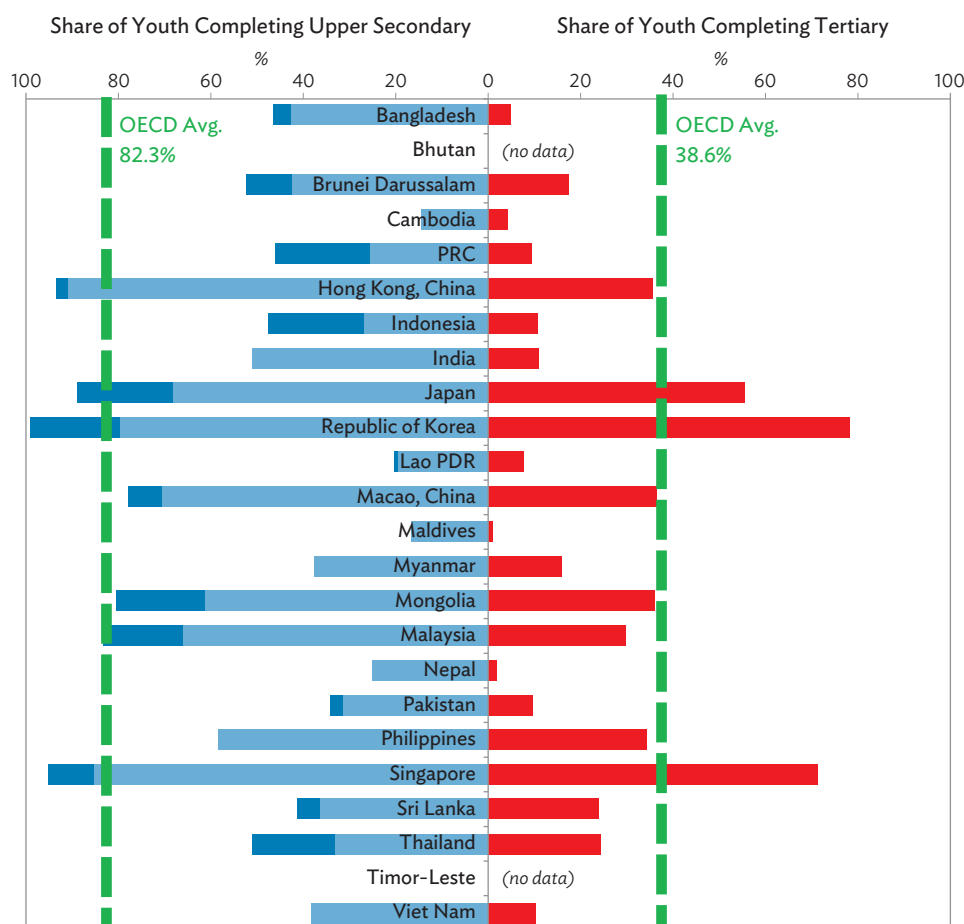
### *(iii) Skills Supply in Asia Is Weakly Prepared to Respond to Future Skills Demand*

Overall, Asian education systems have arguably not kept pace with the emerging rapid shifts in skill demands.

**The unfinished agenda of educational attainment.** A first set of remaining challenges deals with “quantity” aspects. Although primary education is nearing universalization in much of Asia, attainment of secondary (particularly upper secondary) education and of postsecondary TVET and higher education remains much lower, particularly in developing countries in Asia. The net enrollment rate for primary education in Asia as a whole was more than 90% in 2011 (UNESCO and UNICEF 2013), dropping to 64.1% for secondary education (UNDESA 2012b). Particularly in poorer countries in Asia, the transition rate between primary and lower secondary levels and the failure to successfully complete secondary education pose the main bottlenecks to educational attainment among youth.<sup>14</sup> Figure 12 suggests that East, Southeast, and South Asia are characterized by a “double-50” phenomenon: in roughly half of the countries, only less than half of the youth in recent cohorts has completed upper secondary education, including general or TVET-track programs (light and dark blue segments). This is well below the Organisation for Economic Co-operation and Development average of 82.3%. The failure of large numbers of youth to finish secondary schooling is particularly problematic given findings indicating that secondary education is the most effective path for providing youth with soft skills for work and life (World Economic Forum 2014a, 2014b).

For other countries in Asia, the transition between upper secondary education and either TVET or higher education now poses the most significant challenge. At the subregional level, the gross enrollment rates in tertiary-level education were 56% in North and Central Asia, 54% in the Pacific, and only 14% in South and Southwest Asia (UNDESA 2012b). In terms of completion, data presented by Barro and Lee (2014) in Figure 13 suggest that the share of 25- to 29-year-olds in countries in East, Southeast, and South Asia (weighted equally) having completed tertiary education is less than one in four (24.1%). In two-thirds of these countries, the share is well below the Organisation for Economic Co-operation and Development average of 38.6% (measured for 25- to 34-year-olds), with only Japan, the Republic of Korea, and Singapore (where tertiary education is becoming the norm)

<sup>14</sup> For example, among countries for which estimates are available, Myanmar has the lowest primary to secondary transition rate (77.1%) in Asia and the lowest rate of completion rate for lower secondary education (45.3%). See Myanmar Comprehensive Education Sector Review, ADB, and Australia (forthcoming); and ADB (2015) *Asian Development Outlook 2015* (Myanmar chapter).

**Figure 12: Completion by Education Types in Asia and the Pacific**

Lao PDR = Lao People's Democratic Republic, OECD = Organisation for Economic Co-operation and Development, PRC = People's Republic of China.

Source: Authors' calculations using (i) upper secondary completion rates based on Barro and Lee (2014) data for 20–24 year olds; (ii) share of upper secondary enrollment in TVET track based on figures from [www.databank.worldbank.org](http://www.databank.worldbank.org) for available countries; (iii) and tertiary education completion among 25–29 year olds from Barro and Lee (2014); and (iv) OECD estimates for 25 to 34 year olds in 2011 from <http://dx.doi.org/10.1787/888933028634>

exceeding this share. In addition to such “quantity” issues, many countries in Asia face key challenges related to quality and relevance.

**Gaps in technical and vocational education and training provision.** It is also noteworthy that although many upper secondary graduates directly enter the labor market, Figure 12 also shows that relatively small shares of upper secondary level students in Asia are enrolled in TVET programs (dark blue segments), with the share exceeding 25% only in the PRC, Indonesia, and Thailand.<sup>15</sup> Asia also exhibits the general pattern noted earlier (Figure 12), with the share of upper secondary students enrolled in TVET generally lower in countries

<sup>15</sup> The optimal balance of general-track versus TVET-track secondary education is hotly debated. See Section IV.



with lower upper secondary enrollment rates overall. Limited data exist on shares of postsecondary enrollment in TVET versus academic higher education, although overall these appear to be low in Asia, with differences across countries at least weakly correlated with the differences in shares shown in Figure 12 for upper secondary level students.

Relatively low rates of access to various types of TVET have important implications for economic competitiveness and skills mismatches. A 2013 ILO survey of ASEAN Employers on Skills and Competitiveness identified the lack of vocational training as the second greatest source of skills gaps (Emerging Markets Consulting 2014). Institution-based TVET in many Asian countries does not have the capacity to meet the training needs even only for the new entrants to the labor market. For example, while there are around 13 million entrants into the labor market every year in India, the current capacity of the country's training system can train only 25% of them (Panth 2013). This low capacity is partially due to low public spending on TVET, for example, less than 5% of the education budget in South Asia (Panth 2013). At the same time, firms are not picking up the shortfall. In many Asian countries, employers provide very limited on-the-job training to employees.<sup>16</sup> This tends to be particularly true in economies where small and medium-sized enterprises and informal sector jobs account for a large share of employment. However, even in advanced Asian economies and among firms complaining of skill shortages, firms underinvest in training due to an array of factors, including rapid restructuring, poor investment climate, and the risk of newly trained workers being poached by competitors.<sup>17</sup>

**Gaps in quality and relevance.** In addition to quantity-side dimensions, weak quality and relevance of education undermine contributions to the economy and workforce. As outlined in Section IV, this reflects many underlying issues that will require reorienting of both education and training offered by schools, universities, and TVET institutions in relation to overly academic approaches, low quality of education and training, and weak relevance of curriculum and pedagogy to workforce skills needs.

## B. Skills Mismatch and Its Potential Costs

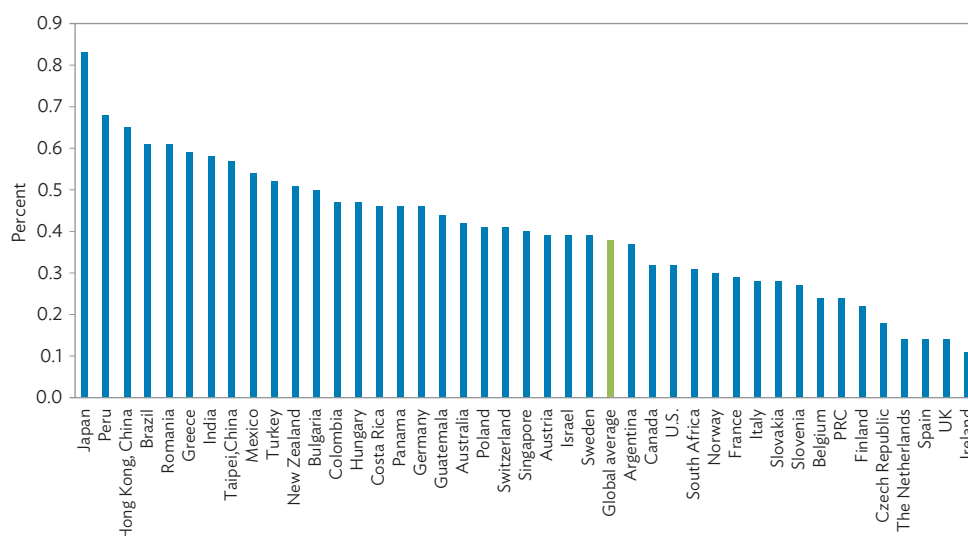
Skills mismatch contributes to an apparent coexistence of undersupply and oversupply of skills: firms' inability to find workers with required skills coexists with high unemployment and underemployment, especially among recent graduates. Even among graduates with advanced degrees, employers routinely complain that young people lack the actually required skills in the workplace. Quantitatively speaking, on the one hand, global unemployment is estimated to have reached 201.3 million in 2014. This reflects an increase of 1.2 million from 2013, and the number is projected to continue to rise in the coming years (ILO 2015a). The employment picture for youth is rather dismal, with one in six young people being unemployed globally, and a much higher rate of underemployment.<sup>18</sup> On the other hand, according to the annual Talent Shortage Survey (ManpowerGroup 2015), firms' difficulty in filling vacancies is a widespread challenge globally (Figure 13).

