

McKinsey Global Institute



September 2012

The archipelago economy: Unleashing Indonesia's potential



The McKinsey Global Institute

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McKinsey & Company in Indonesia

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The archipelago economy: Unleashing Indonesia's potential

Raoul Oberman
Richard Dobbs
Arief Budiman
Fraser Thompson
Morten Rossé

Preface

Indonesia is in the throes of a rapid transformation, swept along by its position at the heart of the world's most dynamic economic region, rapid urbanisation, and rising incomes that will propel an additional 90 million Indonesian people into the world's consuming class by 2030. Over the past decade, the economy has grown more strongly and been more stable; today it is more diversified than many outsiders realise. On current trends, Indonesia is on course to become the seventh-largest economy in the world in 2030 from the 16th largest today. If Indonesia can meet a range of constraints on growth, it can fully leverage today's positive economic trends and offer businesses and investors a lucrative market opportunity.

In this report, the McKinsey Global Institute (MGI) discusses the recent record of the Indonesian economy, looks at its future prospects, suggests priorities for government and business that might best maintain the economy's momentum, and, finally, discusses the potential size of the private business opportunity in Indonesia to 2030.

Raoul Oberman, a McKinsey director and chairman of McKinsey Indonesia, and Richard Dobbs, a director of MGI, led this research together with Arief Budiman, a partner and president director in McKinsey's Jakarta office, and Fraser Thompson, an MGI senior fellow. Morten Rossé, a consultant in Jakarta, led the project team, which consisted of Belva Devara, Falah Fakhriyah, Michael Haase, Nirwanto Honsono, Tim McEvoy, Mulyono, Sabrina Mustopo, Andrew Pereira, Dyah Ramadhani, and Andre Sugiarto.

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This report contributes to MGI's mission to help global leaders understand the forces transforming the global economy, identify strategic locations, and prepare for the next wave of growth. As with all MGI research, we would like to emphasise that this work is independent and has not been commissioned or sponsored in any way by any business, government, or other institution.

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Indonesia today ...

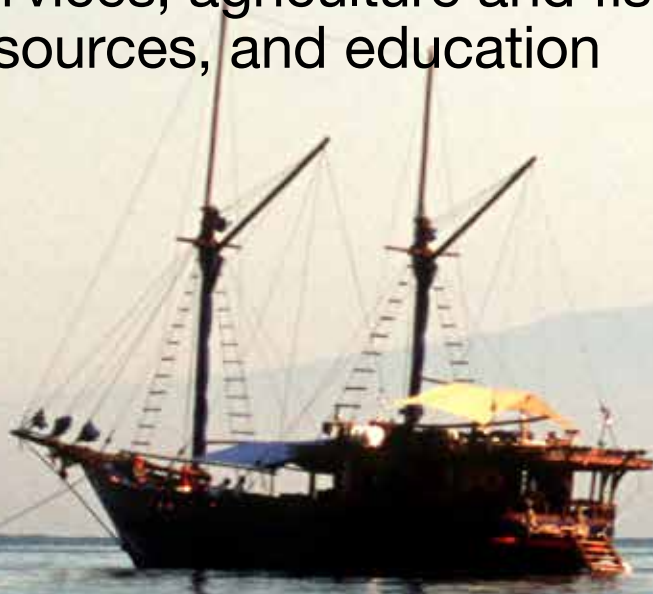
16th-largest economy
in the world

45 million members of the
consuming class

53% of the population in cities
producing **74%** of GDP

55 million skilled workers in the
Indonesian economy

\$0.5 trillion
market opportunity in consumer
services, agriculture and fisheries,
resources, and education



... and in 2030

7th-largest economy
in the world

135 million members of the
consuming class

71% of the population in cities
producing **86%** of GDP

113 million skilled workers
needed

\$1.8 trillion

market opportunity in consumer
services, agriculture and fisheries,
resources, and education

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Executive summary

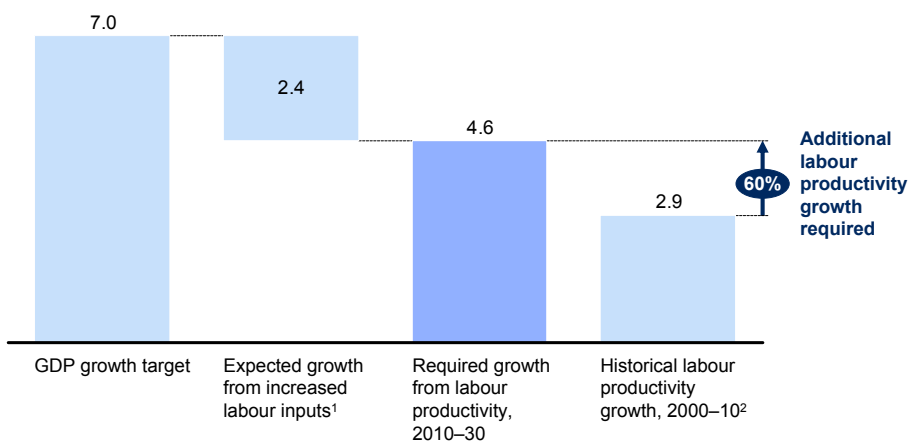
Indonesia's economy has enormous promise. Already the 16th-largest economy in the world, this dynamic archipelago has the potential to be the seventh biggest by 2030. It is a much more stable and diversified economy than many outside observers assume. In recent years, Indonesia has made enormous strides in its macroeconomic management. Inflation has fallen from double into single figures, and government debt as a share of GDP is now lower than in the vast majority of advanced economies. The economy, part of a resurgent Asia, is transforming rapidly. Indonesia has a young population and is quickly urbanising, powering growth in incomes. Between now and 2030, Indonesia will be home to an estimated 90 million additional consumers with considerable spending power. This growth in Indonesia's consuming class¹ is stronger than in any economy of the world apart from China and India, a signal to international businesses and investors of considerable new opportunities.

But Indonesia is at a critical juncture. The archipelago economy is confronted by three major challenges in the period to 2030. First, Indonesia faces a productivity imperative. The economy has performed relatively well on labour productivity, which has accounted for more than 60 percent of economic growth over the past two decades, the rest being delivered by growth in the labour force. But our analysis suggests that Indonesia needs to boost productivity growth by 60 percent from the rate achieved from 2000 to 2010 if the economy is to meet the government's target of 7 percent annual GDP growth, above current trend growth of between 5 and 6 percent (Exhibit E1).

Exhibit E1

Achieving Indonesia's 7 percent annual GDP growth target will require labour productivity to grow 60 percent faster than in 2000–10

Annual real GDP growth rates
%



¹ Driven by additional workers joining the workforce due to demographics and increased participation in workforce; productivity assumed to be the average in 2010–30 based on a business-as-usual growth rate of 5 to 6 percent.

² Based on an average among national and international data sources.

SOURCE: CEIC Data; Indonesia's Central Bureau of Statistics; Conference Board Total Economy Database; International Monetary Fund (IMF); United Nations Population Division; McKinsey Global Institute analysis

¹ We define the consuming class as those individuals with net income of more than \$3,600 per annum in purchasing power parity (PPP), at 2005 exchange rates.

Second, an uneven distribution of growth across the archipelago and rising inequality are concerns. Indonesia might want to consider how to ensure that economic growth is as inclusive as possible. The third challenge is to ensure that Indonesia does not suffer from infrastructure and resource constraints as its expanding consuming class delivers a welcome injection of growth—and that this demand creates potentially lucrative new markets. In the years ahead, this once-in-a-generation economic transformation will need careful management.

This report highlights action that Indonesia could take in three key sectors—consumer services, agriculture and fisheries, and resources—to boost productivity and remove constraints on growth. In addition, we highlight ways to tackle an impending shortage of skills across all sectors. If Indonesia embraces these four priority areas, it has the opportunity to build on recent successes and create a platform for a productive, inclusive, and resilient economy in the long term.

INDONESIA'S RECENT IMPRESSIVE ECONOMIC PERFORMANCE IS NOT WIDELY UNDERSTOOD

The Indonesian economy, today the 16th largest in the world, has performed strongly over the past decade or more and is more diverse and stable than many observers from beyond its shores realise (Exhibit E2). Over the past decade or so, Indonesia has had the lowest volatility in economic growth among any advanced economy in the Organisation for Economic Co-operation and Development (OECD) or the BRICs (Brazil, Russia, India, and China) plus South Africa.

Exhibit E2

Indonesia has performed impressively over the past decade

Overview of OECD and BRIC¹ plus South Africa

Rank	GDP 2011, current prices \$ trillion		Real GDP growth, 2000–10 %		GDP growth standard deviation, annualised, 2000–10 %		Share of debt to GDP, 2009 %		Inflation rate, 2011 %, GDP deflator	
1	United States	15.1	China	11.5	Indonesia	0.86	Russia	8.7	Japan	-2.0
2	China	7.3	India	7.7	Australia	0.95	Estonia	9.0	Czech Republic	-0.7
3	Japan	5.9	Indonesia	5.2	Portugal	1.48	Luxembourg	12.8	Ireland	-0.4
4	Germany	3.6	Russia	4.9	Norway	1.56	China	16.5	Germany	0.7
5	France	2.8	Slovakia	4.9	France	1.59	Australia	24.1	Switzerland	0.7
6	Brazil	2.5	South Korea	4.2	New Zealand	1.70	Indonesia ²	25.0	Slovenia	0.8
7	United Kingdom	2.4	Turkey	4.0	Belgium	1.74	Czech Republic	32.0	Denmark	0.9
8	Italy	2.2	Poland	3.9	Switzerland	1.78	Norway	35.4	Sweden	0.9
9	Russia	1.9	Estonia	3.8	Canada	1.82	Slovakia	38.2	Portugal	1.0
10	Canada	1.7	Chile	3.7	India	1.85	Denmark	40.8	Italy	1.3
11	India	1.7	Brazil	3.6	South Korea	1.98	Sweden	44.2	Netherlands	1.4
12	Spain	1.5	South Africa	3.5	Poland	2.00	Spain	46.4	Spain	1.4
13	Australia	1.5	Czech Republic	3.4	China	2.02	Germany	47.6	France	1.6
14	Mexico	1.2	Israel	3.1	Netherlands	2.09	Poland	48.1	Greece	1.6
15	South Korea	1.1	Australia	3.1	United States	2.10	Turkey	51.4	Slovak Republic	1.6
16	Indonesia	0.8	Slovenia	2.8	South Africa	2.14	Canada	53.1	(36) S. Africa	7.8
17	Netherlands	0.8	Luxembourg	2.8	Austria	2.14	India	53.7	(38) Indonesia	8.4
18	Turkey	0.8	New Zealand	2.6	Italy	2.17	Netherlands	58.2	(39) Turkey	9.0

1 Organisation for Economic Co-operation and Development; Brazil, Russia, India, and China.

2 Based on 2011 debt level.

SOURCE: Conference Board Total Economy Database; IMF; World Bank; McKinsey Global Institute analysis

Government debt as a share of GDP has fallen by 70 percent over the past decade and is now lower than in 85 percent of OECD countries. Inflation has decreased from 20 percent to 8 percent and is now comparable with more mature economies such as South Africa and Turkey. According to the World Economic Forum's competitiveness report on Indonesia, in 2012 the country ranked 25th on macroeconomic stability, a dramatic improvement from its 2007

ranking of 89th place. Indonesia now ranks ahead of Brazil and India, as well as several ASEAN neighbours including Malaysia, Thailand, and the Philippines.²

Another misperception is that Indonesia's economic growth centres almost exclusively on Jakarta; in fact, many other Indonesian cities are growing more rapidly, albeit from a lower base. The fastest-growing urban centres are large and mid-sized middleweight cities with more than two million inhabitants (excluding Jakarta), which have posted annual average growth of 6.4 percent since 2002, compared with Jakarta's 5.8 percent. These cities include Medan, Bandung, and Surabaya as well as parts of Greater Jakarta such as Bogor, Tangerang, and Bekasi.

Nor is Indonesia, as many assume, a typical Asian manufacturing exporter driven by its growing workforce or a commodity exporter driven by its rich endowments of natural resources. The reality is that, to a large extent, it is domestic consumption rather than exports, and services rather than manufacturing or resources, which are propelling growth. Indonesia's exports as a share of GDP are roughly half those of Malaysia in 1989, when Malaysian average incomes were at similar levels to those of Indonesia today. The resource sector's share of the economy has actually fallen since 2000 despite booming resource prices. Mining and oil and gas account for only 11 percent of Indonesia's nominal GDP, similar to more advanced economies such as Australia (8.4 percent) and Russia (11 percent). Indeed, Indonesia is a net oil importer. In contrast, services account for roughly half of economic output.

Over the past two decades, labour productivity improvements accounted for more than 60 percent of economic growth with the rest coming from more labour inputs due to an expanding working-age population. Perhaps surprisingly, the majority of Indonesia's productivity gain has come not from a shift of workers from lower-productivity agriculture into more productive sectors, but from productivity improvements within sectors. The three sectors making the largest contributions to this productivity improvement are wholesale and retail trade; transport equipment and apparatus manufacturing; and transport and telecommunications. And contrary to the widespread belief that productivity improves at the expense of employment, both have risen in tandem in Indonesia in 35 of the past 51 years.

THE ECONOMIC OUTLOOK IS PROMISING, SUPPORTED BY FAVOURABLE LOCAL AND INTERNATIONAL TRENDS

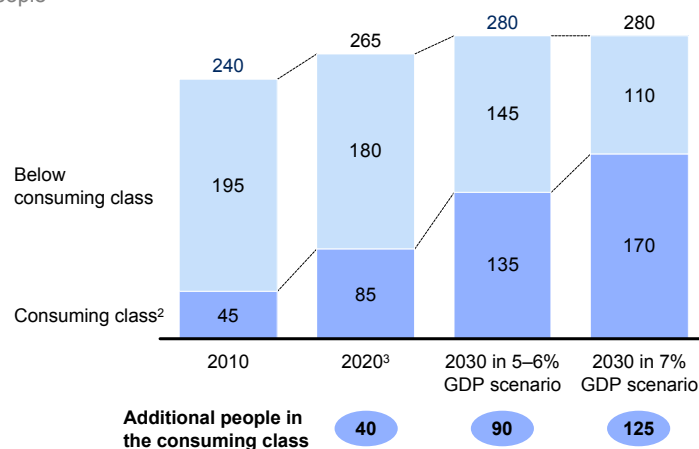
Indonesia's economic growth should benefit from a number of powerful positive trends including the resurgence of Asia, continuing urbanisation that is boosting the number of consumers with the power to spend on discretionary items, and a young population offering the economy a potential demographic dividend. On the current expected trajectory of growth, an additional 90 million Indonesians could join the global consuming class by 2030, powered by the continued rise of urban Indonesia (Exhibit E3). Only China and India are likely to surpass this increase in absolute terms, while Brazil, Egypt, Vietnam, and other fast-growing economies will each bring less than half of Indonesia's number into the consuming class in the same period. By 2030, Indonesia could become the seventh-largest economy in the world after China, the United States, India, Japan, Brazil, and Russia—overtaking Germany and the United Kingdom.

2 Association of South East Asian Nations.

Exhibit E3

An estimated 90 million Indonesians could join the consuming class by 2030

Million people¹



1 Rounded to the nearest five million.

2 Consuming class defined as individuals with an annual net income of above \$3,600 at 2005 purchasing power parity (PPP).