<sup>16</sup> The Republic of Korea and Taipei, China are partial exceptions because of policies promoting on-the-job training.

<sup>17</sup> See, for example, Boeri (2000) and Commandar and Kollo (2008) on the situation in transitional economies.

<sup>18</sup> Youth underemployment is a pressing challenge facing Asia, South Asia in particular, with the number of underemployed youth roughly the same as the employed youth, according to World Bank (2013a) estimates.



**Figure 13: Firms Having Difficulty Filling Vacancies in Surveyed Economies**

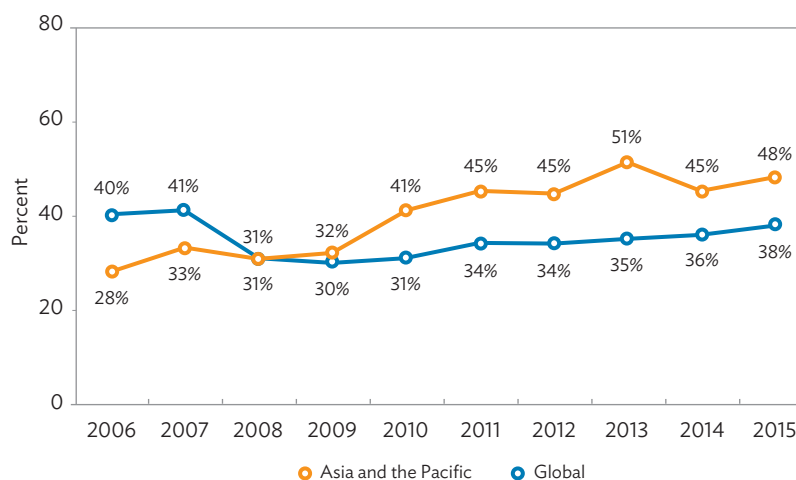
Source: Adapted from 2015 Talent Shortage Survey (ManpowerGroup 2015).

Skills mismatch is widespread in Asia and the Pacific. In fact, data on difficulty in filling vacancies for skilled positions (Figure 14) suggest that skills mismatch may be more serious in this region than the global average. Following a dip to 45% in 2014, the incidence of employers reporting difficulties in filling vacancies had climbed from 28% in 2006 to 48% in 2015. Difficulty finding qualified workers is perhaps expected in advanced and rapidly evolving economies undergoing demographic shifts such as Japan; Hong Kong, China; and Taipei, China. However, perhaps more surprisingly, skills mismatch has also been particularly severe and persistent in countries such as India. Skills mismatch in India is evidenced by the fact that (i) on the one hand, India has consistently ranked among the top three countries in the region in terms of firms' difficulty in filling vacancies since 2011, with 58% of the employers surveyed reporting difficulty in finding people with the requisite skills in 2015; and (ii) at the same time, India has pervasive unemployment and underemployment among youth, even among university graduates, with one in three graduates up to the age of 29 being unemployed.<sup>19</sup> This is consistent with the findings by the World Bank enterprise surveys that suggest many young people, even those with university degrees, are unemployable because of a lack of technical and vocational skills needed by employers (World Bank 2012 and 2013a).

The profile of real wage growth and productivity growth during 2001–2013 (Figure 15) may provide more evidence of skills mismatch in South and Southeast Asia. Productivity growth in these subregions has been slower than that in East Asia, and real wages have grown at a slower rate than output per worker in contrast to East Asia, where wages have risen in tandem with productivity growth (Figure 15). Wage is commonly viewed as an indirect measure of productivity and the value of human capital to firms, as higher wages

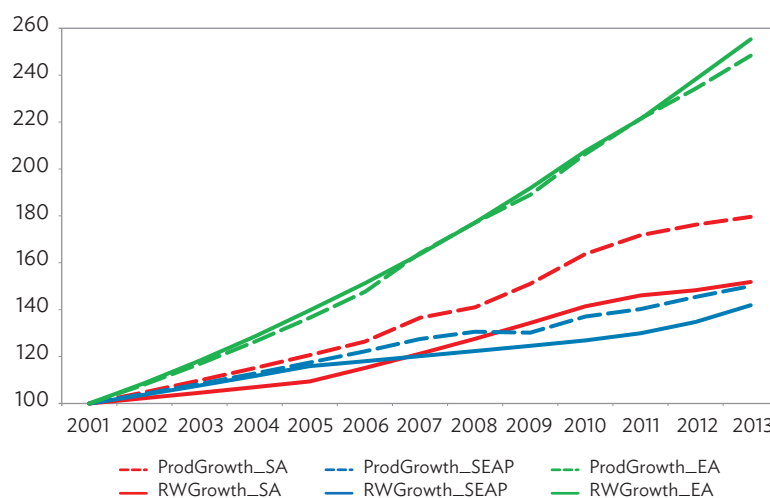
<sup>19</sup> BBC News, 1 July 2014, available at <http://www.bbc.com/news/business-28062071>

**Figure 14: Difficulty Filling Vacancies in Asia and the Pacific (%)**



Source: 2015 Talent Shortage Survey (ManpowerGroup 2015).

**Figure 15: Real Wage Growth in Relation to Growth in Output per Labor by Subregion, 2001–2013 (%)**



EA = East Asia, ProdGrowth = growth of output per labor, RWGrowth = real wage growth, SA = South Asia, SEAP = Southeast Asia and the Pacific.

Sources: Authors' estimates based on ILO (2014c) *Global Employment Trends 2014* and ILO (2015b) *Global Wage Report 2014/15*.

usually reflect higher productivity. Relative low wage implies that the skills supplied are not economically valued, and/or employers' preference to shift to more capital-intensive production models. To some extent these may result from skills mismatch, that is, skills supplied may not meet the level or type needed by the employers.

Worryingly, skills mismatch in Asia is not just about inadequate education, but it is also about the education systems' failure to keep up with the evolving needs of the labor market and specific skills needs. In terms of occupation-specific skills, skills shortages in Asia vary between economies and subregions, and key occupations facing skills shortages include engineers, technicians, sales representatives, managers, accountants, information technology staff, and workers in skilled trades (APEC 2013).<sup>20</sup> Employers globally, including Asia, appear to have difficulty finding resources for both hard and soft skills.<sup>21</sup> There is some evidence that the need for soft skills (e.g., creativity, adaptability, and interpersonal communications) rises in more advanced firms and economies.<sup>22</sup> However, more broadly, the findings reveal that both academic education and TVET are missing the mark.

**Prospects for widening mismatches.** To varying degrees, misalignment of formal education and training and underprovision by firms has already contributed to the emergence of skills mismatch in many Asian countries, that is, mismatches between the supply and demand for various hard and soft skills. Looking ahead, if Asian countries follow a similar trajectory to the United States, such mismatches will likely continue to widen unless education systems can shift toward supply of nonroutine cognitive skills (e.g., managers, highly qualified engineers and research scientists, and information and communications technology programmers). The case of the PRC is presented in Box 1.

For less advanced countries in Asia (perhaps, particularly in South and Southeast Asia), skillsets may be sufficient to maintain rapid growth via a catch-up model in the short term. However, these countries may also face potential skills mismatch in the near future in the face of these key global trends, and when they try to climb the technological ladder.

**Impacts of skills mismatch.** Skills mismatch, in turn, has detrimental macro- and microlevel impacts. At the more macro level, extensive empirical evidence demonstrates that skills mismatch can lead to loss of competitiveness of specific industries and sectors, and depress national economic growth (Cedefop 2010). Economic productivity and competitiveness suffer potentially if firms are forced to fill positions that require higher skills with low or unmatched skills in light of the shortage of qualified labor, or leave the positions vacant. Similarly, a variety of research results (mostly from advanced economies) suggest that having workers who are overqualified in terms of academic credentials but lack the requisite specific competencies is a definite lose-lose proposition. Workers and youth entering the labor market also suffer from constrained opportunities and wages in the domestic economy, which may become a “push” factor for emigration and the resultant brain drain.<sup>23</sup> Such challenges are attracting increasing attention of policy makers globally.

<sup>20</sup> Overall, this corresponds fairly closely to global findings from the annual Talent Shortage Surveys, which have found the greatest unmet demand for trades workers, engineers, sales representatives, and technicians for 6 consecutive years.

<sup>21</sup> Among employers surveyed in the 2015 Talent Shortage Survey (ManpowerGroup 2015), 34% identified a lack of hard skills, 22% identified a lack of workplace experience, and 17% identified a lack of soft skills as the root causes of the skills shortages they encounter, as was the case in 2014.

<sup>22</sup> For example, a global, firm-level survey by the Economist Intelligence Unit found that 54% of employers identified lack of soft skills as a key binding constraint related to skills, followed by 41% citing lack of technical expertise, and 40% citing lack of necessary work experience. See Economist Intelligence Unit (2012).

<sup>23</sup> A study by the World Bank and the European Training Center has concluded that there is a significant mismatch between the skills migrants possess and the occupations they end up doing in the destination countries, which is especially true for immigrants to Europe (Sabadié et al. 2010).

### Box 1: Emerging and Potential Skills Mismatch in the People's Republic of China

The potential for widening skills mismatch is perhaps particularly clear in the case of the People's Republic of China (PRC), a country which is transitioning to advanced industries and services, and experiencing demographic shifts (characterized by a contracting working-age population and a rapid aging population), and escalating wages. While these shifts have dramatically reshaped the demand for skills, the education sector, including technical and vocational education and training (TVET), has not yet adequately responded in terms of skills supply. While the number of graduates from the country's education system has rapidly expanded, employers find graduates poorly suited to new skills needs, leading to the emergence of skills mismatch.

The education system of the PRC has been contributing approximately 17 million graduates to the labor force annually in recent years: roughly 7 million from upper secondary TVET and 5 million each from general-track and TVET-track tertiary-level education. According to official data from the PRC Ministry of Education (MOE), the unemployment rate for graduates from general-track tertiary education was 22.6% in 2013, up from 20.9% in 2012. Even those who managed to find a job expressed their concerns of lack of job stability or satisfaction. A MOE survey of graduates in 2011 revealed that 14% of them who were employed were not satisfied with their jobs, with their remuneration being among the lowest income quintile. However, at the same time, firms distributed across 100 cities in the country reported difficulty in finding technicians and highly skilled workers despite high wage offers, with an annual demand–supply ratio of 2:1 in 2010–2012, according to the MOE.<sup>a</sup>

In terms of the overall skill structure of the workforce, although policy makers in the PRC have targeted the establishment of a balanced occupational pyramid (with larger numbers of workers at lower tiers of the pyramid), there are concerns that the pyramid is actually becoming an “hourglass,” that is, the pyramid is characterized by large numbers of highly educated engineers/managers and entry-level workers, but an insufficient number of mid-skilled workers. For example, qualified technicians and expert technicians accounted for approximately only 4% of the entire workforce in the coastal areas in 2012 (MOE). High-tech manufacturing firms located in cities in the forefront of industrial development widely reported a desperate demand for high-tech manufacturing TVET graduates.

Furthermore, the country's education system has not produced enough graduates with requisite skills for emerging industries such as nursing and elderly care to keep pace with the rapidly rising numbers of the elderly. The PRC is home to the largest population of the elderly in the world (reaching almost 200 million in 2013), and the number is expected to reach 30% of the country's total population by 2050.<sup>b</sup> Expansion of elderly care services will translate into substantial rises in the need for caregivers, ranging from professionals such as doctors, facility managers, nurses, and physical therapists to low-skilled workers such as bedside assistants. However, the demand for caregivers outstrips the current supply by a large margin. According to the PRC Ministry of Civil Affairs, the current supply of caregivers is only able to meet less than one-tenth of the demand, and a low-skilled caregiver in Beijing earns on average four times more than a university graduate.<sup>c</sup>

The challenges arising from skills mismatch have placed substantial pressure on PRC policy makers and firms to upgrade industries and skills to curb capital flight and a further loss of manufacturing jobs since 2014. Policy makers have responded with an array of policies, including efforts to overhaul the education system and massive investments in training for hard and soft skills, to enable the economy to compete globally on the basis of a more productive workforce.

<sup>a</sup> Interview with Madam Lu Xin, Vice Minister of MOE at [http://news.xinhuanet.com/2014-03/24/c\\_126305589.htm](http://news.xinhuanet.com/2014-03/24/c_126305589.htm)

<sup>b</sup> *People's Daily Online* (2010). China's percentage of elderly highest in 2030. Accessible at <http://en.people.cn/90001/90776/90882/7137446.html>

<sup>c</sup> *People's Daily Online* (2014). Accessible at [http://paper.people.com.cn/smsb/html/2014-10/14/content\\_1486315.htm](http://paper.people.com.cn/smsb/html/2014-10/14/content_1486315.htm)  
Source: Authors.

## IV. Conclusions and Policy Recommendations

Asian countries, in varying forms and to varying degrees, increasingly face challenges of skills mismatch that are rooted in key global and regional shifts and trends affecting skills supply and skills demand. Among shifts affecting skills supply, the Great Doubling caused an influx of mostly low-skilled workers (especially workers in the PRC and India) into the global economy, creating a relative oversupply of low-skilled workers that will persist in the coming decades. Other supply-side shifts include the proliferation of basic education. In the past, such shifts in tandem helped fuel Asia's growth, including its ability to capture mass production industries. However, looking forward, these shifts increasingly pose a challenge, as countries such as the PRC and India attempt to expand into advanced industry and service sectors that require more “quality” than “quantity” of workers.

Key shifts affecting skills demand have included the evolving occupational structure of employment driven by economic and industrial transformation, technological advancement, globalization, and demographic shifts. At the more micro level, as new sectors and occupations requiring new skills open up and traditional ones shrink or vanish, workers unable to attain newly demanded skills are rendered obsolete. At the more macro level, countries able to swiftly and effectively respond to evolving skills needs (including due to the efficacy of their education systems) are able to seize new opportunities and attain faster growth, leapfrogging past countries that are less able to meet the emerging skills needs.

Although emerging skills mismatches thus reflect an array of underlying demand- and supply-side factors, the solutions to skills mismatch in Asia and specific countries in the region principally relate to skills supply. On the skills demand side, countries may, for example, adopt policies to support labor-intensive industrialization; however, skills demand factors tend to be more global and outside of the control of specific countries. Policies and strategies to resolve skills mismatch in Asia must therefore principally focus on quantitatively and qualitatively strengthening skills supply. In many cases, this will require fundamental reforms. In particular, to a large extent, Asian countries still rely on old approaches to supply skills into the workforce, which served the region's earlier growth model but are not well suited to support continued dynamism in the region. It thus is critical for countries to reinvent their education systems (including TVET) to be able to swiftly and effectively respond to constantly evolving skills demand.

There is no “one-size-fits-all” solution in addressing skills mismatch in Asia. Asian economies are diverse, fast-growing, and rapidly evolving, and they face increasingly varied skills requirements. Policies aimed at promoting the development of hard and soft skills in a given country should be grounded in that country's specific context, and

tailored to meet the specific causes of skills mismatch in that country. At the same time, countries in Asia can benefit from international evidence and good practices. In particular, international experience suggests that at least four pillars will be critical in forging effective national policies to address skills mismatch. It is essential that countries in Asia (i) develop comprehensive strategies and plans for skills development (including general-track education and TVET) that place skills development at the epicenter of national strategies with strong political commitment underpinning plans for propelling inclusive growth; (ii) further prioritize and also rebalance development of education systems, recognizing skills secured from both TVET and general education are required by the labor market and for economic growth; (iii) give particular priority to overdue reforms of TVET aimed at improving the relevance and quality of TVET; and (iv) advance international cooperation to collectively address skills mismatch in the region. These four policy pillars are discussed in the following sections.

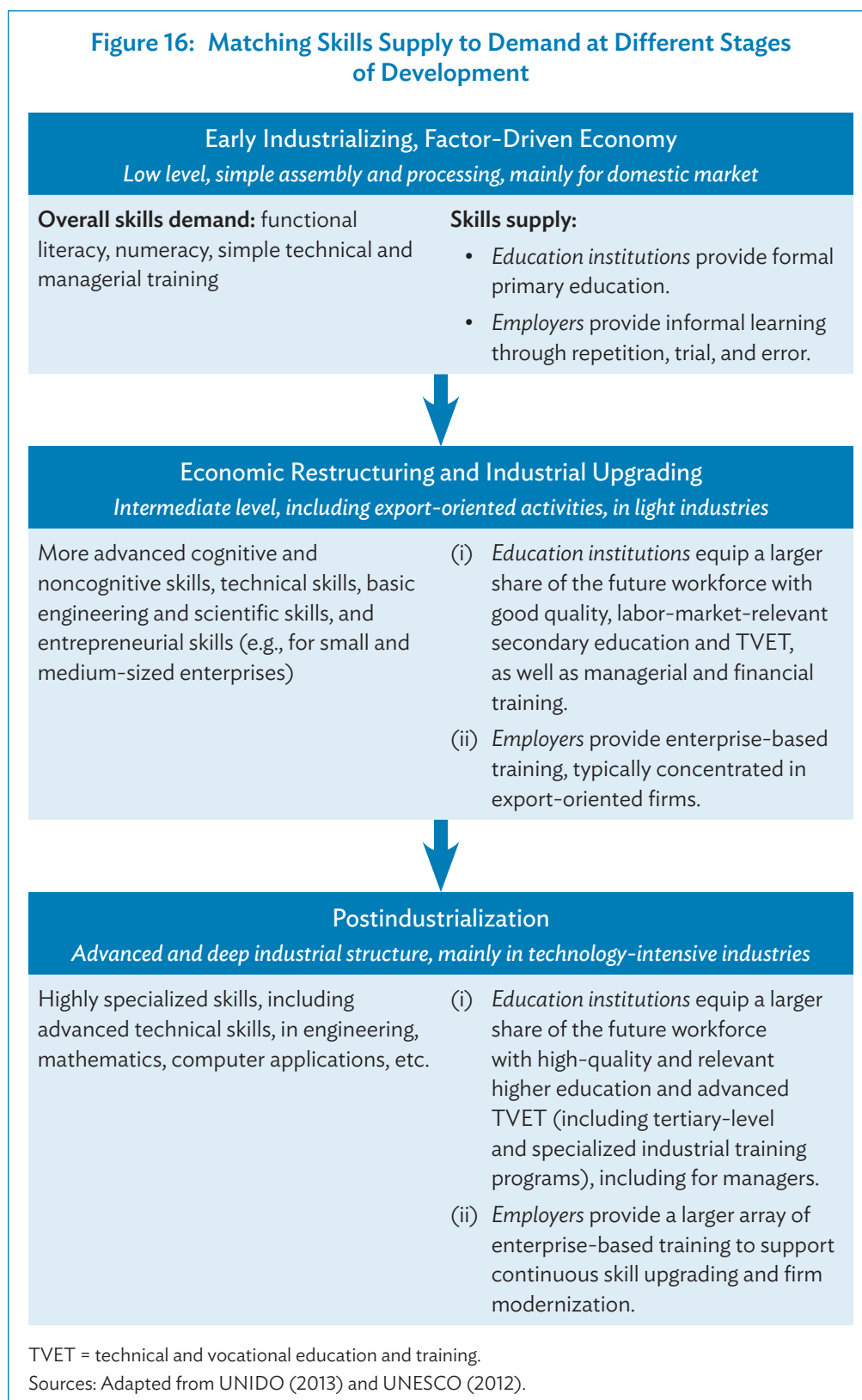
## A. Skills Development as a Central Pillar in National Planning