3 Based on annual GDP growth of between 5 and 6 percent.

SOURCE: McKinsey Consumer and Shopper Insight (CSI Indonesia 2011); 2010 Population Census, Indonesia's Central Bureau of Statistics; Canback Global Income Distribution Database (C-GIDD); McKinsey Global Growth Model; McKinsey Global Institute Cityscope 2.0; McKinsey Global Institute analysis

- The rise of Asia.** The global consuming class will increase its membership by 1.8 billion members over the next 15 years, of whom more than 75 percent are likely to be in Asia. The economic transformation in India and China is happening at a scale and pace unprecedented in history. Average incomes are growing at ten times the pace and on more than 200 times the scale of their increase during England's Industrial Revolution. This will fuel demand for a range of resources and commodities supplied by Indonesia. Exports to other Asian economies, particularly those of China and India, have already accelerated strongly in recent years at annual growth rates of 15 to 20 percent. In 2010, Indonesia exported \$3.8 billion of palm oil to India and \$2.1 billion to China. In the same year, China was Indonesia's largest export market for coal, receiving \$3.6 billion, and India was the destination for \$2.0 billion of coal exports.
- Urbanisation.** The proportion of Indonesians living in urban areas could reach 71 percent in 2030, up from 53 percent today, as an estimated 32 million people move from rural to urban areas. New cities will be created, helping to increase the overall share of Indonesian GDP generated by urban areas from an estimated 74 percent today to 86 percent in 2030. Other urban areas will continue to outpace Jakarta's growth. Small middleweight cities, defined as having between 150,000 and two million inhabitants, will continue to contribute the majority of growth and increase their share of GDP to 37 percent (from 31 percent today) with annual growth of more than 6 percent. We expect that cities including Pekanbaru, Pontianak, Karawang, Makassar, and Balikpapan will lead growth among small middleweight cities, each having annual growth rates of more than 7 percent. Growing even faster in relative terms at rates of around 7 percent are 20 mid-sized and large middleweight cities with between two million and ten million inhabitants. Together, these cities will contribute roughly one-quarter of GDP in 2030. In contrast, Jakarta's contribution to GDP is expected to remain relatively constant, at around 20 percent.

- **Growing working-age population.** Indonesia's young and expanding population could total 280 million by 2030, up from 240 million today. Unlike demographic trends in the many economies that are aging—including some in Asia—we expect those in Indonesia to remain positive until 2025 and contribute an annual 2.4 percent to overall economic growth until 2030.
- **An emerging digital and technology-driven nation.** Over the next decade, Indonesia will become a mobile and digital nation. Today there are 220 million mobile subscriptions in Indonesia. The Internet is becoming mainstream. Growing at an annual rate of more than 20 percent, Internet access is expected to reach 100 million users by 2016, dramatically improving connectivity. Green technologies could also dramatically change the resource market in coming years. For instance, Indonesia is home to 40 percent of the world's potential geothermal energy sources. If fully exploited, these could generate up to 24 terawatt hours a year—roughly equivalent to 70 percent of Jakarta's annual energy consumption today.

INDONESIA'S ECONOMY FACES SEVERAL CHALLENGES— AND ACTION IN FOUR AREAS WILL BE CRITICAL TO ADDRESSING THEM

To meet its triple challenge of boosting productivity, ensuring inclusive growth, and meeting the challenge of soaring demand from its expanding consumer class, Indonesia needs to tackle problems relating to excessive bureaucracy and corruption, access to capital, and infrastructure bottlenecks. However, we believe that beyond these widely discussed issues, Indonesia could usefully prioritise tackling barriers in four key areas of the economy that have significant potential if current constraints on growth are removed. Three of these four areas relate to transformation within three key sectors: consumer services, agriculture and fisheries, and resources. The fourth area is building worker skills to enable further diversification of the economy.

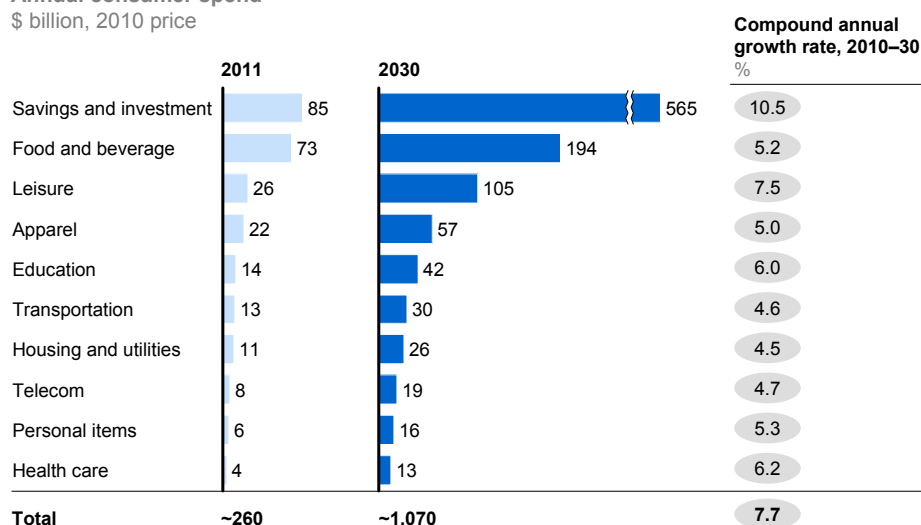
1. Transform consumer services

The burgeoning consuming class will give rise to large new markets, notably in financial services and various retail services such as food and beverages (Exhibit E4). The new wave of consuming class in Indonesia is a huge opportunity, but to capture the full economic potential, the sector needs to boost its productivity and ensure that consumer services are widely available across the Indonesian archipelago. Telecommunications and broadband Internet can be one way to ensure a boost to productivity and improved access to consumer products services as it offers a means to overcome physical barriers.

Relatively low levels of productivity in local consumer-facing service sectors explain more than 60 percent of Indonesia's overall productivity gap with Malaysia today. There are a number of barriers to higher productivity. In financial services, regulation is often a constraint. In retail trade, protectionism that is preventing companies from adopting more efficient practices and is limiting competition is arguably holding back growth. In transportation, poor or insufficient infrastructure is a hindrance. Past MGI work has found that removing barriers to competition is crucial to promoting higher productivity in consumer services. Governments can play a vital role in this regard.

Exhibit E4**Indonesia's savings and investments and retail sectors are expected to become large consumer markets by 2030**

Annual consumer spend
\$ billion, 2010 price



SOURCE: CSI Indonesia survey 2011; Indonesia's Central Bureau of Statistics; Canback Global Income Distribution Database (C-GIDD); McKinsey Global Growth Model; McKinsey Global Institute analysis

2. Boost productivity in agriculture and fisheries

Increasing numbers of relatively affluent consumers in India and China and Indonesia itself will raise demand for food and agricultural products significantly. This increased demand comes at a time when more than eight million Indonesians may leave behind farming to migrate out of the countryside into cities; additionally, pressure on land resources is growing partly because cities are expanding. As a consequence, productivity improvements in the agriculture and fisheries sector are a must. For example, to meet domestic demand alone, productivity among Indonesia's farms will need to increase by more than 60 percent from just over three tons of crops per farmer to five tons in 2030. Environmental concerns and urbanisation are both reasons that increases in production need to come from more intensive production systems rather than more extensive land use. Agriculture is responsible for a significant share of the deforestation and peat-land degradation that account for around 75 percent of Indonesia's total greenhouse gas emissions.

In agriculture, if Indonesia pursued three approaches—boosting yields, shifting production into high-value crops, and reducing post-harvest and value-chain waste—Indonesia could become a large net exporter of agriculture products, supplying more than 130 million tons to the international market.

3. Build a resource-smart economy

Indonesia is entering a period of resource-intensive growth during which demand for energy, materials, water, and other key resources is likely to increase rapidly. Annual demand for energy, for instance, could nearly triple from six quadrillion British thermal units (QBTUs) today to 17 QBTUs by 2030, and demand for finished steel could grow by more than 170 percent from nine million tons to 25 million tons, which is equivalent to 40 percent of India's steel demand today. Indonesia also faces a significant challenge in expanding the supply of safe water and basic sanitation to its growing urban population. We project that 55 million of Indonesia's poorest people, accounting for 20 percent of the total population, could have no access to basic sanitation in 2030 and that 25 million could lack access to water of a decent quality.

Given the strong demand for natural resources that we anticipate, it would be advantageous for Indonesia to maximise its energy supply from unconventional sources such as next-generation biofuels, geothermal power, and biomass, and to more productively extract, convert, and use natural resources such as energy, steel, and water. "Game-changing" forms of energy from unconventional sources could meet up to 20 percent of Indonesia's energy needs by 2030, reducing the country's dependence on oil and coal by almost 15 percent as well as lowering greenhouse gas emissions by almost 10 percent, compared with business as usual. The potential to improve Indonesia's energy efficiency is also significant. For instance, using more efficient methods to generate power, improving transportation, and retrofitting and constructing more energy-efficient buildings could together reduce 2030 energy demand by as much as 15 percent.

4. Invest in skill building

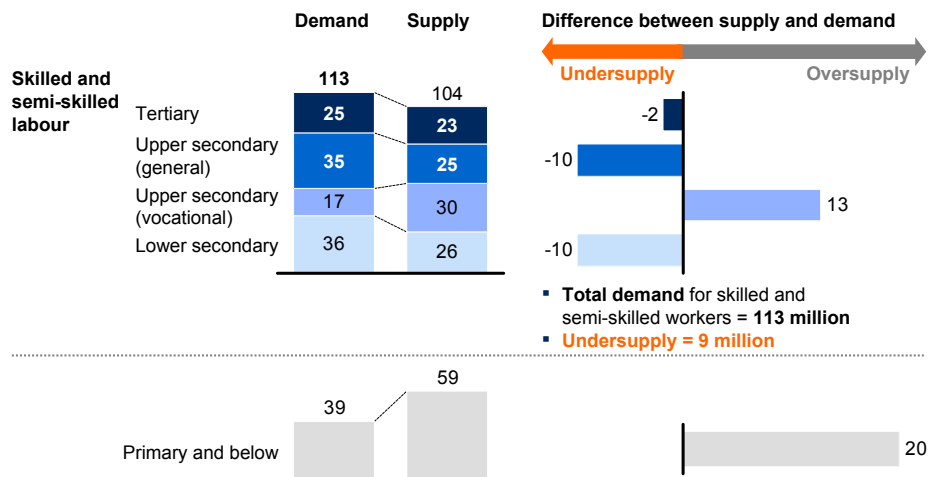
Indonesia's evolving economy will need new skills to support growth. Research by the World Bank suggests that human capital is a major obstacle to the development of a vibrant Indonesian manufacturing sector. The World Bank finds that 84 percent of employers in manufacturing report difficulties in filling management positions and 69 percent report problems in sourcing other skilled workers.³ In addition, strict regulations related to the termination of a job create a difficult environment for corporations. In order to achieve our base-case projection of between 5 and 6 percent annual GDP growth, we estimate that demand for semi-skilled and skilled workers will increase from today's level of 55 million to 113 million by 2030, a rise of almost 60 million workers. Increasing female participation to the level of Thailand today could add 20 million semi-skilled to skilled workers, but this would not be sufficient to meet Indonesia's need for skills to support economic growth. On current trends and policies, and assuming that female participation rises to the levels of Thailand today, we project that, by 2030, Indonesia could face a shortfall of nine million workers educated to the secondary and tertiary levels—nearly the population of Jakarta today (Exhibit E5).

3 *Indonesia skills report: Trends in skills demand, gaps, and supply in Indonesia*, World Bank, May 2010.

Exhibit E5

Indonesia is projected to face challenges in ensuring that workers receive the right level of education

Workforce demand vs. supply, 2030 projections
Million workers



SOURCE: Indonesia's Central Bureau of Statistics; CEIC Data; United Nations Statistics Division; World Bank; The Economist Intelligence Unit; McKinsey Global Growth Model; McKinsey Global Institute analysis

Drawing on McKinsey's global education work, we have identified three measures that could help to close the looming skills gap: (1) raise the standard of teaching significantly, with an emphasis on attracting and developing great teachers; (2) develop a more demand-driven curriculum; and (3) create new, flexible education pathways. Closing the skills gap will require significant investment. Assuming that the government continues to spend about 3 percent of GDP a year on public education, there could be a gap of \$8 billion a year by 2030 given expected total demand for education.

CONCERTED ACTION IN THESE FOUR AREAS COULD OFFER BUSINESSES A \$1.8 TRILLION OPPORTUNITY BY 2030

If Indonesia acts decisively in these four areas, we estimate that they collectively offer private-sector business an opportunity that could be worth \$1.8 trillion by 2030, the lion's share of which would come from consumer services (Exhibit E6).

- **Consumer services.** With an additional 90 million consumers expected in Indonesia, consumer spend in urban areas could increase at 7.7 percent a year to become a \$1.1 trillion business opportunity by 2030. The total opportunity could increase to \$1.5 trillion if Indonesia were to achieve the government's 7 percent annual GDP growth national target, a growth rate that would result in 125 million new consumers. There will be business opportunities across consumer services, but the largest is expected to be in financial services.
- **Agriculture and fisheries.** Revenue from agriculture and fisheries could increase at a rate of 6 percent per year to reach \$450 billion by 2030. Revenue from production could increase to \$250 billion, with increasing yields accounting for almost half the total potential increase. The downstream food and beverages industry could develop into a \$180 billion opportunity, while upstream activities, such as machinery, fertiliser, and seeds could offer additional annual potential of \$10 billion and total potential of \$20 billion a year.

We see the largest absolute production potential in the provinces of West, East, and Central Java, while East Nusa Tenggara could be the location for one of the fastest-growing opportunities in this sector.

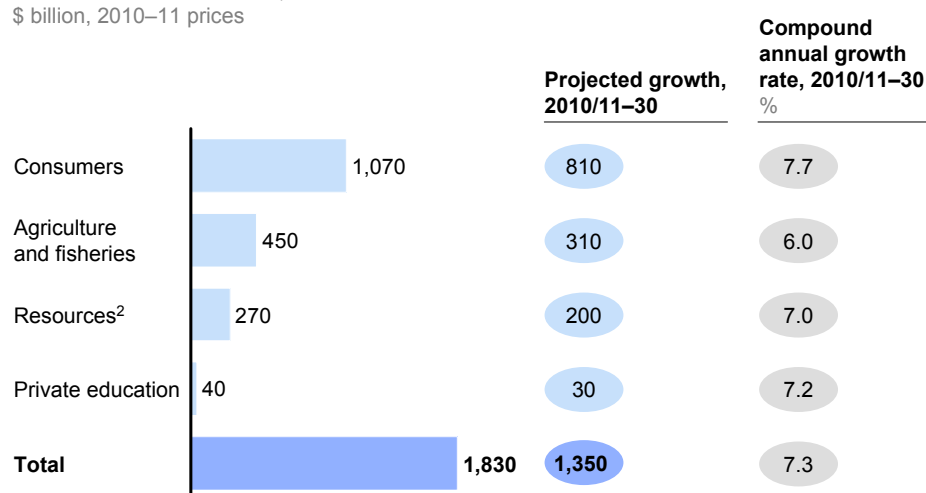
- **Resources.** In 2030, the Indonesian energy market could be worth about \$270 billion, including both the opportunity in new sources of energy and the savings from pursuing energy-efficiency measures. New sources of energy such as geothermal and biofuels could grow rapidly at rates of more than 10 percent a year to become over a \$60 billion market. However, the largest potential of an estimated \$150 billion is likely to continue to come from oil, gas, and coal. Measures to increase energy efficiency could be worth an additional \$60 billion in savings and societal value by 2030.
- **Human capital.** There is a large opportunity in private education, demand for which could potentially increase four-fold from \$10 billion a year to an estimated \$40 billion in 2030. We project that the number of students in private education will nearly double to 27 million by 2030. If this opportunity were realised, Indonesia could expand its labour force by an additional 13 million semi-skilled and skilled workers.

To capture these opportunities, businesses will need to rethink their geographical footprint in Indonesia given the shift toward middleweight cities and the rise of new, economically important regional centres. Businesses will also need to consider how they can collaborate most effectively with local governments to tackle some of the barriers impeding regional growth today and how they can best develop local talent, particularly in the ranks of middle management.

Exhibit E6

Four Indonesian sectors offer a potential \$1.8 trillion business opportunity by 2030

Estimated annual revenue, 2030¹
\$ billion, 2010–11 prices



¹ Rounded to the nearest \$10 billion.

² Only includes upstream energy market, and savings and societal value from increased energy efficiency.

SOURCE: McKinsey Global Institute analysis



Indonesia could be on the cusp of a new era of sustained growth and rising prosperity with the advantage of a following wind from major domestic and international trends. But there is still much to do if the archipelago economy is to make the most of this opportunity. In chapter 1, we examine five misconceptions common among external observers of Indonesia's economy. In chapter 2, we look at Indonesia in the context of powerful positive trends that should buoy growth. In chapter 3, we discuss some of the barriers to growth that Indonesia faces, highlighting the importance of action in four priority areas. Finally, in chapter 4, we size the potential private-sector opportunity in Indonesia and offer some brief thoughts on how businesses need to react and adapt to prospects in the archipelago economy today.

1. Five myths about Indonesia's recent growth

Indonesia has performed remarkably well during the past decade, emerging as a vibrant democracy, a strong economy, and a serious player on the international stage. At the turn of the century, Indonesia was the 28th-largest economy in the world; by 2011, the economy had surged up the global GDP rankings to 16th place. Within Asia, Indonesia is the fifth most important economy behind China, Japan, India, and South Korea, and an established member of the G-20 leading economies.

The economy rebounded strongly after the financial crisis that swept through Asia in 1997 and 1998, growing steadily at an average rate of 5.2 percent a year between 2000 and 2010, a pace exceeded only by China and India. Projections indicate that Indonesia's prominence in the global economy will continue to grow. Indonesia is one of six countries that the World Bank believes will account for more than half of all global growth by 2025, the others being Brazil, China, India, South Korea, and Russia.⁴

In short, the Indonesian economy is larger, more stable, and more advanced than many companies and investors around the world realise. In this chapter, we discuss five widely held misperceptions about this fast-changing and dynamic archipelago economy.

MYTH 1: THE INDONESIAN ECONOMY IS RELATIVELY UNSTABLE

Far from being unstable, Indonesia's economy has had one of the most consistent growth rates among global economies over the past ten years. During these years, Indonesia has experienced the least volatility in economic growth of any Organisation for Economic Co-operation and Development (OECD) or BRIC (Brazil, Russia, India, and China), plus South Africa economy in the world (Exhibit 1). From 2000 to 2010, Indonesia's annual GDP growth ranged between 4 and 6 percent. In comparison, annual growth in Malaysia and Thailand in this period has been much more variable, ranging from 9 percent to minus 2 percent during the global financial crisis that began in 2008. Indonesia's recent growth has been supported by high demand for its export commodities combined with a strong domestic market.

Indonesia's macroeconomic management has improved considerably. According to the World Economic Forum's competitiveness report on Indonesia, the country ranked 25th on macroeconomic stability in 2012, an impressive rise from its 2007 ranking of 89th place.⁵ This put the country ahead of BRIC nations (Brazil in 62nd, and India in 99th place) and its ASEAN neighbours (Thailand in 27th, Malaysia in 35th, and the Philippines in 36th place).

4 *Global development horizons 2011: Multipolarity—The new global economy*, World Bank, May 2011.

5 *The Indonesia competitiveness report 2011: Sustaining the growth momentum*, and *The global competitiveness report 2012–2013*, World Economic Forum, June 2011 and June 2012.

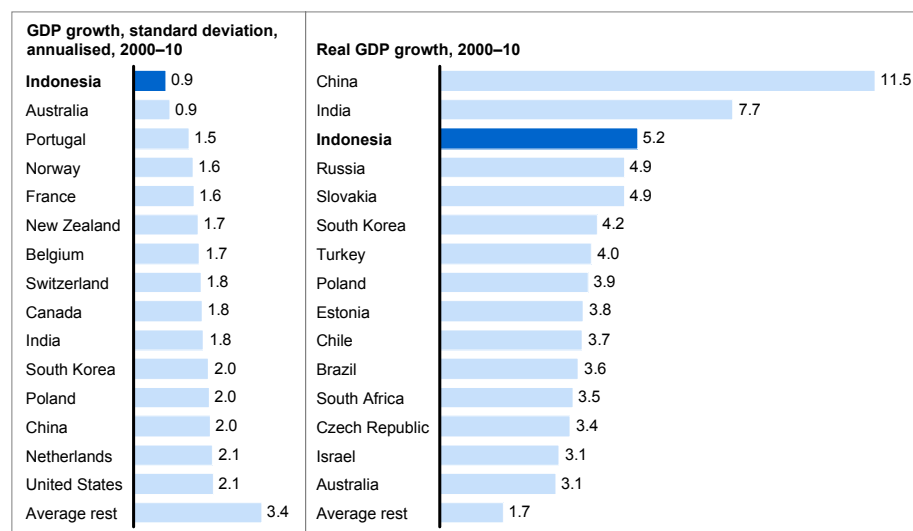
Indonesia's exchange rate is fully floating, and its public finances have been restored to health. Government debt as a share of GDP has fallen by 70 percent from a peak in 2000 of around 90 percent to stand at 25 percent today, a lower ratio than in 85 percent of advanced OECD economies.⁶

Exhibit 1

Indonesia's recent economic growth has been stable

Overview of OECD and BRIC plus South Africa

%



SOURCE: Conference Board Total Economy Database; International Monetary Fund; World Bank; McKinsey Global Institute analysis

Having experienced hyperinflation, which peaked at 1,000 percent per annum in the 1960s, Indonesia's inflation rate now stands at around 8 percent, compared with around 20 percent at the turn of the century. This makes it comparable with rates in more developed economies, such as South Africa and Turkey, although still somewhat higher than in other economies of the region including China, South Korea, Thailand, and Australia. Although Indonesia's economic fundamentals have demonstrably improved, the economy remains vulnerable to negative trends in the international economic environment (see Box 1, "Lessons from the 1997–98 financial crisis").

⁶ Japan is at the extreme end of the scale; its government deficit has been persistently rising over the past 15 years to today's high of 208 percent of GDP. Singapore's government deficit was around 70 percent of its GDP in the late 1990s and now stands at 96 percent.

Box 1. Lessons from the 1997–98 financial crisis

What caused the 1997–98 financial crisis in Indonesia? There are two schools of thought. The first holds that “a combination of panic on the part of the international investment community, policy mistakes at the onset of the crisis by Asian governments, and poorly designed international rescue programmes have led to a much deeper fall in (otherwise viable) output than was either necessary or inevitable”.¹ The second argues that “the crisis reflected structural and policy distortions in the countries of origin” and was triggered by fundamental imbalances, even though “market overreaction and herding caused the plunging of exchange rates, asset prices and economic activities to be more serious than warranted by the initial weak economic conditions”.²

Although the two perspectives disagree on the forces driving the crisis (investor panic and poor rescue programmes versus weak financial fundamentals), there is a consensus that underlying domestic financial weaknesses contributed. These weaknesses included a large amount of foreign short-term debt, which reached \$35 billion in June 1997. Part of this debt was used to finance credit for more speculative investment, such as real estate, rather than increasing productive capacity such as manufacturing for export. By June 1997, the ratio of foreign debt to foreign exchange reserves was 1.7.³

The impact of the crisis was severe. In 1998, the Indonesian economy shrunk by 13.7 percent and fell into deep recession. The worst-hit sectors were construction (minus 39.8 percent GDP growth), finance (minus 26.7 percent), and the retail trade, hotel, and restaurant industry (minus 18.9 percent). Incomes fell and the share of Indonesians living in poverty rose to about 24 percent. The ensuing riots brought an end to the Suharto era.⁴

In contrast, Indonesia has emerged from the 2008 crisis relatively unscathed. In 2009, it was the only country in the G-20 to lower its public debt-to-GDP ratio—reflecting improved economic management over recent years, as well as appropriate policy responses during the crisis. Indonesia was also supported by high terms of trade, largely thanks to strong coal and palm oil prices. However, global economists have cautioned that the economy still needs to be strengthened by a more credible monetary policy, a better financial regulatory framework, and more government spending to support productive investment.⁵

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- 1 Steven Radelet and Jeffrey Sachs, *The onset of the East Asian financial crisis*, Harvard Institute for International Development, March 1998.
 - 2 Giancarlo Corsetti, Paolo Pesenti, and Nouriel Roubini, “What caused the Asian currency and financial crisis?”, January 1998, published in *Japan and the World Economy*, Volume 11, Number 3, 1999.
 - 3 Steven Radelet and Jeffrey Sachs, *The onset of the East Asian financial crisis*, Harvard Institute for International Development, March 1998.
 - 4 Tulus T. H. Tambunan, “Indonesia during two big economic crises 1997/98 and 2008/09: How was the impact and what was the main difference between the two crises?” *E3 Journal of Business Management and Economics*, Volume 2, Number 2, August 2011.
 - 5 Thomas Rumbaugh and Laura Lipscomb, “Indonesia’s economy: Strong with room for improvements,” *IMF Survey Magazine*, September 17, 2010.

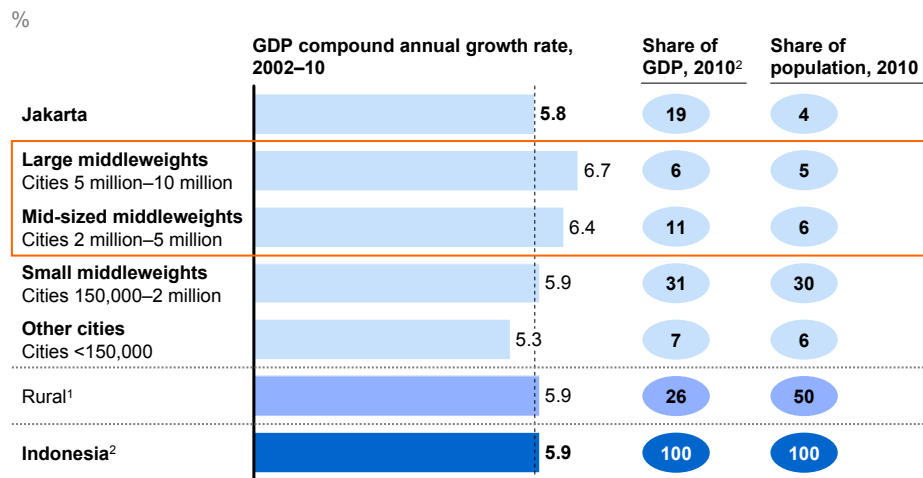
MYTH 2: ECONOMIC GROWTH CENTRES ALMOST EXCLUSIVELY ON JAKARTA

Some assume that Indonesia's growth comes almost entirely from its capital city, but this is not entirely correct. Jakarta is indeed the major contributor to Indonesia's economic output, accounting for between one-fifth and one-quarter of the total if the whole of greater Jakarta—known in Indonesia as *Jabodetabek*—is included. However, a broad swathe of mid-sized cities is outstripping the capital's GDP growth:

- Mid-sized and large middleweight cities.** The economies of mid-sized and large middleweights—with between two million and ten million inhabitants—have been growing at a faster pace than Jakarta (6.7 percent a year for large middleweights and at least 6.4 percent for mid-sized middleweights) since 2002 (Exhibit 2). These cities include Bandung, Bekasi, Bogor, Medan, Surabaya, and Tangerang. Bekasi, Bogor, Depok, and Tangerang are often treated as part of the Jakarta urban agglomeration. The output of these cities is expanding mainly thanks to their high population growth. Bandung (Java) is growing at 6.7 percent a year, while Surabaya (Java) and Medan (Sumatra) are each growing at 7 percent a year, largely driven by productivity improvements.

Exhibit 2

Large and mid-sized middleweights are growing faster than Jakarta



1 We use the definition of urban and rural areas from Indonesia's Central Bureau of Statistics.

2 Model is based on more than 400 cities and districts, covering 90 percent of GDP. GDP is allocated to urban and rural areas based on population share, with a 28 percent premium per capita for urban areas based on historical income differences.

NOTE: Numbers may not sum due to rounding.

SOURCE: 2010 Population Census and Socio-Economy Survey, Indonesia's Central Bureau of Statistics; McKinsey Global Institute analysis

- Small middleweight cities.** Small middleweights are defined as cities (*kota*) or districts (*kabupatens*) with urban populations of between 150,000 and two million. They are growing at an average annual rate of 5.9 percent, on a par with Jakarta. Around 40 percent of the cities in this category are outside Java. Among the fastest-growing cities in this category are Pekanbaru in Sumatra, Pontianak and Balikpapan in Kalimantan, and Makassar in Sulawesi with growth of 9.8, 9.5, 8.6, and 9.0 percent, respectively. The economies of Pekanbaru, Pontianak, and Balikpapan are benefiting from the commodity boom, while Makassar is a key commercial centre for Eastern Indonesia. Growth in small middleweights is, in general, being fuelled by simultaneous growth in their populations and productivity.

- **Other cities.** In our data sample, we also include urban areas with populations of 150,000 or less, which we define as “other cities”. These cities, the vast majority of which are outside Java, are growing from a relatively low starting point at a generally slower pace than other urban areas.

Continuing urbanisation and the expansion of Indonesia's consuming class should help in the delivery of services, including health care and education. Because cities have so many customers in a relatively confined geographic area, supplying such services is cheaper. Moreover, cities tend to have higher numbers of people qualified to deliver health care and education. In Indonesia, the number of primary schools with an undersupply of teachers is 50 percent higher in rural areas than in urban areas.⁷ Given that cities have better access to teachers, urbanisation could therefore help to improve educational attainment across the nation.

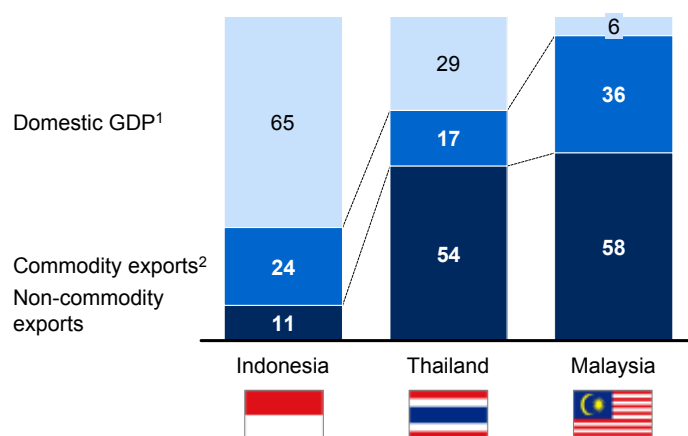
MYTH 3: INDONESIA FOLLOWS THE ASIAN TIGERS' EXPORT-DRIVEN GROWTH MODEL

Asia's constituent economies do not take a homogeneous approach to economic development. The so-called Asian model—driven by investment and exports—is not ubiquitous.⁸ Indonesia is a case in point. In Indonesia, exports generate 35 percent of GDP, a relatively low proportion, with non-commodity exports accounting for only 11 percent. Instead, the economy is fuelled largely by domestic consumption. Indeed, Indonesia's total exports as a share of GDP are roughly half those of Malaysia in 1989 when the average income there was similar to Indonesia's today. The share of non-commodity exports in Indonesia's GDP is about one-third that of Thailand or Malaysia today (Exhibit 3).