International experience suggests that it is critical for countries to develop strong national strategy and planning for skills development that is coordinated and aligned with national economic, industrial, and sector growth strategies. Sound strategies and planning are prerequisites for ensuring that skills development effectively aligns skills supply with skills demand and promotes improvements in worker employability, industry productivity and competitiveness, and dynamism and inclusiveness of economic growth (ILO 2011). Skills development should be prominently cast into a country's national planning as a top priority and central pillar supporting long-term economic and social development goals, and must be backed up by increased government financing. A holistic plan at the national level with sufficient political and financial support is critical to guide line ministries and training providers to align efforts.

**Linking skills development with economic transformation phases.** Alongside close linkages to a country's economic and social vision, and to national strategies of economic restructuring, industrial upgrading, migration, and attracting offshoring, national policy, strategies, and planning for skills development must also be phased and carefully sequenced to produce the skills needed at progressive development stages. Figure 16 illustrates a simplified and generalized profile of skills needs and skills supply responses at various stages of development: phased and sequenced national strategies and plans should be informed by careful examination of country-specific factors and assessment of industry-specific needs.

**Skills development as an integral part of national industrial policy.** Industrial policies in many countries have focused on trying to pick “winners” and “losers” and providing government subsidies and other support to selected industries. However, such policies have been proven to be detrimental to industrial competitiveness in most cases. There is a growing consensus that national industrial policy should instead focus on creating an enabling framework for economic development, including strategizing and providing skills development in support of a broad range of industries and firms (OECD 2013b).

**Figure 16: Matching Skills Supply to Demand at Different Stages of Development**





### Box 2: Republic of Korea: Tight Coordination between Skills and Economic and Industrial Transformation

The Republic of Korea has sustained a spectacular track record in constant catch-up and inclusive growth in the past 4 decades, rising from a poor economy to a global powerhouse. At the epicenter of this success is a government-led skills development strategy that comprises a core national development strategy and has been closely coordinated with industrial policies at each development stage (Cheon 2014, Ra and Shim 2009). The Republic of Korea has been particularly successful in matching skills supply with demand, in part reflecting the following four factors. First, skills development has drawn strong political and funding support, and has been consistently integrated in the country's five-year economic development plan. In the past 4 decades, the President of the country also convened weekly meetings to discuss skills development strategy. Second, the close linkage between skills development and industrialization planning enables the country to master the opportunity ushered in by economic and industrial transformation, globalization, and rapid technological advancement. Third, the government's large investments in gathering robust and accurate data on current and future economic conditions and skills needs have been instrumental in aligning skills supply with demand. Fourth, the government's strategic planning, demand-driven approach, and balanced emphasis on general education, and school-based and enterprise-based technical and vocational education and training have effectively contributed to the alignment of skills supply and demand at each stage of development.

Period	Economic and Industrial Strategies	Skills in Demand	Skills Development Strategies and Initiatives
1960s to mid-1970s	Transition from agricultural to industrial economy Labor-intensive industries	Low-skilled workers	1st–3rd FYEDP Introduction of skills development system Strong focus on basic education Expansion of upper secondary TVET and on-the-job training
Mid-1970s to mid-1990s	Industrial transformation and open economy Capital-intensive industries	Technicians	4th–7th FYEDP Expansion of junior college, public training institutes, and enterprise training system through levy grant programs
Mid-1990s to date	Knowledge-based economy and industries	Engineers and scientists	New Economy Plan Expansion of colleges and universities Strengthen university—industry collaboration in research

FYEDP = five-year economic development plan, TVET = technical and vocational education and training.  
Sources: Adapted from Ra and Shim (2009) and World Bank (2013b).

The heavy investment by the Republic of Korea in upskilling and right skilling its workforce starting in the late 1960s may have particular lessons for Asian countries. The training of 2.5 million workers during 1967–1996 contributed to and benefited from the country's rapid economic and industrial transformation. During that time, labor productivity in manufacturing increased from 12% of that of the United States to above 30% by 1996. A growing share of these trainees was trained through enterprise-based training, which significantly improved the relevance of the training.

TVET = technical and vocational education and training.  
Sources: Adapted from UNIDO (2013) and UNESCO (2012).



Skills development is essential to lay a solid foundation of skills necessary for national industrial transformation. It is critically important for policy makers to take active measures to synchronize skills development with industrial upgrading, aimed at developing and providing skills for anticipated needs. Strategies aimed at producing skills based on needs of the recent past will worsen (not address) skills mismatches. Embedding skills development in industrial policy is vital to ensure that the skills supplied by education systems and employer-provided training will collectively match the hard and soft skills needed by current industries, while also driving progressive industrial upgrading (UNIDO 2013), as illustrated in Figure 16.

## B. Reorienting and Rebalancing Asia's Education Systems

Asian countries need to reorient their education systems to focus on meeting the evolving economic and labor market demands. This is true for both general-track (or “academic”) education and TVET. At the same time, in many countries in Asia, there is a need to rebalance education sectors to reemphasize TVET.

### (i) *Reorienting and Rebalancing Education Sectors to Align with Skills Needs*

**“Rocket scientists” and basic skills as joint determinants of growth.** Education policies in many countries explicitly or implicitly prioritize advanced and highly specialized education programs focused on developing a small number of elite experts (i.e., “rocket scientists”) in an aim to encourage technological innovation and spur rapid growth. However, to achieve economic modernization and maximize the economic benefits from technology, the right proportion of “rocket scientists” and workers with basic hard and soft skills is required (Hanushek and Woessmann 2012). Economies need “rocket scientists” to innovate and develop new technologies, and also require a workforce with at least basic skills to implement technology in production.<sup>24</sup> Education systems need to thus strengthen both top-down and bottom-up approaches to generate the optimal mix of “rocket scientists” and workers with basic hard and soft skills required in the current labor market and an emerging economy.

**Collectively meeting the spectrum of skills needs.** Much of the literature equates development of “skills” with TVET. However, general-track education bears the responsibility of preparing a large majority of youth for employment in nearly all countries globally, including Asia. This appears unlikely to change in the foreseeable future. The debate<sup>25</sup> on whether to prioritize TVET or general-track education arguably misses the point: education systems in Asia need to shift toward a cohesive approach for meeting the diverse spectrum of hard and soft skills needed in Asia’s future workforce. Similarly, it is worth emphasizing that the successful TVET systems in countries such as Germany and the

<sup>24</sup> Likewise, good basic education for all is also needed to maximize the pool of youth from which to identify “rocket scientists.”

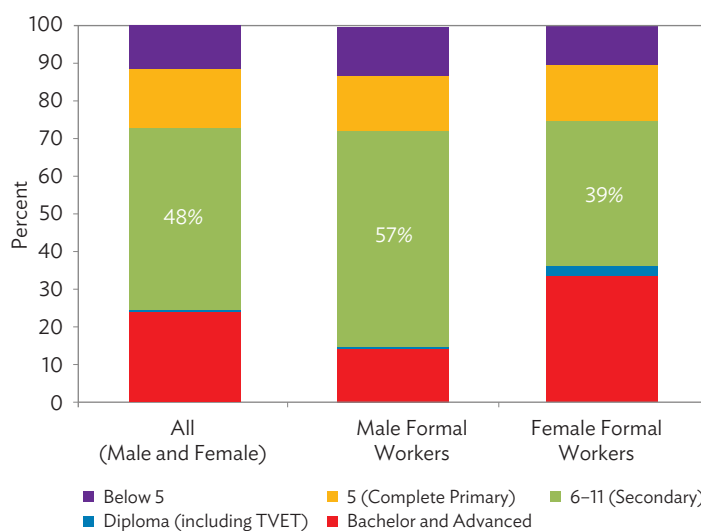
<sup>25</sup> For a review of the related literature, see Hanushek et al. (2011).

Republic of Korea benefit from having strong general-track education and links between TVET and general education.

**General-track education: shifting from credentials to relevant learning.** To drive the next phase of Asia's economic miracle, Asia's education systems need to move away from "academic education for the sake of academic education" to focus on skills needed in the workplace. In many countries in the region, there is a need to dramatically reorient higher education systems, which continue to be very weakly aligned with employer needs. This will also be critical for secondary education, which will continue to account for the majority of new entrants into the workforce in many countries in Asia: for example, as highlighted in the *Asian Development Outlook 2015*, in Myanmar, even among young workers (aged 18–27) engaged in wage employment, roughly half (48%) left school during or immediately after secondary school, with less than one-fourth having bachelors or higher-level degrees and less than 2% having completed postsecondary forms of TVET (Figure 17).

In much of Asia, secondary education subsectors are largely structured as "pre-higher education," focusing on academic preparation and (in many cases) screening out a minority of students for university rather than preparing all youth for either continued education and training or direct entry into the labor force.<sup>26</sup> Arguably, expansion of access to general-track education in Asia has eclipsed improvements in quality and relevance. In many countries, graduates fail to master even basic knowledge and soft skills, with considerable

**Figure 17: Share of 18- to 27-Year-Old Wage Workers by Years of Formal Education**



TVET = technical and vocational education and training.

Sources: Authors' calculations based on data from UNIDO (2013) and UNESCO (2012).

<sup>26</sup> See, for example, World Bank (2005) on the role of secondary education in preparing youth for modern sector employment, including problem-solving skills and the ability to continue to learn on the job in response to new challenges.

implications for employment outcomes.<sup>27</sup> In addition to investments in improving learning environments (e.g., including science and computer laboratories, libraries), reforming secondary and higher education curriculum, pedagogy, and assessment will be critical to improve quality and relevance, shifting education away from rote-based memorization of information toward mastery of applied competencies needed in a modern economy. As a positive example of such a shift, Singapore’s overhaul of its general-track education system in the 1990s—reorienting the focus of the system to developing skills such as innovation, creativity, and entrepreneurship—has paid key dividends in fueling the country’s continued dynamism and climb up the technological ladder.

**Reorienting technical and vocational education and training away from “vocationally flavored” academic education.** In many Asian countries, TVET is seen as “second-class education” intended for academic underperformers. As a result, TVET systems are often highly academic in their approach, focused on granting parallel credentials to those provided in general-track education, rather than preparing youth for the workplace. Even if national TVET policies and curriculum prescribe specific shares of practical versus theoretical education and training, TVET schools often emphasize textbook-based learning, lecture-based instruction, and rote-based memorization of information (e.g., names of machinery), rather than mastery of competencies needed by employers.<sup>28</sup> TVET systems need to reorient from academic toward competency-based approaches driven by labor market demands. This will also require increased investment in TVET provision, as the current bias toward “chalk and talk” in TVET is exacerbated by inadequate resources to support workshop facilities needed to support competency-based approaches.

**Workplace-driven “fusion” approaches.** However, it will be important for TVET systems to go beyond hard skills alone. Development of TVET programs and curriculum should embed a multidisciplinary and integrated approach that provides trainees with core elements lying along the spectrum of hard and soft skills needed in the workplace (e.g., creativity, problem solving, critical thinking, communication and ability to function in teams, and decision making). Providing TVET graduates with a flexible skill base will be critical in preparing them to respond to evolving workplace demands and also to pursue further training and lifelong learning.

## *(ii) Rebalancing Academic Education and Technical and Vocational Education and Training: Expanding the Role of Technical and Vocational Education and Training*

The balanced development of a TVET and general-track education is critical toward equipping the current and future workforce with the right mix of hard and soft skills, and thereby avoiding or mitigating skills mismatches. However, many Asian countries have underinvested in TVET and will need to rebalance their education systems toward a greater

<sup>27</sup> For example, OECD (2013a) analysis of Program for the International Assessment of Adult Competencies results and other evidence suggest that cognitive skills including proficiency in literacy, numeracy, and problem solving in technology-rich environments is positively associated with the likelihood of participating in the labor market and with higher wage.

<sup>28</sup> See, for example, Myanmar Comprehensive Education Sector Review (CESR), ADB; Australia, GIZ. CESR Phase 2 Technical Annex on the TVET Subsector (forthcoming). Yangon in the case of Myanmar.

emphasis on TVET alongside efforts to improve the quality and relevance of general-track education.

There are clear justifications for expanded national-level investments in TVET. At the level of the economy, sound TVET systems produce workers with an array of specific and applied skills complementing those produced by general-track education. TVET can play a key role in promoting growth and industrial diversification; for example, the experience of the Republic of Korea suggests that TVET has provided workers with niche skills needed to support the country's ability to quickly enter and dominate several manufacturing industries, including that of heavy chemicals (Ra and Shim 2009). In addition, evidence suggests that countries with balanced education systems that include a strong TVET subsector appear to be more resilient to economic shocks (e.g., the 2008 global financial crisis) in terms of impacts on growth rates and youth unemployment.<sup>29</sup> At the microeconomic level, good quality TVET that is aligned with the demands of the labor market (i) equips youth with job-specific skills to facilitate a more rapid entry into the productive workforce, (ii) increases the likelihood of quickly finding a good match between skills and job requirements,<sup>30</sup> and (iii) allows for continuous upgrading the skills of the existing workers. Recent quantitative analysis reveals that TVET graduates have a significantly lower likelihood than general education graduates of mismatch in their current job at both secondary- and tertiary-level education (Cedefop 2010).

**Reemphasizing technical and vocational education and training in national education planning and budgeting.** In many countries, TVET is ascribed very low importance in national education sector planning, at least in terms of financing and specific programs and targets. National planning and policy documents for the education sector often give limited strategic direction for TVET, in part because TVET is often fractured across multiple ministries and/or is seen to be the responsibility of the private sector. Governments need to strengthen the positioning of TVET (including TVET provided by schools and institutions and by employers) within national planning, and link increased budgeting to those plans. Specific priorities for recommendations for TVET policy and investment are discussed in Section IV C.

**Technical and vocational education and training as an equal pathway.** In many Asian countries, TVET is seen as inferior to general-track education and tends to attract weakly performing students. This partly reflects cultural norms, but government strategies to place TVET on even footing can play an important role, as evidenced in Germany, the Republic of Korea, and Singapore. As with general-track education, investing in improved quality and relevance of TVET may be the most urgent priority, since the ability of TVET graduates to find good, high-paying jobs upon graduation may play a key role in boosting the status of TVET.

<sup>29</sup> There is some evidence that countries that suffered a sharp rise in youth unemployment rates (rising to up to 20%–30%) during the 2008 financial crisis appear to have weaknesses in their national TVET systems.

<sup>30</sup> In part, this is achieved by reducing friction and informational asymmetries between firms and prospective workers, such as by providing formal skill certification.

### (iii) *“Making the Pieces Fit”: Aligning General-Track Education and Technical and Vocational Education and Training*

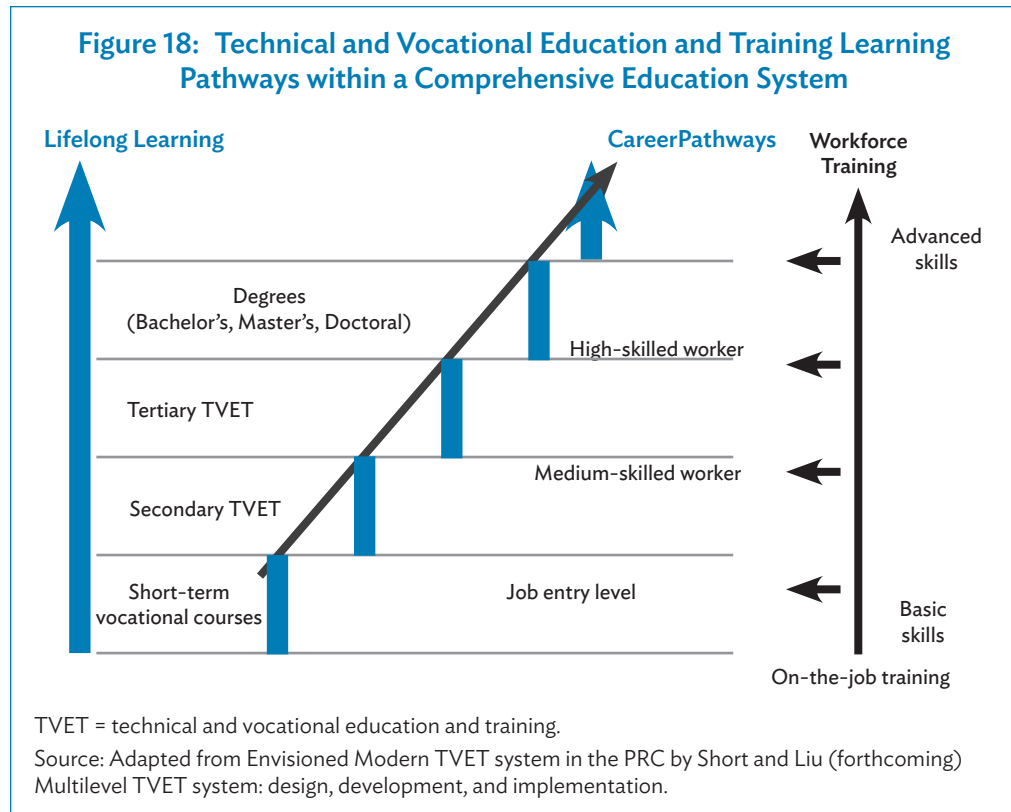
**Technical and vocational education and training as an integral part of cohesive education sectors.** Efforts to strengthen TVET and general-track education need to be closely linked, so that they collectively meet the increasingly diverse array of demands for hard and soft skills in the economy. However, in many countries, TVET and general-track education systems operate in a disconnected manner. TVET is often a “dead-end” option, with no pathway for students who want to pursue a more advanced degree if they aspire to attain higher-level professions. This undermines youth participation in TVET and also the education sectors’ ability to provide the full array of skills needed in the economy.