Exhibit 3

Non-commodity exports have a lower share of GDP in Indonesia than in Malaysia or Thailand

Share of GDP, 2010
%



¹ Domestic GDP defined as the sum of government and private consumption, fixed investment, and inventory. Import is deducted.

² Includes processed commodities such as CPO, petroleum products.

SOURCE: Bank of Thailand; Bank of Indonesia; Department of Statistics Malaysia; The Economist Intelligence Unit; McKinsey Global Institute analysis

⁷ *Indonesia demographic and health survey, 2002–2003*, Badan Pusat Statistik-Statistics Indonesia and ORC Macro, 2003.

⁸ Vietnam is a case in point. Household final consumption accounts for 65 percent of Vietnam's GDP (compared with just 36 percent of GDP in China), and the economy is balanced relatively equally between manufacturing and services, each of which accounts for about 40 percent of GDP. For more detail, see *Sustaining Vietnam's growth: The productivity challenge*, McKinsey Global Institute, February 2012 (www.mckinsey.com/mgi).

This economic pattern partly reflects Indonesia's lack of a vibrant manufacturing export sector; the upside is that Indonesia's relatively high share of consumption has insulated the economy to a large extent from adverse economic trends overseas, including during the global downturn. Manufacturing today accounts for 25 percent of Indonesia's GDP, down from 28 percent in 2000. The sector's growth, at 3.6 percent a year, is well below average growth across other sectors of the economy.⁹ These recent developments are in marked contrast to the situation in the 1980s and early 1990s when manufacturing was Indonesia's economic growth engine—as it was in Malaysia and Thailand at that time. Indonesian manufacturing posted double-digit growth in almost every year between 1985 and 1996. However, since the deep financial crisis in 1997, manufacturing growth has been weaker and indeed has increasingly lagged behind that of Indonesia's Asian counterparts. While Thailand and Malaysia achieved an increase in the real value of manufacturing output of more than 60 percent between 1997 and 2008 and South Korea registered a 120 percent increase, Indonesia managed only 40 percent growth.¹⁰

Different manufacturing subsectors have varied in their growth performance. Indonesia has largely missed out on the opportunity of joining East Asian networks of electronics production mainly because of its relatively poor infrastructure, which has also constrained growth in its automotive sector.¹¹ Labour-intensive activities such as garment and footwear manufacturing have under-performed due to restrictive labour laws.¹²

Nevertheless, the Indonesian market is of sufficient size for foreign companies to develop manufacturing bases there in order to serve local demand.

MYTH 4: RESOURCES ARE THE ECONOMY'S MAIN DRIVER

Indonesia's resource sector is substantial. Indonesia is the world's largest producer and exporter of palm oil, the second-largest exporter of coal, and the second-largest producer of cocoa and tin, and it has the fourth- and seventh-largest reserves of nickel and bauxite, respectively, according to government data.¹³ But Indonesia's economy is becoming more advanced, and its large endowments of natural resources, including crude oil and natural gas, no longer drive the country's economic development.

The overall share of resource sectors in the economy has declined over the past decade despite soaring resource prices. The mining sector has grown at 0.3 percent a year in real terms, and agriculture by 2.6 percent, compared with annual growth in services of more than 6 percent (Exhibit 4). Mining and oil and gas together account for 11 percent of Indonesia's nominal GDP—identical to the

9 The average growth rate across sectors has been 4.4 percent, according to Indonesia's Central Bureau of Statistics. Variation in price indices explains the difference with the statistics in the Conference Board's Total Economy Database.

10 *Indonesia economic quarterly: Enhancing preparedness, ensuring resilience*, World Bank, December 2011.

11 Robert E. Lipsy and Fredrik Sjöholm, "Foreign direct investment and growth in East Asia: Lessons for Indonesia," *Bulletin of Indonesian Economic Studies*, Volume 47, Issue 1, March 2011.

12 Haryo Aswicahyono, Hal Hill, and Dionisius Narjoko, "Industrialisation after a deep economic crisis: Indonesia," *The Journal of Development Studies*, Volume 46, Number 6, 2010.

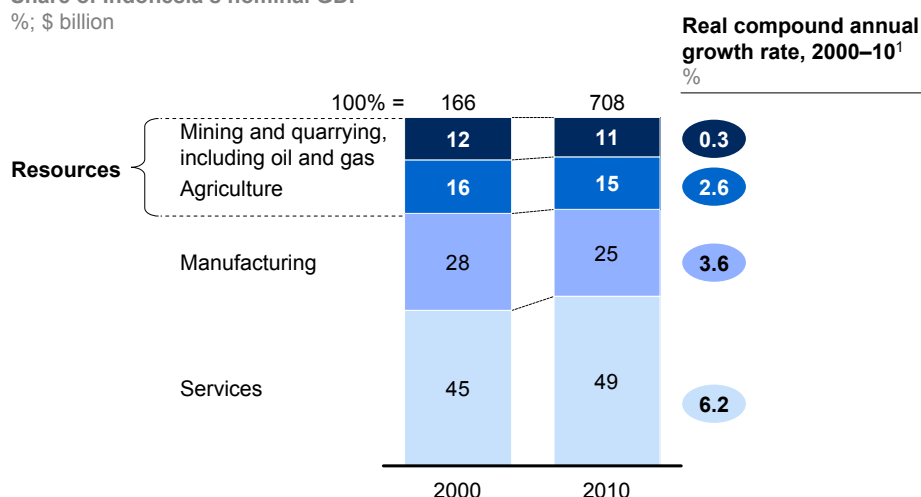
13 *Masterplan: Acceleration and expansion of Indonesia economic development 2011–2025*, Coordinating Ministry for Economic Affairs, Republic of Indonesia, 2011.

share of these sectors in Russia and slightly higher than the 8.4 percent share in Australia. Indonesia is sometimes still perceived as a large oil producer, thanks to its past role in the Organization of the Petroleum Exporting Countries (OPEC). However, Indonesia has been a net importer of oil since 2004, and the steady decline in Indonesia's oil production that has occurred since 2000 is expected to continue as its fields mature.

Exhibit 4

The resource sector's share of the economy has fallen between 2000 and 2010

Share of Indonesia's nominal GDP
%; \$ billion



¹ The compound annual growth rate is calculated based on 2000 real prices.

NOTE: Numbers may not sum due to rounding.

SOURCE: Indonesia's Central Bureau of Statistics; McKinsey Global Institute analysis

Nevertheless, resources, in particular palm oil, coal, and oil and gas, remain critical to Indonesia's trade balance as they represent 68 percent of exports. High prices, notably for coal and palm oil, have until recently underpinned favourable terms of trade for Indonesia, but, given current fluctuations in resource prices, the sensitivity of the trade balance to resource exports remains a source of concern. Indonesian coal prices fell by 10 percent between January and June 2012—one explanation for the country's current trade deficit. Such fluctuations in global resource prices could result in instability in Indonesia's currency and even risk the stability of the economy as a whole.

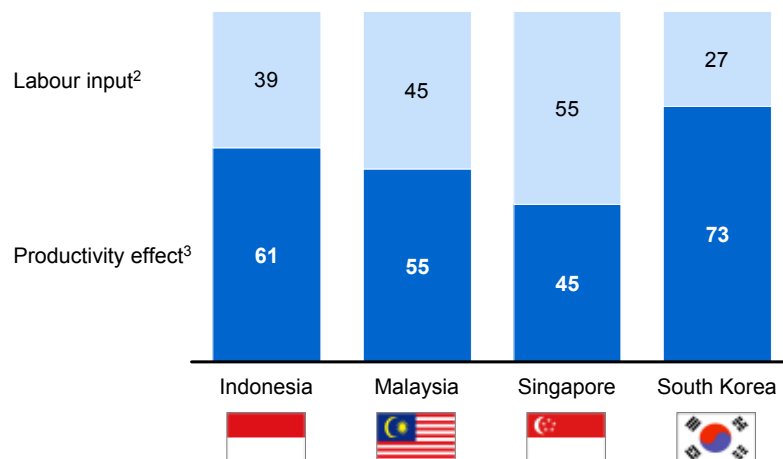
MYTH 5: GROWTH HAS COME LARGELY FROM AN EXPANDING WORKFORCE

Contrary to conventional wisdom, improving productivity, rather than a higher number of workers, has been the most important driver of Indonesia's recent growth. Labour productivity has grown at a rate of almost 3 percent a year over the past decade, among the highest rates observed in ASEAN countries (albeit from a low starting point). Indeed, higher productivity has accounted for just over 60 percent of Indonesia's overall growth over the past two decades, more than in Malaysia, where it accounted for 55 percent of growth over the same period, or Singapore, where it was 45 percent of growth. Expanding labour inputs have accounted for less than 40 percent of Indonesia's growth, while they have been a more important driver of growth in both Malaysia and Singapore (Exhibit 5).

Exhibit 5

Indonesia's growth has been driven mainly by productivity increases

Contribution of labour input and productivity increases to overall GDP increase, 1990–2010¹
%



¹ Productivity is based on GDP contribution per employee over 20 years.

² Higher labour input reflects increased population and changes in participation and employment rates; calculated as a residual.

³ Labour productivity growth is measured as real GDP per employee times the average employment over the 20 years.

SOURCE: The Conference Board Total Economy Database; McKinsey Global Institute analysis

One might assume that Indonesia's relatively strong productivity performance results from its evolving mix of sectors, especially the declining weight of agriculture. It is certainly true that, between 1990 and 2010, the share of jobs in agriculture in national employment dropped by 18 percent and that service sectors largely filled the gap. However, we find that the majority of Indonesia's productivity gain has come not from a shift of workers from lower-productivity agriculture into more productive sectors, but from productivity improvements within sectors. The three sectors that have made the biggest contributions to overall productivity improvements are wholesale and retail trade, transport equipment and apparatus manufacturing, and transport and telecommunications.

Despite Indonesia's strong progress on productivity, however, average labour productivity across sectors is still only around half of Malaysia's. Approximately 80 percent of the gap is explained by the performance of the retail trade, manufacturing, transport and telecommunications, and agriculture sectors (Exhibit 6).

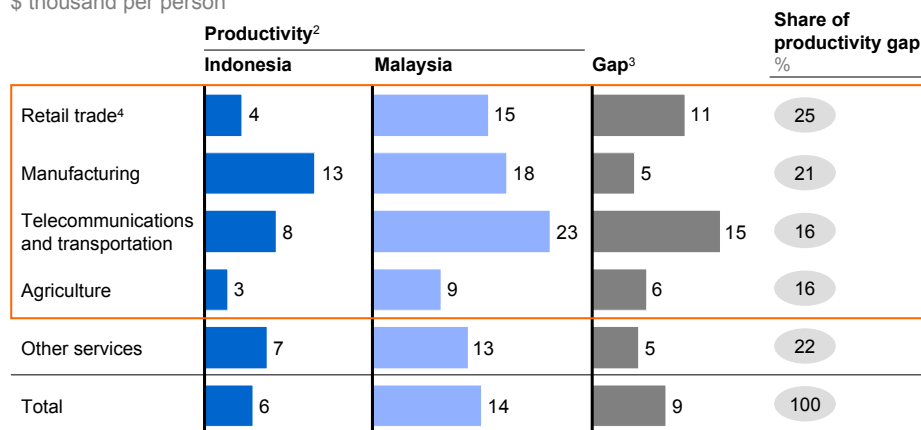
Higher productivity has not led to lower employment. Indeed, Indonesia has posted significant productivity gains across sectors at the same time that employment has increased in 35 of the past 51 years (Exhibit 7). This pattern is similar to the experience of developed countries, including Japan and Canada. Since 1960, Indonesia's productivity has increased by 255 percent and employment by 230 percent.¹⁴ Between 2000 and 2010, telecommunications outshone all other sectors in Indonesia with a productivity improvement of more than 150 percent and a net increase in employment of 5 percent. Employment has expanded across the economy. With the sole exception of the electricity, gas, and water sector, where employment was static, every sector has created net new jobs.

Exhibit 6

Retail trade, manufacturing, telecommunications and transportation, and agriculture explain 80 percent of the productivity gap with Malaysia

Productivity levels and gap, 2010¹

\$ thousand per person



1 Mining and quarrying excluded due to data inconsistencies.

2 Productivity is based on GDP contribution per employee.

3 Gap is Malaysia productivity minus Indonesia productivity.

4 Retail trade includes hotel and restaurants.

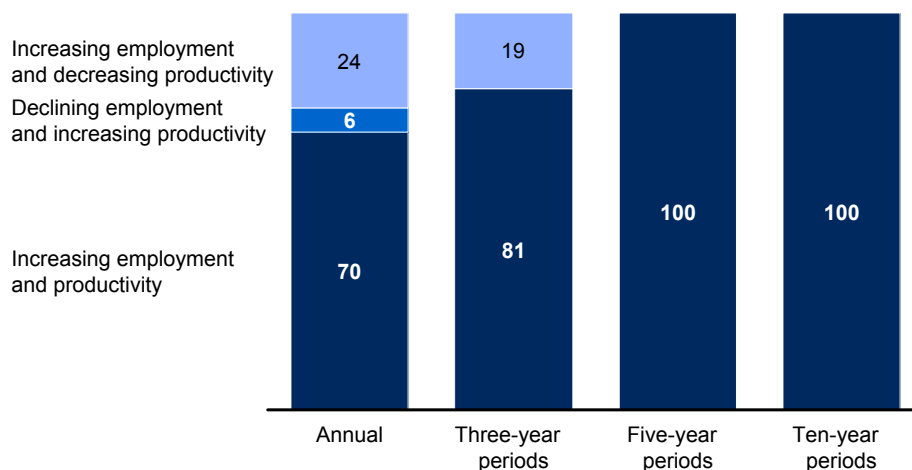
SOURCE: Indonesia's Central Bureau of Statistics; Department of Statistics Malaysia; Malaysia Productivity Corporation; McKinsey Global Institute analysis

Exhibit 7

Growth in past decades has been characterised by rising productivity and employment

Rolling periods of employment and productivity change, 1960–2010

%



SOURCE: The Conference Board Total Economy Database; McKinsey Global Institute analysis



Perhaps the biggest surprise about Indonesia's economy is that the main driver of its recent growth has not been its large labour pool (Indonesia is, after all, the world's fourth most populous country), but improving labour productivity. In spite of its strong economic performance over the past decade, Indonesia still faces significant challenges. In response, the analysis suggests that Indonesia will need to consider how best to boost productivity growth, address inequality, and manage soaring demand from its expanding consuming class. Volatile resource prices, particularly for coal, are already troubling its trade balance. In the next chapter, we discuss Indonesia's future growth prospects.

2. Indonesian growth could benefit from powerful trends

Indonesia can expect continued strong economic growth to 2030. Our base case, which uses conservative assumptions, sees average annual GDP growth of 5 to 6 percent a year to 2030, compared with the government's 7 percent target.¹⁵ Citigroup estimates that Indonesia could overtake Germany and the United Kingdom to become the seventh-largest economy in the world by 2030 after China, the United States, India, Japan, Brazil, and Russia.¹⁶

Indonesia's economic growth is benefiting from a number of powerful positive ongoing trends. Asia's renaissance, powered by urbanisation, is a piece of geographical and historical good fortune for Indonesia that is already fuelling its exports. The expansion of a consuming class with considerable spending power across Asia and in Indonesia itself promises new markets overseas and also a more vibrant domestic market at home. These consumers are already pushing up demand for Indonesian exports, including agricultural products and energy. And, in contrast to the many regions whose rapidly aging populations are constraining growth, Indonesia has a young population with the potential to do the opposite.

INDONESIA LIES AT THE HEART OF A RESURGENT ASIA

Of the 1.8 billion people who will join the global consuming class over the next 15 years, more than 75 percent will likely be in Asia.¹⁷ This economic transformation is creating unprecedented prosperity. We estimate that there will be 4.2 billion members of the global consuming class by 2025, compared with 1.2 billion in 1990. Urbanisation has been the main driver of rising incomes in Asia, as it has been elsewhere in the world over a long period—urbanisation and per capita GDP tend to grow together. For Indonesia, this extraordinary development in its home economic region promises a surge of demand for the resources and commodities that the country supplies and potentially for other activities such as tourism and the export of manufactured goods.

Asia accounted for the majority of global economic activity until 1500 but, in the 18th and 19th centuries, urbanisation and industrialisation made Europe and the United States more prominent. Now the balance of economic power is shifting back toward Asia at a speed and on a scale never before seen. It took

15 Our base-case projection for economic growth assumes changes in the working-age population as the population increases, projected unemployment rates per educational level, and that labour productivity growth is maintained at historical rates.

16 *Global economics view*, Citigroup Global Markets, September 2011. Our projection appears to be in line with the views of other forecasters. For instance, Global Insight estimates annual growth rates ranging from 5.1 to 6.1 percent a year over the next decade. The US Department of Agriculture's Economic Research Service projects an average annual growth rate of 5.1 percent between 2012 and 2030 with ranges from 4.7 to 6.7 percent. The International Monetary Fund (IMF) projects a growth rate of 6.1 to 7 percent between 2012 and 2017. Standard Chartered Bank projects Indonesia to be the sixth-largest economy in the world by 2030.

17 *Urban world: Cities and the rise of the consuming class*, McKinsey Global Institute, June 2012 (www.mckinsey.com/mgi).

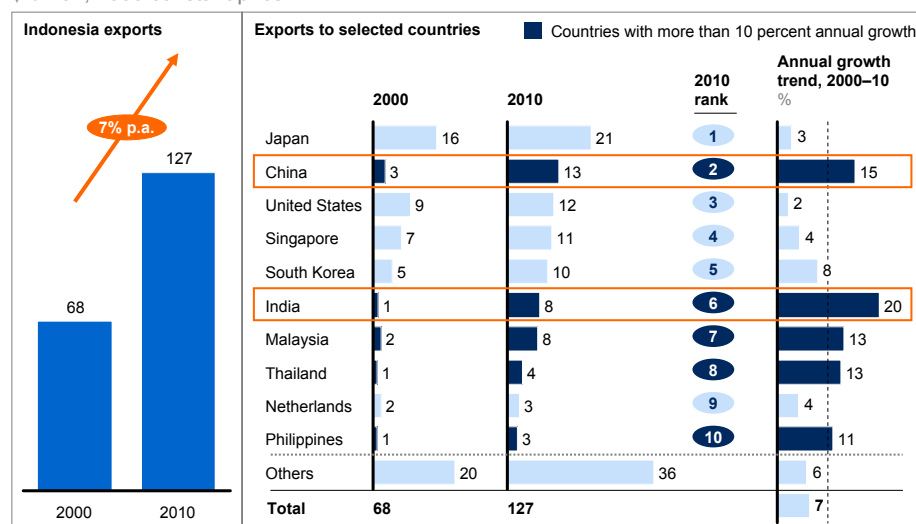
Britain 155 years in the 18th and 19th centuries to double per capita GDP for its population, which numbered nine million at the start of that period. The United States achieved this feat in 53 years, starting with a population of ten million in 1820. Japan doubled per capita GDP in 33 years between 1906, when its population numbered 47 million citizens, and 1939. India did the same in just 17 years, between 1989, when the population was 820 million, and 2006. China has passed the same milestone for one billion people in only 12 years between 1983 and 1995.

Indonesia's exports to other Asian economies, particularly China and India, have already accelerated strongly in recent years (Exhibit 8). Consider its largest exports today—palm oil and coal. In 2010, Indonesia exported \$3.8 billion of palm oil and \$2.0 billion of coal to India and \$2.1 billion of palm oil and \$3.6 billion of coal to China (making China its largest export market for coal). Rising demand for food in the region also creates scope for Indonesia to revolutionise its agricultural industry from a domestic provider into an international food hub (see chapter 3 for a detailed discussion).

Exhibit 8

Asia's renaissance is fuelling growth in Indonesia's exports, particularly to China and India

\$ billion, 2000 constant price



NOTE: Numbers may not sum due to rounding.

SOURCE: Indonesia's Central Bureau of Statistics; McKinsey Global Growth model; McKinsey Global Institute analysis

URBANISATION IS INCREASINGLY DRIVING GROWTH—AND MIDDLEWEIGHT CITIES WILL BE PARTICULARLY IMPORTANT

Urbanisation in Indonesia is an increasingly important stimulus to economic growth. The urbanisation rate—the share of the population living in cities—could reach 71 percent in 2030 from 53 percent today as an estimated 32 million people are expected to move from rural to urban areas over the period 2010 to 2030.¹⁸ By 2030, an additional 72 million people could live in urban areas. Jakarta could become a megacity—defined as a city with ten million or more inhabitants—

¹⁸ The urbanisation forecast is in line with a forecast of 67.5 percent to 2025 by the World Bank in the report, *Indonesia, The rise of metropolitan regions: Towards inclusive and sustainable regional development*. See the appendix for more detail on our calculations.

with a population of more than 12 million by 2030. The city's population is growing at 1.1 percent a year, 0.3 percentage points higher than the national rate of population growth. However, Jakarta's economic prominence appears to have reached a plateau. After years of rapid population and GDP growth, Jakarta's GDP is not expected to expand faster than national GDP between now and 2030, and we expect Jakarta's share of national GDP to remain stable at around 20 percent.

Other cities are growing at a faster average rate. This means that small middleweights will increase their share of GDP to 37 percent from 31 percent today. Large and mid-sized middleweights, with populations between two million and five million, are growing at the fastest pace and could together make up 27 percent of GDP by 2030 from 17 percent today (Exhibit 9). Around 90 percent of the urban areas whose economies are growing faster than 7 percent per annum will be outside the island of Java, where the Indonesian capital is located (Exhibit 10). This pattern of middleweight cities closing the gap with their larger cousins is a pattern we are seeing throughout the emerging world with some variations.¹⁹ Three cities that could double their populations from around one million today to about two million by 2030 are Batam, Pekanbaru, and Makassar (see Box 2, "Future mid-sized middleweights: Batam, Pekanbaru, and Makassar").

Expanding cities will require significant amounts of investment. We estimate that \$150 billion of investment in infrastructure such as housing, water, commercial buildings, and transportation will be necessary to keep pace with urban demand. Without such investment, cities risk running into the type of growth constraints that many very large cities in Latin America are experiencing due to a lack of investment in infrastructure as they expanded.²⁰ Latin America's largest cities are now being outpaced in terms of their growth by the region's middleweights.²¹ We can already see Jakarta suffering from infrastructural inadequacies, and, if the pattern that is playing out in Latin America and other regions occurs in Indonesia, the capital city's population and GDP growth could wane as a result. Indonesia arguably needs to invest a great deal more than the 4 percent of GDP it spends

19 Take India, for comparison. MGI research has found that by 2030, the number of cities in India's urban landscape will increase by half. However, in India and China, the expansion of existing very large cities into megacities will be a major driver of growth, while emerging new cities will be Indonesia's urban growth dynamos. MGI analysis finds that 443 cities in developing economies—dubbed the Emerging 440—will account for 47 percent of expected global GDP growth between 2010 and 2025. This group includes 20 megacities (with populations of ten million or more) that are expected to grow at a compound annual rate of 7.6 percent during this period. The rest of the cities in this group are middleweights (with populations of between 200,000 and ten million), and these economic dynamos are expected to grow at an even faster rate of 8 percent annually. See *Urban world: Cities and the rise of the consuming class*, McKinsey Global Institute, June 2012 (www.mckinsey.com/mgi).

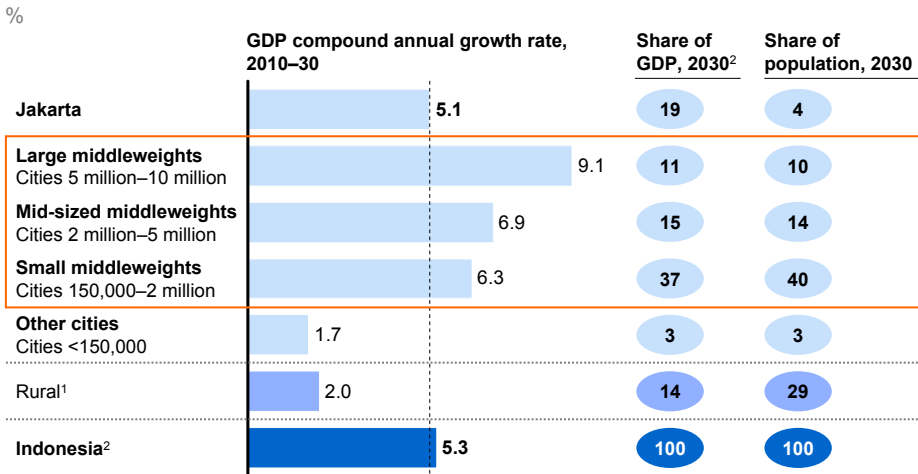
20 The \$150 billion assumes that the investment share of GDP is 7 percent, similar to China's investment today.

21 In Latin America, MGI research finds that, between 2007 and 2025, the region's top ten cities will post below-average growth in both population and GDP, while the rest of Latin America's large cities are likely to expand their populations at an above-average rate. These cities are projected to generate almost 40 percent of the region's overall growth between 2007 and 2025, almost 1.5 times the growth the top ten cities are expected to generate. The reason for this shift in the balance of urban economic power is that Latin America's largest cities are beginning to suffer from diseconomies of scale, such as congestion and pollution. These have started to outweigh scale benefits, diminishing the quality of life they can offer citizens and sapping their economic dynamism. See *Building globally competitive cities: The key to Latin American growth*, McKinsey Global Institute, August 2011 (www.mckinsey.com/mgi).

on urban infrastructure today, mainly on electricity and roads; its investment is significantly less than China’s 7 percent. Our estimates suggest that the nation’s capital stock should increase by a factor of ten to 2030, but finding enough capital to finance huge infrastructure needs at an affordable cost will not be easy.

Exhibit 9

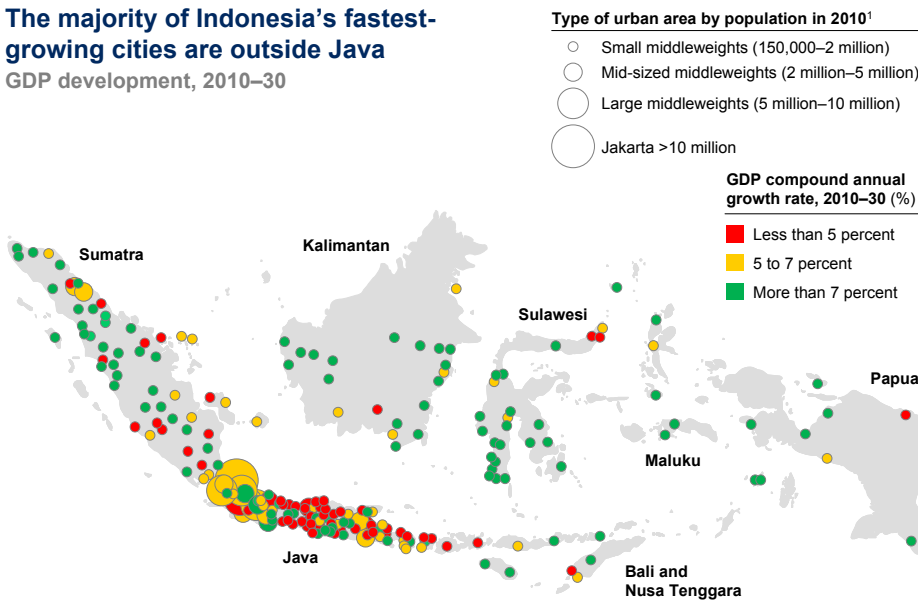
Large, mid-sized, and small middleweight cities will continue to grow faster than Jakarta



1 We use the definition of urban and rural areas from Indonesia’s Central Bureau of Statistics.
2 Model is based on more than 400 cities and districts, covering 90 percent of GDP. GDP is allocated to urban and rural areas based on population share, with a 28 percent premium per capita for urban areas based on historical income differences.
NOTE: Numbers may not sum due to rounding.
SOURCE: 2010 Population Census and Socio-Economy Survey, Indonesia’s Central Bureau of Statistics; McKinsey Global Institute analysis

Exhibit 10

The majority of Indonesia’s fastest-growing cities are outside Java
GDP development, 2010–30



1 Urban areas are aggregated areas consisting of cities (kota) and districts (kapupaten) rather than specific city jurisdictions.
SOURCE: 2010 Population Census, Indonesia’s Central Bureau of Statistics; McKinsey Global Institute analysis

Box 2. Future mid-sized middleweights: Batam, Pekanbaru, and Makassar

While growth among Java's cities is expected to slow between now and 2030, a number of cities outside Java will grow rapidly over the period.

Batam (Sumatra). We expect Batam to grow at 6.4 percent per annum. The city is benefiting from the SIJORI (Singapore-Johor-Riau) Growth Triangle that was started in 1989. The governments of Indonesia and Singapore signed a memorandum of understanding on a free trade zone that includes Batam and Bintan. The memorandum offers foreign investors incentives, including a liberal tax regime and streamlined official administration, which, for example, has resulted in relatively mature infrastructure.

Pekanbaru (Sumatra). This city's economy has been one of the fastest growing over the past ten years, with a 9.8 percent compound annual growth rate fuelled by the commodity boom. By 2030, the city could have a population of 1.9 million, double its size today. Largely driven by this growing population, Pekanbaru's GDP will grow at an average of 7.3 percent a year to 2030, we project. We expect a similar commodity-driven growth story in Balikpapan.

Makassar (Sulawesi). This is the trade centre of eastern Indonesia. Over the past ten years, Makassar's economy has grown at 9 percent a year, largely due to productivity growth. We project that the city will maintain rapid GDP growth of 7.1 percent a year. By 2030, Makassar could have a population of 1.9 million.

INDONESIA'S YOUNG POPULATION COULD BOOST THE WORKFORCE BY MORE THAN 40 MILLION BY 2030

Indonesia has one of the world's youngest demographic profiles—60 percent of the population is below 30 years of age, and the population is growing at a rate of 2.5 million a year. The United Nations Population Division estimates that the population could reach 280 million by 2030 from around 240 million in 2011. We expect around 70 percent of the overall population in 2030 to be of working age (between 15 and 64) and 10 percent to be below the age of 15.