**Addressing technical and vocational education and training subsector fragmentation.**

The challenges above are compounded by fragmentation within TVET systems in many Asian countries, partly due to the involvement of many agencies and private providers and the lack of cohesive national planning for TVET. Programs at different levels are disjointed, with no alignment between competencies targeted by different types of TVET, and with no sequenced pathway for progressing into more advanced skill level training (or entry into higher education). In particular, in many Asian countries, a hard distinction is made between “formal TVET” (e.g., multiyear programs provided in upper secondary level TVET schools or postsecondary polytechnics) and “informal training” (e.g., ranging from programs run by government or nongovernment organizations for disadvantaged groups to employer-provided training for existing workers). Among other problems, this leads to underinvestment in short-term competency-based programs, undermining their potential role within the TVET systems in swiftly addressing skills shortages (e.g., in innovative industries or rapidly expanding industries). By contrast, in countries where focused short courses are an integral part of national TVET systems (with appropriate mechanisms for skill certification and recognition of prior learning in place), they can both serve short-term objectives (quickly providing needed skills) and longer-term aims by allowing workers to continuously upgrade their skills.

**Building learning pathways.** Addressing the dual challenges above—the disjoint of TVET from general-track education, and fragmentation within the TVET subsector—will require countries to systematically build a new architecture for a comprehensive education system, which includes a well-established TVET subsector. Figure 18 sketches out such a “ladderized” TVET system, which would provide clear learning pathways linking different types of TVET programs while also building pathways to and from general-track education.

**Skills Standards and Qualifications Frameworks.** Developing skills standards (or competency standards) that are aligned with international norms provides an important tool for constructing such a system, supporting the definition of clear competency objectives for specific TVET programs while supporting sequenced learning pathways for upskilling and lifelong learning. These may be (but are not necessarily) linked with national and/or international qualification frameworks (e.g., the ASEAN Qualifications Reference Framework), which provide a loose yardstick for comparing qualifications in TVET and general-track education.



## C. Priority Technical and Vocational Education and Training Reforms

### From supply-driven to demand-driven technical and vocational education and training.

In many Asian countries, in addition to being relatively academic in their approach, TVET systems are largely supply driven; for example, public TVET institutions continue to provide programs in outdated skills or even skill areas that are no longer needed in the economy. In such cases, TVET subsectors need to be dramatically reoriented to flexibly respond to current and emerging industry demands in view of national, regional, and global trends.

**Industry engagement.** To better align skills generated by the TVET subsector with the skills demanded by employers, planners and policy makers need to foster improved linkages with industry.<sup>31</sup> Analyses conducted by the United Nations Industrial Development Organization (2013), the Department for International Development of the United Kingdom (2011), and others demonstrate that engagement with industry is a vital prerequisite to ensure that skills supply is linked with current labor market needs while also ensuring that TVET promotes economic and industrial transformation and technological modernization. Countries with successful TVET systems have engaged industry associations and individual industries in a range of dimensions, including (i) setting TVET priorities at the policy level,

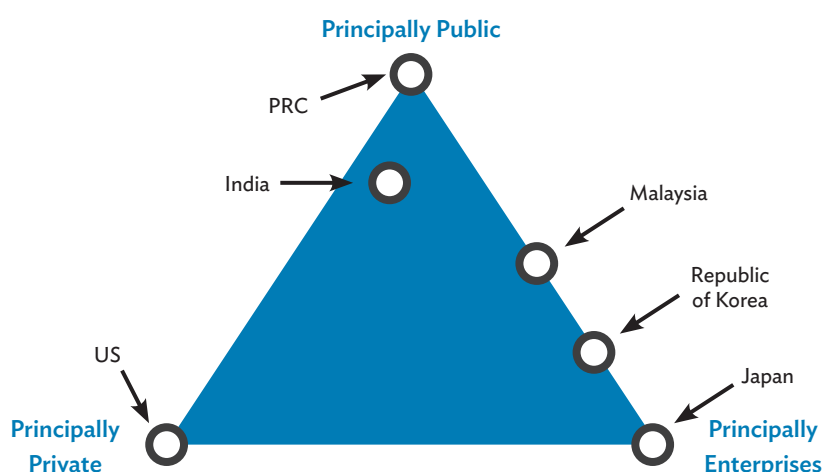
<sup>31</sup> More generally, TVET systems need to effectively engage with multiple stakeholders, including individuals, training providers, employers, governments, and society.

(ii) determining current and future priority skill areas, (iii) development of national skill standards, (iv) financing of TVET, (v) provision of TVET (including preemployment training and on-the-job learning), and (vi) enhancing placement of TVET graduates. In addition to engagement of industry by the Republic of Korea in identifying and addressing skills needs, innovative examples include various initiatives launched by SPRING Singapore (an agency under the Ministry of Trade and Industry). These include the new SkillsFuture Learn and Earn Programme, under which the government provides financial and other support to both industries and polytechnics, and institute of technical education graduates to place graduates in salaried jobs while undergoing institution-based and structured on-the-job training leading to an industry-recognized qualification.

**Technical and vocational education and training provision.** Governments need to strike the right balance of TVET provision by public TVET institutions and private providers, including private TVET schools and enterprise-based training (EBT). The optimal mix will likely depend on many factors, and countries have adopted very different models (Figure 19). For example, in the United States, TVET is principally provided by private training institutions. By contrast, in the PRC, most TVET providers are from the public sector, whereas Japan relies heavily on EBT. TVET provision in Malaysia and the Republic of Korea is more balanced between public TVET institutions and enterprises, whereas India relies on a mix of public and private TVET institutions as well as EBT.

**Governance.** It should be emphasized that private provision does not mean that governments simply leave TVET to private providers: policies need to create an enabling framework while also ensuring quality control. Sound policies are also needed to promote effective partnerships between TVET institutions (public or private) and industry, including through internships, apprenticeships, and/or training for existing workers, particularly in

**Figure 19: Reliance on Public and Private Technical and Vocational Education and Training Institutions and Enterprise-Based Training**



EBT = enterprise-based training, PRC = People's Republic of China.

Source: Authors.



the provision of specific and specialized skills. Regardless of the balance of public school, private school, and EBT forms of TVET, governments also must play a key role in building broader structures, such as (i) developing a coherent education system that embeds a ladderized TVET subsector; (ii) TVET quality assurance systems, including national skill standards; (iii) provision of information on current and emerging labor market conditions, as well as skills needs and economic shifts nationally and regionally; (iv) coordination; and (v) financing.

**Financing of technical and vocational education and training.** It should also be emphasized that TVET provision and TVET financing are distinct. It is critical that governments throughout Asia reverse the current under-resourcing of TVET, which will be essential for increasing TVET quality and relevance (as well as access). TVET provision by private TVET institutions or private firms does not necessarily mean that the costs of such programs should fall solely upon households and firms themselves. There are strong equity and public goods arguments for providing state support for at least some forms of TVET provided by private schools or enterprises. Examples range from state-financed scholarships for students attending private TVET schools to state-financed skills development funds, outsourcing of TVET programs, and more elaborate public–private partnerships (PPPs). Conversely, some countries (e.g., the Republic of Korea) have imposed skill levy funds, wherein employers (at least the larger ones) are required to contribute a fixed share of their revenue or wage bill to support skills development in a range of public and private providers (including enterprises themselves).

**Other innovative public–private partnerships.**<sup>32</sup> There are strong justifications for engaging the private sector in various dimensions ranging from identification of skills demands to provision of training, advice, and financing for TVET. In many countries, employer engagement in TVET has remained limited to employers' participation in dialogue (ranging from ad hoc meetings to established industry councils) to examine employment trends, and in many cases, private sector entities serve mostly as observers with little or no decision-making role (UNESCO 2013). Similarly, private TVET schools have sprung up in many countries but often compete with public TVET providers, and in many cases in a context of either inadequate or overly restrictive regulation by the government.

However, in addition to broader forms of engagement with industry and private TVET providers, many countries with mature TVET systems are increasingly exploring innovative forms of systematic public–private partnership (PPP).<sup>33</sup> PPPs in TVET can be categorized into

- (i) **Education service delivery initiatives**, such as contracting private TVET schools and/or employers to provide TVET services, or contracting private management of public TVET schools;

<sup>32</sup> This section draws heavily on ADB (2013). Public–Private Partnerships in Education (presentation by N. LaRocque and M. Latham to the ADB Education Community of Practice, 20 March 2013).

<sup>33</sup> While there are varied definitions of PPP, this study uses the definition provided in ADB (2012). Public–Private Partnership Operational Plan 2012–2020, which defines PPP as a *contractual arrangement between public (national, state, provincial, or local) and private entities through which the skills, assets, and/or financial resources of each of the public and private sectors are allocated in a complementary manner, thereby sharing the risks and rewards, to seek to provide optimal service delivery and good value to citizens.*



- (ii) **Infrastructure PPPs**, ranging from private leasing of public TVET school facilities to government contracting of private entities to finance, construct, and maintain new TVET facilities, sometimes as build–operate–transfer;
- (iii) **Demand-side financing programs**, such as publicly financed voucher programs allowing youths and/or workers to attend training at accredited TVET institutions, or provision of tax credits or other support for private entities establishing new TVET schools; and
- (iv) **Education support initiatives**, including mechanisms for engaging the private sector in curriculum development, quality assurance, testing, and/or provision of apprenticeships.

In addition to the generic argument that PPPs can allow for more optimal efficiency in using resources, evidence suggests that strong PPPs in TVET can deliver robust labor market outcomes (McKinsey Global Institute 2012). In addition, compared with public providers, private TVET providers are often able to more quickly respond to changing skills needs in the service sector and high-growth industries. Finally, some countries (e.g., Singapore) have successfully developed innovative PPP models targeting high-technology companies with foreign investment and skills upgrading in strategic sectors, which helped Singapore accelerate technological convergence.

However, it should be stressed that PPPs are neither a magic bullet nor quick or easy to implement. In many Asian countries, despite high-level policy statements on promotion of PPPs in skills development, there has been little (if any) experience with PPPs as defined herein, and the prerequisite legislative and policy frameworks are generally not in place. In the absence of carefully developed systems, there are risks to pursuing PPPs, which may fail to take off or to deliver targeted objectives. Along with clear policies, supportive and well-crafted legislative framework must be established to support successful “win–win” PPPs. In particular, legislation, regulations, and mechanisms need to be in place to specify responsibility and risk allocation among partners, and to ensure quality standards while empowering the private sector in decision making.