Unlike the many countries and regions around the world grappling with constraints on growth caused by their aging populations, Indonesia has the potential to continue to reap a demographic dividend. We estimate that the employed workforce could rise to 152 million in 2030 from 109 million today and that this additional labour could add about 2.4 percentage points a year to GDP. In addition, a rise in the rate of women's participation in the labour force from 54 percent today to 64 percent by 2030 could potentially add 20 million more skilled workers (see chapter 3 for more detail).

To take advantage of favourable demographics while they last, Indonesia will need to address relatively low rates of participation in the labour force, particularly among women, and what is likely to be a substantial gap between the supply and demand for skilled labour. Indonesia had a 5 percent literacy rate at independence in 1949 and only 123 middle schools for 70 million people. The

older generation, in short, received very little education. Since independence, Indonesia has made considerable progress in improving its educational provision, but ensuring that the economy has sufficient skills to support robust growth remains a challenge (see chapter 3 for a detailed discussion).

INDONESIA COULD TAKE ADVANTAGE OF DISRUPTIVE TECHNOLOGIES

Over the next decade, Indonesia could seize opportunities presented by disruptive or game-changing technologies, including developments in digital communications and in the resources field. In 2010 there were 220 million registered mobile subscriptions in Indonesia.²² The Internet is also becoming mainstream. Growing at an annual rate of more than 20 percent, Internet access is expected to reach 100 million users by 2016, dramatically improving connectivity. The majority of Indonesian Internet users are relatively new to the medium, and this gives the fast-growing number of organisations using digital media an opportunity to shape online behaviour. There are clearly implications for how companies inform and influence consumers about their products and services and how they enable consumers to transact with them. With more than 40 million users, Indonesia is the fourth-largest market for Facebook, behind only the United States, Brazil, and India, indicating Indonesians' enthusiasm for, and ease with, digital applications. Indonesia has a solid platform from which to launch e-commerce. Drawing on the Digital Consumer Asia survey, we estimate that only about 5 percent of Internet users engage in e-commerce.²³ However, this figure is expected to rise as consumer confidence in the reliability and risk protection of credit card transactions improves. In addition, providers of public goods such as health and education might also use digital media to improve access.

Despite this strong growth in Internet access, research in Asia shows that Indonesia's broadband penetration lags behind that of its peers. Vietnam, for instance, has more than 4 percent broadband penetration, compared with Indonesia's 1 percent. The World Bank has found that, in low- and middle-income countries, every 10 percentage point increase in broadband penetration accelerates economic growth by 1.4 percentage points—more than in high-income countries and more than is the case with other telecommunications services.²⁴ We expect that mobile Internet will continue to be the preferred channel in Indonesia. However, investing to achieve regional broadband coverage on a par with Asia's leading broadband nations would be worthwhile for the productivity gains it would bring. We estimate that investment of \$20 billion is required to cover 20 percent of the most densely populated areas of Indonesia.

Digital technologies are not the only ones showing promise for Indonesia. Green technologies could dramatically change the country's resource markets. For instance, Indonesia is well positioned in renewable energies, with the largest geothermal resources in the world (see chapter 3 for more detail).

22 *World development indicators*, World Bank, 2010.

23 The Digital Consumer Asia survey is part of a broader McKinsey effort called iConsumer China. This is a customer survey developed to understand changing consumer behaviour across digital experiences. For more information, see csi.mckinsey.com/knowledge_by_topic/digital_consumer.

24 *Information and communication for development: Extending reach and increasing impact*, World Bank, 2009.

AN ADDITIONAL 90 MILLION PEOPLE COULD JOIN INDONESIA'S CONSUMING CLASS

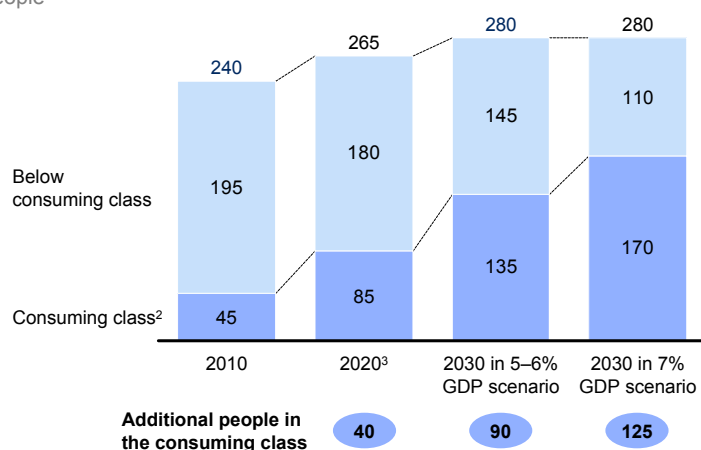
If Indonesia's GDP growth to 2030 is aligned with our base-case projection of 5 to 6 percent a year, an additional 90 million Indonesians could join the ranks of the consuming class by 2030 (Exhibit 11). In this scenario, the consuming class could increase in number from 45 million in 2010 to 135 million by 2030.²⁵ If Indonesia were to achieve 7 percent annual growth up to 2030, then the consuming class would be 170 million strong in that year, an increase of 125 million individuals.

A jump of 90 million in the number of consumers with enough income to purchase not just basic necessities such as food and clothing but also discretionary goods and services would be the largest increase expected in any country in the world apart from China and India. It would more than double the growth in the overall populations of Brazil and Egypt, both of which are populous and rapidly growing nations.

Exhibit 11

An estimated 90 million Indonesians could join the consuming class by 2030

Million people¹



¹ Rounded to the nearest five million.

² Consuming class defined as individuals with an annual net income of above \$3,600 at 2005 purchasing power parity (PPP).

³ Based on annual GDP growth of between 5 and 6 percent.

SOURCE: McKinsey Consumer and Shopper Insight (CSI Indonesia 2011); 2010 Population Census, Indonesia's Central Bureau of Statistics; Canback Global Income Distribution Database (C-GIDD); McKinsey Global Growth Model; McKinsey Global Institute Cityscope 2.0; McKinsey Global Institute analysis

²⁵ We define the consuming class as individuals with annual net income of more than \$3,600 in 2005 PPP terms.



Indonesia has many advantages by virtue of its location, its young population, and its continuing urban shift. But it faces major challenges, too. Rising prosperity is propelling millions more into the consuming class in Indonesia—and across Asia—and this is a significant boost to GDP growth. But surging demand for a range of products and services will inevitably strain Indonesia's natural and capital resources. In the next chapter, we discuss the challenges that Indonesia faces and suggest action in four priority areas to help meet them.

3. Meeting the challenges facing Indonesia

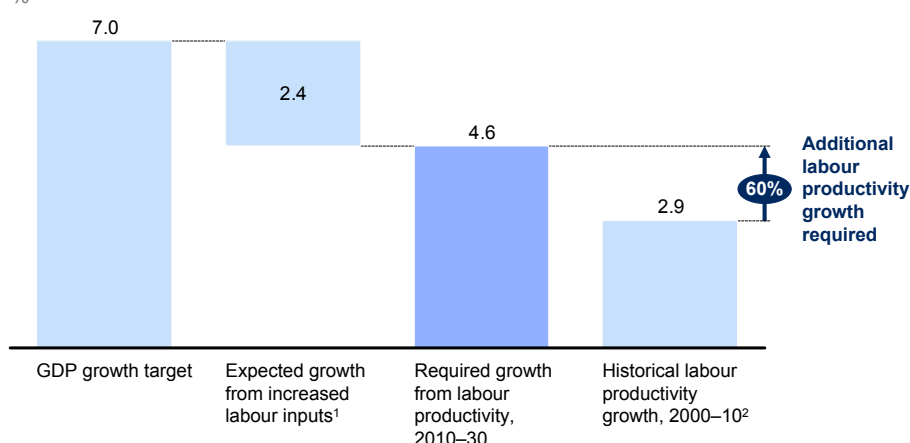
Indonesia is poised to continue its impressive economic performance of recent years, but major challenges also lie ahead. We see imperatives on three fronts—productivity, inclusivity, and managing the strains created by surging demand from Indonesia's army of new consumers.

Meeting the productivity imperative is the first major task ahead. Addressing this issue, particularly in local the services that explain more than 60 percent of Indonesia's productivity gap with Malaysia, for instance, will be crucial for Indonesia's future economic success. On current productivity trends, we see the economy posting annual average GDP growth of 5 to 6 percent to 2030. But if Indonesia is to meet the government's growth target of 7 percent annual growth, it will have to achieve a significant acceleration in productivity growth. We estimate that Indonesia would need to boost the rate of labour productivity growth to 4.6 percent a year—60 percent higher than in the past decade (Exhibit 12). Annual productivity growth of 4.6 percent is significantly faster than the 4 percent a year Indonesia achieved between 1970 and 1990, and that was from a low base.²⁶ And the necessary rate of growth that Indonesia now needs to post is a pace that very few countries—Singapore and South Korea among them—have achieved.

Exhibit 12

Achieving Indonesia's 7 percent annual GDP growth target will require labour productivity to grow 60 percent faster than in 2000–10

Annual real GDP growth rates
%



1 Driven by additional workers joining the workforce due to demographics and increased participation in workforce; productivity assumed to be the average in 2010–30 based on a business-as-usual growth rate of 5 to 6 percent.

2 Based on an average among national and international data sources.

SOURCE: CEIC Data; Indonesia's Central Bureau of Statistics; Conference Board Total Economy Database; International Monetary Fund (IMF); United Nations Population Division; McKinsey Global Institute analysis

26 Chris Manning, "Approaching the turning point? Labour market change under Indonesia's new order," *Developing Economies*, Volume 33, Issue 1, May 1995.

The second major challenge for Indonesia is to ensure that growth is as inclusive as possible. Not every Indonesian is sharing in the fruits of the hard-won economic stability and robust growth of recent years. Indonesia has large income inequalities. As much as half of the population lives on less than \$2 a day, according to the World Bank. There are large variations in incomes between provinces, and many Indonesians have only limited access to health care and education (see Box 3, “Indonesia’s human development challenge”).

The third challenge is how to manage soaring demand from the nation’s expanding consuming class. The major expansion of Indonesia’s consuming class expected to 2030 will put pressure on energy, food, and water resources as well as available capital at a time when that capital may well be scarce.²⁷ The way that Indonesia manages these strains will have a significant impact on the performance of the economy.

Excessive bureaucracy and corruption, insufficient access to capital, and infrastructure bottlenecks are widely discussed issues in Indonesia. However, we believe that there are barriers to growth in three key sectors of the economy (consumer services, agriculture and fisheries, and resources) that have been less discussed but are nonetheless priorities for urgent action. In addition, across the economy, Indonesia could usefully address the important issue of developing sufficient human capital to support robust economic growth given projections of a significant skills gap in coming years. We now discuss these three sectors and the human capital challenge in turn.

27 Previous MGI research found that long-term trends in global saving and investment that contributed to low rates in the past will reverse in the decades ahead, primarily because developing economies are embarking on one of the biggest building booms in history. See *Farewell to cheap capital? The implications of long-term shifts in global investment and saving*, McKinsey Global Institute, December 2010 (www.mckinsey.com/mgi).

Box 3. Indonesia's human development challenge

On average, a child born in Indonesia today can expect live to 17 years longer and receive four more years of education than a child born 30 years ago. However, much remains to be done. Indonesia ranks only 124th out of 187 countries and below the regional average on the United Nations' Human Development Index, which measures development along the dimensions of health, education, and income.¹ Indonesia has responded by approving a new health and workforce social insurance law, scheduled to be in full effect by 2014.² The details are still being developed, but the aim of this law is to guarantee people, especially those on lower incomes, improved access to health care, including hospital care, medicines, medical treatment, and surgery.³

There is substantial room for improving the quality of health care. Indonesia has fewer hospital beds and fewer physicians per 1,000 people than either Laos or Vietnam.⁴ Regional inequality is also marked—a resident of West Nusa Tenggara can expect to live 15 years less than a resident of Yogyakarta, where infant mortality is also more than four times lower.⁵ Part of the reason for this is underinvestment in health care. In recent years, Indonesia has spent between 2 and 3 percent of GDP on health care, compared with 7 percent in Vietnam.⁶

Finally, large income inequalities exist in Indonesia. According to the Indonesian Central Bureau of Statistics, 12.5 percent of all Indonesians were living below the poverty line in 2011 (defined as earning less than \$1 a day). The World Bank's estimate, based on a poverty line of \$2 a day (PPP-adjusted) is much higher. Using this measure, nearly half the population is deprived—more than in Sudan, where the equivalent figure is 44 percent, and Vietnam with 43 percent.⁷ There are also large income inequalities between regions; residents of Papua and East Nusa Tenggara, for example, are over four times more likely to be deprived than those in Jakarta.⁸ Although the Indonesian economy is expected to continue to post robust economic growth to 2030, this growth could have an unequal impact across different parts of Indonesia, and on income groups within those regions, and many Indonesians may remain in poverty.

1 *Human development report 2011—Sustainability and equity: A better future for all*, United Nations Development Programme, November 2011.

2 Law number 24, 2011.

3 *Indonesia health profile 2008*, Indonesian Ministry of Health, 2010.

4 *World development indicators*, World Bank, 2008–2011; Claudia Rokx et al., *New insights into the provision of health services in Indonesia*, World Bank, 2010.

5 Claudia Rokx et al., *Health financing in Indonesia: A reform road map* (Washington, DC: World Bank, 2009).

6 *World development indicators*, World Bank, 2010.

7 Ibid.

8 *Country briefing: Indonesia*, Oxford Poverty and Human Development Initiative, University of Oxford, Department of International Development, 2011.

3.1 Transform consumer services

In contrast to many other Asian economies, the major drivers of Indonesian growth are domestic consumers, rather than manufacturing and exports. Consumption generated 61 percent of GDP in 2010, a share expected to increase to 65 percent by 2030. Consumption of services is particularly important. Service sectors are growing at an annual rate of 6.2 percent, compared with the economy's overall GDP growth of 5.2 percent. In 2010, Indonesia's service sectors accounted for 49 percent of GDP. This distinctive mix has profound implications for the archipelago's economic development.

Around 50 percent of all Indonesians could be members of the consuming class by 2030, compared with 20 percent today. This presents a potentially major opportunity for consumer-facing service companies. Another way of measuring the consumption opportunity is by looking at households. Using McKinsey's Indonesia Consumer and Shopper Insight survey, we have estimated the potential size of Indonesia's consumer-facing markets in 2030 measured by changes in household income as the economy grows (see the appendix for more detail).

We use four income brackets in this analysis (based on 2005 dollars at PPP): (1) household income of less than \$7,500 a year (equivalent to 47 million Indonesian rupiah at the 2011 price level); (2) between \$7,500 and \$20,000 (47 million rupiah to 127 million rupiah); (3) between \$20,000 and \$70,000 (127 million rupiah to 443 million rupiah); and (4) more than \$70,000 (more than 443 million rupiah). As households move up through these brackets, the share of income they spend on discretionary goods and services increases and the share they devote to basic necessities shrinks (Exhibit 13).

Overall, household consumer spend in urban areas of Indonesia could increase at an annual rate of 7.7 percent in real terms—an estimated \$1.1 trillion business opportunity by 2030. This growth opportunity is based on a conservative growth estimate of 5 to 6 percent. If 7 percent annual growth were to be achieved, the opportunity would rise to \$1.5 trillion.

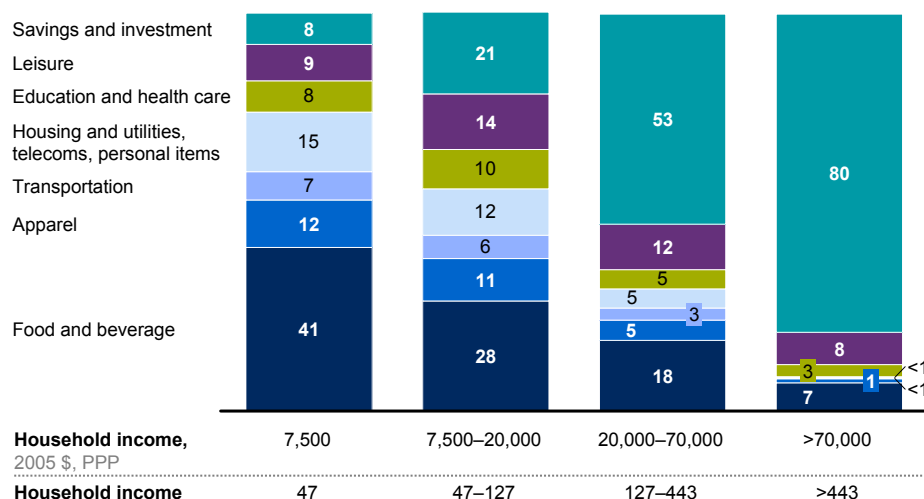
We now discuss some key consumer services subsectors that are expected to post rapid growth and where it is particularly important for Indonesia to act to remove any constraints on growth. They are the financial services industry, specifically savings and investment; retail; and telecommunications. Savings and investment is expected to be the fastest-growing consumption segment, with double-digit growth between 2010 and 2030 (Exhibit 14).

Exhibit 13

Discretionary spending increases as households become wealthier

Share of annual household spend

%



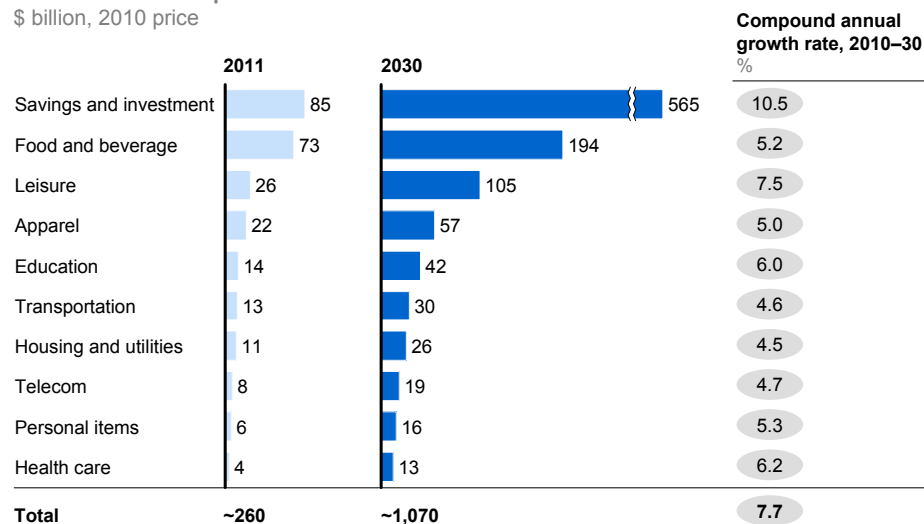
SOURCE: Consumer and Shopper Insight (CSI) Indonesia survey 2011; McKinsey Global Institute analysis

Exhibit 14

Indonesia's savings and investments and retail sectors are expected to become large consumer markets by 2030

Annual consumer spend

\$ billion, 2010 price



SOURCE: CSI Indonesia survey 2011; Indonesia's Central Bureau of Statistics; Canback Global Income Distribution Database (C-GIDD); McKinsey Global Growth Model; McKinsey Global Institute analysis

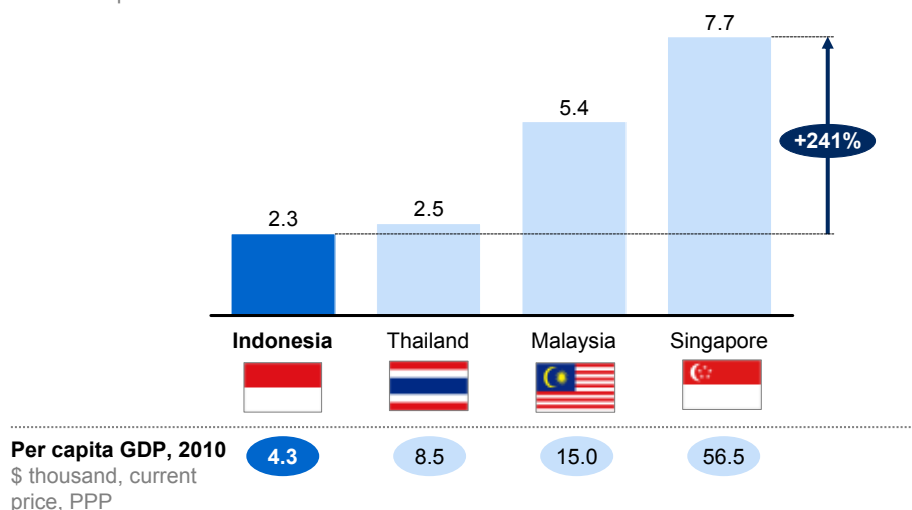
RETAIL FINANCIAL SERVICES COULD GROW MORE THAN ANY OTHER AREA OF CONSUMER EXPENDITURE

Growth in financial services, including banking and non-banking financial institutions, real estate, and business services and insurance, has been running at 6 percent a year over the past decade and today contributes 8 percent of Indonesia's GDP. However, Indonesia's financial services story is still in its early chapters. Financial services have penetrated Indonesia's consumer markets far less than in other Asian countries. In 2011, consumers owned an average of only 2.3 products, up from 2.0 in 2007 but still far fewer than the Southeast Asian average of 3.6 products and well below Malaysia's 5.4 (Exhibit 15). Indeed, Indonesia lags behind other Asian economies on every class of financial product.

Exhibit 15

Indonesia's ownership of financial products is low compared with the level in other Southeast Asian economies

Average financial product ownership per capita
Number of products



SOURCE: McKinsey Asia Personal Financial Survey 2011; McKinsey Global Institute analysis

Most retail financial service income today is derived from traditional interest. As consumers' wealth increases, they will demand more sophisticated products and services and financing options, as well as broader investment opportunities.

A fast-expanding financial services sector could have significant spill-over effects on growth throughout the economy. But four main hurdles stand in the way of this sector's growth: access channels (see Box 4, "Capital availability challenges"); credit information; trust and understanding; and regulatory overlap.

- Access channels.** Banking is the primary conduit for savings and investment for Indonesians. Yet McKinsey's 2011 Asia Personal Financial Services survey, which covered some of the largest urban areas in Indonesia (Bandung, Greater Jakarta, Makassar, Medan, and Surabaya), found that only 40 percent of Indonesians in these cities currently have a banking relationship.²⁸ This leaves a great deal of scope for alternative channels to develop. One way for Indonesia to ramp up the share of the population with banking relationships would be to introduce mobile banking. This is a route being pursued elsewhere

28 Customer first: New expectations for Asia's retail banks, McKinsey & Company, March 2012.

in Asia. In the Philippines, for instance, Smart Communications has introduced Smart Money, which combines a mobile payment system for international remittances and a cash account for users wanting to make micro payments and purchases. Smart Money has attracted 7.1 million subscribers who have made transactions worth more than \$1 billion a year. More collaboration between banks and telecommunications players could stimulate much wider use of financial products in Indonesia.

Box 4. Capital availability challenges

Indonesia's commercial banks, the dominant domestic financial services players, have been largely liquid, solvent, and profitable in recent years. The capital adequacy ratio for commercial banks stands at 20 percent, which is one-and-a-half times the regulatory minimum and nearly double the Basel III requirement.¹ The return on assets for Indonesian commercial banks is two to three times that of banks in Singapore, Malaysia, and Thailand, for instance.

However, only 12 percent of Indonesian businesses currently access bank credit, compared with nearly 80 percent in Thailand.² Discouragingly, access to capital, especially through microfinance services, has been declining, and small and medium enterprises are now facing a credit crunch. Commentators have offered several explanations for this paradox, including the comparative attractiveness of high-yield, low-risk Bank Indonesia Certificates (SBIs), which the central bank has been issuing in an attempt to rein in inflation. They also cite a lack of competitive pressure in the local banking sector.³

1 Jay K. Rosengard and A. Prasetyantoko, "If the banks are doing so well, why can't I get a loan? Regulatory constraints to financial inclusion in Indonesia," *Asian Economic Policy Review*, Volume 6, Issue 2, December 2011.

2 *Enterprise surveys*, World Bank, 2009.

3 *Doing business 2010: Reforming through difficult times*, World Bank and International Finance Corporation, 2009.

- **Credit information.** Loans are, to a substantial extent, used to buy goods for personal consumption such as vehicles and consumer goods in Indonesia. Nevertheless, Indonesia today lacks strong credit-scoring systems, and this makes it difficult to manage the risk of bad debt. In 2006, Bank Indonesia established the Credit Bureau, or Biro Informasi Kredit (BIK), to collect and record credit and loan data, one objective being to distribute credit information to financial institutions. This initiative should help to improve risk, expedite the process of making loans, and encourage responsible borrowing and loan repayments. However, BIK's coverage remains limited, and private banks say the data are often out of date and cover only those people who already have a traditional credit history.²⁹ These gaps have prompted plans to create an independent credit bureau for Indonesia. Further discouraging lending is the fact that legal protections for lenders are weak, which makes it more difficult for them to recover loans in the event of bankruptcy or default. Foreign lenders, in particular, regard this lack of a protection as a barrier to lending.

29 *OECD investment policy reviews: Indonesia 2010*, Organisation for Economic Co-operation and Development, 2010.

- **Trust and understanding.** Few Indonesian consumers currently purchase sophisticated financial products. McKinsey's Personal Finances Services survey found that more than 90 percent of all customers have no long-range financial plans, even in the highest-spending consumer segments. Some 44 percent of all customers see their business as the source of their retirement income, followed by bank deposits (26 percent) and a government plan (11 percent). Less than 1 percent considers buying more complex financial products such as equities or mutual funds, and only 3 percent see life insurance producing an income for their retirement. Liquid liabilities and bank deposits have also declined as a proportion of GDP since 1999 and remain lower than in countries including India, Thailand, and Malaysia. This indicates that there is unmet demand in Indonesia. Building trust in the system, still fragile after the Asian financial crisis of the late 1990s, would help to ease the path to greater participation in various areas of financial services. One step in the right direction is the Financial Services Authority (OJK), which will be operational from January 2013, to supervise and regulate financial institutions. Another idea under discussion is for the government to set up a fund to protect investors in the event of a broker default.³⁰ In addition to action by government, financial service providers could do more to educate consumers about the range of investment products in which they could invest apart from bank deposits. In combination with greater consumer demand, scope exists for the development of asset management, pension, and investment-linked insurance products.
- **Regulatory overlap.** Regulations are complex and act as a barrier to consumers investing in financial products through the financial service system. While regulation is definitely required, a more relaxed regulatory system with more flexibility may help. Indonesia has two main regulatory bodies—Bank Indonesia, the central bank, which regulates banking and capital markets, and Bapepam, the non-banking financial services regulator for other financial products. Currently, banks need to apply to both institutions for permission to offer banking and financial products to their customers. Consolidating their regulatory functions into the new Financial Services Authority could ease the regulatory burden with which banks are grappling today.

EXPANDING MARKETS AND OPERATIONAL EFFICIENCY COULD CREATE OPPORTUNITIES FOR GROWTH IN THE RETAIL SECTOR

Retail, including hotels and restaurants, is Indonesia's largest single sector, contributing 16 percent of GDP in 2011 on the back of real annual growth of 5 percent over the past decade. In 2011, the sector employed 22.5 million people, making it the second-largest employer in Indonesia. By 2030, we expect retail to overtake agriculture as the largest employer in the economy. The retail sector is changing rapidly as patterns of consumer spending evolve. Urbanisation will be an important part of this story. As cities grow and expand, there will be an agglomeration of consumers in clusters of cities. Already today, clusters have been created around Greater Jakarta and Surabaya. Over the next few years, we see clusters developing around growing cities such as Central Java, Makassar, and Medan.

30 *Republic of Indonesia: Strengthening Indonesia's capital market*, Asian Development Bank technical assistance report number 32507, December 2009.

Food and beverages will remain an important segment—but growth patterns are evolving with urbanisation

By 2030, the urban population may have shifted as much as 9 percent of its spending from food to non-food products.³¹ Nevertheless, food and beverages will remain an attractive market, with the potential to be the second-largest spending category in 2030. Indonesian urbanites today spend \$73 billion a year on beverages and food products, and we expect this segment to grow at a rate of 5.2 percent a year to 2030. Restaurants offer a further growth opportunity in food and beverages. We project that urban spending on dining out in quick-service restaurants could triple to more than \$30 billion by 2030.

We expect growth to be skewed toward higher-value convenience products, particularly beverages. McKinsey's Indonesia Consumer and Shopper Insight survey shows that the overall penetration of beverages is high. However, there are significant differences in penetration across regions, and we see this as evidence of significant scope for increasing penetration in regions outside Java. Jakarta is likely to experience weak growth in most foods and beverages, although quick-service restaurants, mainly Indonesian-style, will be at the forefront of what growth there is.

In contrast, cities outside Java that we expect to post high growth rates of both their populations and GDP will likely experience strongly increasing demand for food and beverages. We estimate \$1.4 billion of additional spending by 2030 on this retail segment in the city of Batam, for instance, with more than two-thirds of that extra spending devoted to beverages. Milk, energy drinks, and ready-to-drink tea and herbal drinks are the products that we anticipate will have the highest incremental growth from today's levels. In the case of food, citizens of this city will likely be consuming more "self-indulgent" products such as biscuits, wafers, other snacks, and instant noodles. The city of Denpasar is also a large potential opportunity, particularly in some beverages and fast foods. Citizens are most keen on milk and energy drinks, which are the fastest-growing products, followed by beer. Growth in consumption in food and beverages is likely to be concentrated in quick-service restaurants; we see Western-style restaurants being the main driver of this growth as Denpasar is known for its tourism.

Modern trade could become the preferred point-of-sale format

Although retail channels are still fragmented in Indonesia, we anticipate a revolution in the sector to 2030, led by convenience stores. Today, three-quarters of retail sales are through traditional channels.³² However, the share of spending through modern retail formats is rising rapidly.³³ In the case of modern channels, the mini market convenience store format for food and drink has grown strongly in recent years and now accounts for almost half of modern retail stores. Mini markets are popular with consumers because they stock a broad selection of merchandise and offer a more comfortable shopping experience than traditional outlets.

31 The same trend is expected to play out in China; over the next 15 years, the share-of-wallet spent on food is projected to fall by 15.8 percentage points.

32 According to *Market Management Indonesia (Asparindo)* traditional channels include wet markets, street stalls (warungs), and individually owned shops.