## D. Mitigating Skills Mismatch through International Cooperation

**Intelligence on skills demand and supply.** Information on skills supply and demand is often limited, outdated, and scattered, and too aggregated to allow identification of specific skills lacking in the workforce, which in turn contribute to skills mismatch. This is particularly true in the increasingly globalized economy, where national skills supply strategies must be informed by updated information on regional and global skills supply and demand. Labor market analysis on both demand and supply sides at the national, regional, and global levels is central in informing policy makers of employment trends in the global context, in improving their understanding of the nature and extent of demand for skills, and in helping them make well-informed decisions on devising policies and mechanisms to equip individuals with skills needed in the present and the future. At the same time, governments need to provide students and its workforce with information on the types of training available from various training providers and their effectiveness in yielding

labor market outcomes. Tracer study is a potentially useful means to assess the relevance, impact, and cost-effectiveness of skills development interventions for both the formal and informal economy, and thus to inform skills development strategies.

**Regional collaboration on labor market information and analysis.** Understanding job creation and destruction driven by the key global trends elaborated in Section II requires examination and interpretation of the dynamics of economies, industries, and demographics globally, including Asia. Collaborative regional research can play a key role by (i) sharing knowledge, expertise, resources, and data; (ii) helping countries keep abreast of others' innovations and good practices; and (iii) promoting industrial cooperation, including developing complementary positions within a linked value chain and improving the region's collective competitiveness in global markets.

**Establishment of bilateral or regional mutual recognition mechanisms.** Skills mobility across geographic areas is an effective way to tackle skills mismatch in one geographic location by tapping excess resources of supply from another. Allowing an excess of workers with a given skill to move to a country lacking such a skill can reverse skills mismatch (Cedefop 2010). Removal of barriers to skills mobility requires mechanisms for skills recognition across countries. Countries with a large share of emigrants need to ensure that skill certifications are recognized by the most dominant destination countries. At the same time, as Asia progresses toward greater global and regional integration, the rationale for efforts to harmonize regional standards becomes stronger.

Joint certification programs, which are increasing in number, are a relatively straightforward means of skills recognition. In addition to facilitating skills mobility and employability across borders, joint certification programs offer the prospect of improvement in quality and governance through convergence between the participating education systems. A more comprehensive approach is the development of a mutual recognition arrangement (MRA), which serves as a process whereby the qualifications gained in the home country is recognized as such in the host country, with no need for recertification. For example, Australia and New Zealand signed an MRA applicable to TVET qualifications to encourage industry and training providers to work together to avoid duplication and to support a single labor market. In addition to facilitating skills mobility to mitigate skills mismatch across countries, an MRA allows skills acquired abroad to be recognized by the home country, which may increase the likelihood of migrants returning home, facilitating the home country to capitalize on the wealth of skills brought back.

A third way is regional-level cooperation to develop regional qualifications framework, as a translation device to enable comparison and communication of an individual country's national qualifications framework with a common regional reference framework, which promotes skills-based mobility across borders and facilitates lifelong learning. A regional qualifications framework can promote skills-based mobility across borders and greater regional integration. ASEAN member states are envisioning the development of an ASEAN Regional Qualifications Reference Framework as a step toward a more effective ASEAN Economic Community. There are also efforts to align national qualifications frameworks with the ASEAN Regional Qualifications Reference Framework such as the PRC and Australia to avoid being isolated from the ASEAN Economic Community.

### Box 3: The Efforts of the Association of Southeast Asian Nations toward Mutual Recognition System

Mutual recognition of skills can be an effective approach to mitigate geographic skills mismatch by promoting flows of workers with a specific skill from countries with surplus to those where such skills are in short supply. The development of a system of mutual recognition is a core strategy of the Association of Southeast Asian Nations (ASEAN), which has made substantial progress in developing mutual recognition arrangements, particularly in tourism and hospitality. Regional standards were set and then validated by ASEAN members and sectoral employer bodies in each member country, and training authorities then aligned their related technical and vocational education and training programs with the unified regional standards. Building on such successes, the ASEAN Mutual Recognition System aims to (i) develop mutually recognized professional qualifications; (ii) complete mutual recognition arrangements in identified professions (e.g., architecture, accountancy, surveying, medical and dental practitioners); and (iii) develop the required core competencies and qualifications for occupations as well as technical and vocational education and training trainers. Specific priority is given to service sectors such as air transport, e-ASEAN, health care, and tourism.

Source: ASEAN (1998) and ASEAN Vision 2020 at <http://www.asean.org/news/item/asean-vision-2020>

## E. Concluding Remarks

Asia has experienced a “growth miracle” in recent decades, which in part has been propped up by human capital, which allowed Asia to become a factory for the globe. However, a series of key global shifts and trends has dramatically altered the context for Asia’s future growth. In particular, amid such shifts and as a by-product of Asia’s own success in climbing the technological ladder, models for skills supply that served Asia well in the past are no longer adequate to support continued economic dynamism. To varying degrees, countries in Asia now increasingly face skills mismatch, as education systems (including TVET) are unable to keep pace with the rapidly evolving skills demands as Asia continues to modernize. Mismatches between skill supply and demand have negative impacts at the macro- and microlevels, undermining national competitiveness and growth as well as individuals’ employment outcomes.

In the face of such challenges, there is no one-size-fits-all solution for Asia. However, this study proposes recommendations in four key areas that will be critical to aligning skills supply with skills demand to advance Asia’s continued economic ascendancy. First, it will be critical for countries to place skills development as a central pillar in national planning, rather than assuming that markets will align skills supply with skills demand. Second, it will be essential for Asian countries to reorient their education systems to meet the evolving economic needs, and (at least in many cases) to rebalance the mix of soft and hard skills created in general-track education and TVET. Third, the study identifies particular priorities for reforms and increased investment in TVET, which has been relatively neglected in many countries in Asia and needs to be reinvented to more fully contribute to dynamic growth.

Finally, efforts by individual countries to tackle skills mismatch can benefit from regional cooperation, ranging from collaboration in regional labor market analysis to development of mutual recognition mechanisms for skilled workers.

While the specific mix of interventions will need to be tailor-fit to country needs, concerted efforts in these areas can collectively help mitigate skills mismatch, and in turn support Asia's continued rise into more advanced and higher-valued-added manufacturing and service industries while advancing inclusive growth.

# References

- ADB. 2011. *Asia 2050: Realizing the Asian Century*. Manila.
- . 2012. *Public–Private Partnership Operational Plan 2012–2020*. Manila.
- . 2013. *Public–Private Partnerships in Education*. Paper presented by N. LaRocque and M. Latham to the ADB Education Community of Practice, 20 March 2013, Manila.
- . 2015. *Asian Development Outlook 2015: Financing Asia’s Future Growth*. Manila.
- ADB and Asian Development Bank Institute (ADBI). 2014. *ASEAN, PRC, and India: The Great Transformation*. Tokyo: ADBI.
- ADBI, Organisation for Economic Co-operation and Development (OECD), and International Labour Organization (ILO). 2014. *Labor Migration, Skills and Student Mobility in Asia*. Tokyo: ADBI.
- F. Allen et al. Towards a Better Global Economy: Policy, Implementation for Citizens Worldwide in the 21st Century.
- . 2014. *Today’s Structural Transformation Is a More Mixed Story Than in the Past*. Guest post by Uma Lele. [http://rodrik.typepad.com/dani\\_rodriks\\_weblog/2014/05/todays-structural-transformation-is-a-more-mixed-story-than-in-the-past.html](http://rodrik.typepad.com/dani_rodriks_weblog/2014/05/todays-structural-transformation-is-a-more-mixed-story-than-in-the-past.html)
- ASEAN. 1998. *ASEAN Framework Agreement on Mutual Recognition Arrangements*. <http://www.asean.org/communities/asean-economic-community/item/asean-framework-agreement-on-mutual-recognition-arrangements-2>
- Asia-Pacific Economic Cooperation (APEC). 2013. *A Report on the APEC Region Labour Market: Evidence of Skills Shortages and General Trends in Employment and the Value of Better Labour Market Information Systems*. APEC Human Resources Development Working Group. Singapore: APEC Secretariat.
- D. H. Autor, F. Levy, and R. J. Murnane. 2003. The Skills Content of Recent Technological Change: An Empirical Exploration. *Quarterly Journal of Economics*. 118 (4). pp. 1279–1333.
- D. H. Autor and B. M. Price. 2013. *The Changing Task Composition of the US Labor Market: An Update of Autor, Levy, and Murnane (2003)*. MIT Monograph.
- R. J. Barro and J. W. Lee. 2014. Educational Attainment Dataset, 30 June 2014. Version 2.0. [www.barrolee.com](http://www.barrolee.com)
- T. Boeri. 2000. *Structural Change, Welfare Systems and Labour Reallocation*. Oxford: Oxford University Press.

- P. H. Cappelli. 2015. Skill Gaps, Skill Shortages, and Skill Mismatches: Evidence and Arguments for the United States. *ILR Review*. 68 (2). pp. 251–290.
- B. Y. Cheon. 2014. Skills Development Strategies and the High Road to Development in the Republic of Korea. In J.M. Salazar-Xirinachs, I. Nübler, and R. Kozul-Wright, eds. *Transforming Economies: Making Industrial Policy Work for Growth, Jobs and Development*. Geneva: ILO. pp. 213–238.
- S. Commandar and J. Kollo. 2008. The Changing Demand for Skills: Evidence from the Transition. *Economics of Transition*. 16 (2). pp. 199–221.
- Department for International Development of the United Kingdom (DFID). 2011. *Engaging the Private Sector in Skills Development. Guidance Note: A DFID Practice Paper*.
- Economist Intelligence Unit. 2012. *Plugging the Skills Gap: Shortages among Plenty*. New York: The Economist.
- Emerging Markets Consulting. 2014. *Survey of ASEAN Employers on Skills and Competitiveness*. Bangkok: ILO.
- European Centre for the Development of Vocational Training (Cedefop). 2010. *The Skill Matching Challenges, Analyzing Skill Mismatch and Policy Implications*. Luxembourg: Publications Office of the European Union.
- European Commission. 2015. *EU Skills Panorama*. <http://euskillspanorama.cedefop.europa.eu/Glossary> (accessed 23 July 2015).
- European Union Skills Panorama. 2014. *Health Sector Analytical Highlight*. Prepared by ICF GHK and Cedefop for the European Commission. Thessaloniki, Greece.
- R. Freeman. 2006. *The Great Doubling: The Challenge of the New Global Labor Market*. Unpublished paper available at [http://emlab.berkeley.edu/users/webfac/eichengreen/e183\\_sp07/great\\_doub.pdf](http://emlab.berkeley.edu/users/webfac/eichengreen/e183_sp07/great_doub.pdf) (accessed 23 July 2015).
- T. Fukunishi and T. Yamagata. 2013. Slow and Steady Wins the Race: How the Garment Industry Leads Industrialization in Some Developing Countries. Background paper for the Industrial Development Report 2013. Vienna: United Nations Industrial Development Organization (UNIDO).
- E. A. Hanushek and L. Woessmann. 2012. Do Better Schools Lead to More Growth? Cognitive Skills, Economic Outcomes, and Causation. *Journal of Economic Growth*. 17 (4). pp. 267–321.
- . 2015. *Universal Basic Skills: What Countries Stand to Gain*. Paris: OECD Publishing.
- E. A. Hanushek, L. Woessmann, and L. Zhang. 2011. General Education, Vocational Education, and Labor-Market Outcomes over the Life-Cycle. *NBER Working Paper Series*. No. 17504. Cambridge, MA: National Bureau of Economic Research.
- E. A. Hanushek, G. Schwerdt, S. Wiederhold, and L. Woessmann. 2015. Returns to Skills around the World: Evidence from PIAAC. *European Economic Review*. 73 (C). pp. 103–130.
- J. Heckman and J. Yi. 2012. Human Capital, Economic Growth, and Inequality in China. *NBER Working Paper Series*. No. 18100. Cambridge, MA: National Bureau of Economic Research.

- ILO. 2011. *Formulating a National Policy on Skills Development*. Skills for Employment, Policy Brief. Geneva.
- . 2014a. Wages in Asia and the Pacific: Dynamic but uneven progress. Global Wage Report 2014/15, Asia and the Pacific supplement. ILO Regional Office for Asia and the Pacific. Bangkok.
- . 2014b. Trends Econometric Models. October 2014. Geneva.
- . 2014c. *Global Employment Trends 2014: Risk of a Jobless Recovery?* Geneva.
- . 2015a. *World Employment and Social Outlook – Trends 2015*. Geneva.
- . 2015b. *Global Wage Report 2014/15: Wages and Income Inequality*. Geneva.
- International Organization for Migration (IOM). 2013. *World Migration Report 2013*. Geneva.
- B. Krugman. 1994. The Myth of Asia's Miracle. *Foreign Affairs*. 73(6): 62–78.
- J. W. Lee and S. Mehrotra. 2015. *Human Capital Development in South Asia: Achievements, Prospects, and Policy Challenges*. Manila: Asian Development Bank.
- P. Lolwana. 2013. *The Meaning of Skills in Global Reports*. <http://www.norrag.org/en/publications/norrag-news/online-version/2012-the-year-of-global-reports-on-tvet-skills-jobs-consensus-or-diversity/detail/the-meaning-of-skills-in-global-reports.html>
- ManpowerGroup. 2015. *2015 Talent Shortage Survey*. Milwaukee, WI.
- McKinsey Global Institute. 2012. *The World at Work: Jobs, Pay, and Skills for 3.5 Billion People*. [http://www.mckinsey.com/insights/employment\\_and\\_growth/the\\_world\\_at\\_work](http://www.mckinsey.com/insights/employment_and_growth/the_world_at_work)
- Organisation for Economic Co-operation and Development (OECD). 2012. *Better Skills, Better Jobs, Better Lives: A Strategic Approach to Skills Policies*. <http://skills.oecd.org/documents/OECDSkillsStrategyFINALENG.pdf>
- . 2013a. *Skills Outlook 2013: First Results from the Survey of Adult Skills*. Paris: OECD Publishing.
- . 2013b. *Perspectives on Global Development 2013: Industrial Policies in a Changing World*. Paris: OECD Publishing.
- . 2014. *OECD Factbook 2014: Economic, Environmental and Social Statistics*. Paris: OECD Publishing.
- B. Panth. 2013. Skills Training and Workforce Development with Reference to Underemployment and Migration. In R. Maclean, S. Jagannathan, and J. Sarvi, eds. *Skills Development for Inclusive and Sustainable Growth in Developing Asia-Pacific*. Volume 19 of Technical and Vocational Education and Training: Issues, Concerns and Prospects. Dordrecht: Springer. pp. 195–212.
- L. Powell. 2013. *What Skills Are We Talking About? Comparing the Global Monitoring Report 2012 and South African Skills Development*. <http://www.norrag.org/en/publications/norrag-news/online-version/2012-the-year-of-global-reports-on-tvet-skills-jobs-consensus-or-diversity/detail/what-skills-are-we-talking-or-comparing-the-global-monitoring-report-2012-and-south-african-skil.html>



- Y. S. Ra and K. W. Shim. 2009. The Korean Case Study: Past Experience and New Trends in Training Policies. *Social Protection Discussion Paper*. No. 0931. Washington, DC: World Bank.
- D. Rodrik. 2013. *The Past, Present, and Future of Economic Growth*. Global Citizen Foundation. Oxford Publishing.
- J. A. Sabadie et al. 2010. *Migration and Skills: The Experience of Migrant Workers from Albania, Egypt, Moldova and Tunisia*. Washington, DC: World Bank.
- C. Spohr. 2003. Formal Schooling and Workforce Participation in a Rapidly Developing Economy: Evidence from Compulsory Junior High School in Taipei, China. *Journal of Development Economics*. 70 (2). pp. 291–327.
- M. Tewari. 2008. Deepening Intraregional Trade and Investment in South Asia: The Case of the Textiles and Clothing Industry. *Indian Council for Research on International Economic Relations Working Paper*. No. 213. New Delhi.
- P. Toner. 2011. *Workforce Skills and Innovation: An Overview of Major Themes in the Literature*. Directorate for Science, Technology and Industry, Centre for Educational Research and Innovation. STI Working Paper Series. Paris: OECD.
- UNESCO and UNICEF. 2013. *Asia-Pacific End of Decade Notes on Education for All: Universal Primary Education*. Bangkok.
- UNESCO Institute for Statistics. 2012. Adult and Youth Literacy. *UIS Fact Sheet September 2012*. No. 20. Montreal: UNESCO.
- UNIDO. 2013. *Industrial Development Report 2013. Sustaining Employment Growth: The Role of Manufacturing and Structural Change*. Vienna.
- United Nations Conference on Trade and Development (UNCTAD). 2013. *Inward and Outward Foreign Direct Investment Stock, Annual, 1980–2013*. <http://unctadstat.unctad.org/wds/TableView/tableView.aspx?ReportId=89>
- United Nations, Department of Economic and Social Affairs (UNDESA). 2012a. *Trends in International Migrant Stock: Migrants by Destination and Origin*. New York.
- UNDESA. 2012b. *Regional Overview: Youth in Asia and the Pacific*. New York.
- United Nations Educational, Scientific and Cultural Organization (UNESCO). 2012. *Promising Practices in TVET*. <http://www.unevoc.unesco.org/go.php?q=fwd2TVET+Promising+Practices+Database+-+Introduction>
- . 2013. *School-to-Work Transition Information Bases. Asia-Pacific Education System Review Series*. No. 6. Bangkok.
- World Bank. 2005. *Expanding Opportunities and Building Competencies for Young People: A New Agenda for Secondary Education*. Washington, DC.
- . 2010. *Stepping Up Skills for More Jobs and Higher Productivity*. <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTEDUCATION/0,,contentMDK:22640776~menuPK:282391~pagePK:148956~piPK:216618~theSitePK:282386,00.html>
- . 2012. *More and Better Jobs in South Asia*. Washington, DC.
- . 2013a. *World Development Report 2013: Jobs*. Washington, DC.



- . 2013b. *SABER Multiyear Country Report, Workforce Development, Republic of Korea*. Washington, DC.
- World Economic Forum. Global Agenda Council on Employment. 2014a. *Matching Skills and Labour Market Needs: Building Social Partnerships for Better Skills and Better Jobs*. Davos-Klosters, Switzerland, 22–25 January 2014. Geneva.
- . 2014b. *Education and Skills 2.0: New Targets and Innovative Approaches*. Geneva.

## Challenges and Opportunities for Skills Development in Asia

### *Changing Supply, Demand, and Mismatches*

This report discusses six key global trends on skills supply and demand in Asia. These are (i) the doubling of the labor pool, (ii) expansion of education access, (iii) economic and industrial transformation, (iv) technological advancement, (v) globalization and regional integration, and (vi) demographic shifts. The report highlights the need for Asia's education systems to transform. It proposes four pillars on policies to address skills mismatch including (i) developing comprehensive national strategies and planning, (ii) reorienting and rebalancing education systems, (iii) prioritizing reforms in technical vocational education and training relevance and quality, and (iv) advancing international cooperation.

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