33 According to the Indonesian *Retail Entrepreneur Association (Aprindo)*, modern retail includes mini markets (e.g., Indomaret, Circle K), department stores (e.g., Matahari and Sogo), hypermarkets (e.g., Carrefour, Lotte Mart), supermarkets (e.g., Kem Chicks, Ranch Market), and specialty stores (e.g., Ace Hardware, Frank & Co.).

McKinsey's Consumer and Shopper Insight survey suggests that the popularity of different channels varies by product category. For example, more than 80 percent of urban shoppers prefer to purchase home and personal-care products from modern channels, but more than half of consumers surveyed remain loyal to traditional channels for general food and beverages. In food retail, demand for chilled goods is providing additional impetus to modern formats; more than half of consumers prefer to buy categories such as ready-to-drink juice and chocolate at mini markets (see Box 5, "Indonesia's urban consumers").

Box 5. Indonesia's urban consumers

Indonesia's urban consumers are brand loyalists increasingly attracted by modern retail formats and influenced by fewer types of media than their counterparts in China.¹

Brand loyal. Indonesian consumers are aware of, and largely loyal to, brands. More than 90 percent of consumers know which brand or set of brands they will buy before they visit a store and are unlikely to switch from a brand they use and like. They also perceive well-known and expensive brands to be better quality, far more than consumers in other Asian countries including China.

Fewer types of media. Indonesian consumers are influenced by far fewer types of media than consumers elsewhere when making purchase decisions. Television and word-of-mouth remain the most prominent form of "media" in virtually all categories. For the food and beverage and home and personal-care categories, around two-thirds of consumers claim to have received credible information from television; for consumer electronics, the proportion was around half. Indonesians are influenced by their community and take family and friends' recommendations seriously, as the high numbers of Facebook, Twitter, and BlackBerry Messenger users might suggest. Although the Internet is becoming more widely used, we found little evidence of consumers consulting Web sites to inform their purchase decisions in any category to date.

Optimistic in the short term. Indonesian consumers are a great deal more optimistic about the short term than consumers in, for example, China. Of the Indonesians we surveyed, 64 percent said they expect their households to be better off in one year, six percentage points more than in China.

¹ McKinsey's Indonesia Consumer and Shopper Insight survey.

These evolving trends have implications for consumer companies as well as retailers. Consumer companies need to adapt their footprint to fast-growing markets in emerging cities and build the capability to serve fragmented trade formats, while retailers need to address hurdles that are preventing them from capturing the full potential value of retail.

Modern retailers need to overcome a range of barriers in order to maximise their opportunity

Modern retailers need to improve access to products, productivity, and efficiency to fully reap the benefits of strong consumer spending trends. Their success in this regard will depend on improvements to infrastructure, supply-chain efficiency, regulation, and technology. Some of these are within the power of retailers to change, but the rest will require action from the government.

- **Infrastructure.** More than half of all goods and two-thirds of traded goods are still transported by road in Indonesia but the nation's roads need upgrading if today's high levels of late deliveries and costs are to fall. Water is the second most important means of transport in the Indonesian archipelago, accounting for an estimated 17 percent of all goods. Major ports such as Jakarta and Balikpapan are already congested, and Indonesia will need to build more capacity if retail services are to develop to their full potential across the nation. We also believe that air transport will become increasingly important as the economy grows. Demand for services such as air express will increase, as it has done in India and China. Rail, too, needs to be upgraded.
- **Supply-chain efficiency.** Many of today's distribution centres for hypermarkets and mini markets operate only one shift a day—and some for only 12 hours between 5 a.m. and 5 p.m.—which causes bottlenecks and lost productivity in the supply chain. Suppliers have to queue for hours to get their products into warehouses. If distribution centres were to operate 24 hours a day—subject to tackling security concerns about operating at night—congestion would be cut and productivity increased. Ports and some airports do not operate 24 hours a day despite the fact that many are already beyond their capacity. We also foresee an imminent need for sophisticated “cold-chain” logistics to meet rapidly increasing demand for fresh food retailing. In the medium term, most players will probably have to deal with modern and traditional channels simultaneously, reinforcing the requirement for sophisticated supply-chain managers who can efficiently navigate this complex mix.
- **Regulation.** Regulation is a barrier to the growth of modern retail in Indonesia, our analysis shows (see Box 6, “The regulatory challenge” for a discussion of how regulation makes it more difficult to do business across sectors). By presidential decree, district governments are required to approve the operation of modern and traditional retailers. However, in some areas such as Solo and Bali, where retail markets are concentrated, the local authorities have stopped issuing new licenses to mini markets because of their perceived negative impact on traditional outlets. Some mini market operators have responded by modifying their store concepts and product offerings so that they can operate under different types of licenses, such as those for cafés. Another example of constraining regulation is that some districts are requiring stores to source produce locally, the aim being to protect local producers. Given the evidence that modern formats drive higher retail productivity, district officials may need to be persuaded of the benefits to consumers and the economy of

adopting a more accommodating approach to modern store formats.³⁴ Central government could also choose to take action itself. For instance, it could ease the way for large store formats to open in dense urban areas by strengthening laws that protect tenants.

- **Technology.** Indonesia's retail sector lags behind those of other countries, including Malaysia, in terms of the technology that it deploys. Unless retail uses more automated processes and other technical tools to boost productivity, the sector will become less competitive as salaries increase. In the United States, technological innovation by a single firm in the 1990s triggered productivity improvement throughout the retail sector—and the economy as a whole.³⁵ We see Indonesian online retail channels proliferating if consumers develop more trust in credit card services and if the quality and penetration of broadband improve.

34 There is a large body of evidence suggesting that deregulation that allows the development of modern formats is a powerful tool to increase retail productivity. In Russia, for instance, retail productivity has increased from 15 percent of US productivity in 1999 to 31 percent of the US level in 2009, while at the same time creating five million jobs in the sector. See *Lean Russia: The productivity of retail*, McKinsey Global Institute and McKinsey & Company, April 2009 (www.mckinsey.com/mgi).

35 *US productivity growth, 1995–2000*, McKinsey Global Institute, October 2001 (www.mckinsey.com/mgi).

Box 6. The regulatory challenge

About half of all executives in Indonesia name corruption as the largest constraint on doing business in the country. Some common themes emerge from our review of the regulatory environment.

Decentralisation. Since the “big-bang” decentralisation in 2001, 500 provincial, district, and municipal governments now deliver public services and investment in education, health care, and infrastructure, among others. Local governments account for 38 percent of public spending and half of public investment.¹ Numerous observers have argued that decentralisation has led to inefficiency.

Corruption. Many business executives as well as Indonesians in general regard corruption as one of the most pressing issues facing the nation.² Transparency International ranks Indonesia 100th out of 182 countries for freedom from corruption. According to the Ministry of Home Affairs of Indonesia, more than one-third of all local government leaders have been involved in corruption cases. Although Indonesia has made efforts to tackle this pervasive problem, some argue that the impetus appears to have weakened in recent years.³

Excessive bureaucracy and high compliance costs. One study found that “all levels of Indonesian government often regulate when no regulation is called for”.⁴ For instance, it takes nine procedures lasting an average of 33 days to start a business in Indonesia, 30 days longer than the process takes in Malaysia.⁵ This surfeit of bureaucracy raises the cost of compliance—registering a business, for example, costs 22 percent of annual income per capita, quadruple the cost in Thailand.

Lack of predictability. Government agencies with authority over different aspects of regulation often have overlapping jurisdictions and regularly issue regulations that are inconsistent or contradictory. Furthermore, many regulations offer excessive discretion to officials and this makes regulation significantly less predictable for businesses.⁶

1 *Indonesia: Urban development and local government*, World Bank (to be published 2012).

2 *Corruption Perceptions Index 2011*, Transparency International, 2011.

3 Simon Butt, “Anti-corruption reform in Indonesia: An obituary?” *Bulletin of Indonesian Economic Studies*, Volume 47, Issue 3, 2011.

4 *Labor Law: Measure plus: Indonesia*, Business Growth Initiative, USAID, April 2011.

5 *Doing business in Indonesia 2012*, World Bank and International Finance Corporation, 2012.

6 *Labor Law: Measure plus: Indonesia*.

THE TELECOMMUNICATIONS SUBSECTOR HAS THE POTENTIAL TO CONTINUE ITS STRONG RECENT GROWTH

Since the turn of the century, the telecommunications subsector, excluding transportation, has been expanding at 21 percent a year, making it the fastest-growing sector in Indonesia.³⁶ This subsector is particularly important as an enabler, or catalyst, for other sectors and potentially a means of addressing corruption. For example, the agriculture sector is currently using information and communications technology (ICT) to provide farmers with timely farm-management and market information, improving their yields and incomes. The transportation and telecommunication sectors together employ 5.6 million people.

Since privatisation following the Telecommunication Law in 2000, the sector has changed markedly.³⁷ The sector has attracted \$17 billion of foreign direct investment, and mobile telecommunications penetration increased from 3 percent in 1999 to 22 percent in 2005. Greater competition has also resulted in improved services and technology and a 40 percent reduction in domestic tariffs.

Today, 80 percent of private spend in the mobile sector is on voice services, but the consumption of data packages is likely to drive future revenue growth. The number of fixed broadband Internet accounts has grown by 40 percent a year over the past four years and is set to grow at an estimated 23 percent a year from 2013 to 2017, resulting in a total of seven million subscribers.³⁸

In our view, the deployment of broadband across Indonesia would be the most powerful driver of growth in the sector and a significant enabler of productivity growth in other sectors. The main obstacle to this development is building and financing the necessary infrastructure. Wireless hotspots and fixed broadband lines are appearing in larger cities across Indonesia, but these need to spread across the archipelago—a logistically difficult and potential costly undertaking.

The government could play a useful role in catalysing the further development of the sector as other governments, including those of Malaysia and Singapore, have done with considerable impact. In Malaysia, broadband penetration is expected to reach 35 percent by the end of 2012, up from 15 percent in 2007. The government has invested in a next-generation network in parallel with bringing forward policies to increase competition, tax incentives for businesses to subsidise broadband access to employees and for consumers to adopt broadband, and initiatives to boost demand (including e-government portals and ICT learning centres).

36 Indonesia's Central Bureau of Statistics.

37 Government regulation number 52, 2000.

38 *Fixed communication demand*, Pyramid Research, www.pyr.com/, June 2012.

3.2 Boost productivity in agriculture and fisheries

The increasing population and prosperity of Asia—notably in India, China, and Indonesia itself—will mean that demand for food and agricultural items is set to increase sharply. At the same time, urbanisation could result in about eight million fewer farmers by 2030 as people migrate from rural areas to cities. The only way to meet increased demand with far fewer agricultural workers will be to adopt more intensive production systems. We estimate that, to meet domestic demand alone, the productivity of Indonesia's farms needs to increase by more than 60 percent from just over three tons of crops per farmer today to five tons in 2030.

The global agriculture sector has been entering a new phase of tightening supply and increasing demand over the past few years. In the past decade alone, a 100-year decline in the price of agriculture products has been reversed due to surging demand, slower agriculture productivity growth, and supply disruptions. Not only have food prices increased by 135 percent, but the volatility of prices today is at an all-time high.³⁹ Globally, the physical agriculture commodity market is highly local, and only 12 percent of the total cereals produced are traded internationally.⁴⁰ However, as the economies and populations of developing countries expand, their demand for imports will increase. In South Asia, for example, imports of cereals are expected to grow by 600 percent between 1997 and 2020.⁴¹

Transforming Indonesia's agricultural sector—notably through boosting its productivity—is crucial for a number of reasons. Not only is it important for meeting increasing domestic and global demand, but it could also play a critical role in alleviating poverty in Indonesia, reducing greenhouse gas emissions, and stimulating economic growth. Agriculture employs almost 40 percent of the entire workforce, or 41 million people, and is the main source of employment in rural areas where poverty is most prevalent.⁴² The link between improving agricultural productivity and reducing poverty is well documented—very few countries have managed a sustained reduction in poverty without increasing agricultural productivity.⁴³ GDP growth that originates from agriculture is estimated to be at least twice as beneficial to the poorest segment of a country as growth from non-agricultural sectors.⁴⁴ Poverty reduction through improved agricultural productivity occurs through four “transmission mechanisms”. First, improved productivity directly improves farmer incomes and provides rural employment. Second, increased production results in cheaper food for both the urban and rural poor. Third, growth in the sector has multiplier effects on the growth of the non-farm sector. Fourth, agriculture plays a role in stimulating and sustaining structural

39 *Resource revolution: Meeting the world's energy, material, food, and water needs*, McKinsey Global Institute and McKinsey & Company's sustainability & resource productivity practice, November 2011 (www.mckinsey.com/mgi).

40 *Cereal supply and demand brief*, Food and Agriculture Organization, July 2012.

41 International Food and Policy Research Institute; Organisation for Economic Co-operation and Development; Food and Agriculture Organization.

42 Indonesia's Central Bureau of Statistics.

43 Peter Timmer and Selvin Akkus, *The structural transformation as a pathway out of poverty: Analytics, empirics and politics*, Center for Global Development, July 2008.

44 *Agriculture and poverty reduction*, World Bank, 2008.

transformation as labour and growth shifts from agriculture to manufacturing and services.⁴⁵

On the environmental front, President Susilo Bambang Yudhoyono has committed to reducing greenhouse gas emissions by 26 percent from their business-as-usual trajectory by 2020 using the country's own resources and by a total of 41 percent with support from the international community.⁴⁶ Today, agriculture is one of the sectors responsible for the deforestation and peat-land degradation that contribute to approximately 75 percent of the country's total greenhouse gas emissions.⁴⁷

In 2010, about 40 million hectares of the country was dedicated to agricultural production.⁴⁸ Cereal production—rice in particular—dominates the sector and occupies about one-third of agricultural land. About 11 million tons of fisheries products were produced in 2010, with almost equal amounts coming from aquaculture production and marine and inland capture.⁴⁹ But productivity in Indonesia's agricultural sector, at \$3,000 per worker, is very low compared with neighbouring countries such as Malaysia, where value added per worker is \$9,000.

Projections from the Food and Agriculture Organization of the United Nations (FAO) indicate that Indonesia will produce 197 million tons of crops in 2030 under a business-as-usual scenario. Taking into account post-harvest and value chain losses, total supply would be only 185 million tons (Exhibit 16). However, we estimate that action to increase production by boosting yields, putting unused low-carbon land into production, and reducing post-harvest waste, combined with shifting production into high-value horticulture and oil palm crops, could in total increase Indonesia's production of crops to 310 million tons in 2030.⁵⁰ This would translate into well over 8,000 kilocalories (kcal) of food per person per day, of which about 2,000 kcal would be calories from cereal crops. This far exceeds Indonesia's daily nutrition requirements and creates the potential for exporting food. We estimate that optimising agricultural productivity could enable Indonesia to produce a surplus of more than 130 million tons of net agricultural exports by 2030, on top of meeting its own requirements that the FAO estimates at 180 million tons of crops.

45 *Agriculture, growth, and poverty reduction*, UK Department for International Development (DFID), October 2004.

46 "Cooperation on reducing greenhouse gas emissions from deforestation and forest degradation," letter of intent between Norway and Indonesia, signed on May 26, 2010.

47 *Indonesia's greenhouse gas abatement cost curve*, Indonesia National Council for Climate Change, August 2010.

48 Ministry of Agriculture. Excluding Papua and West Papua where no data from the ministry were available.

49 Ministry of Marine Affairs and Fisheries.

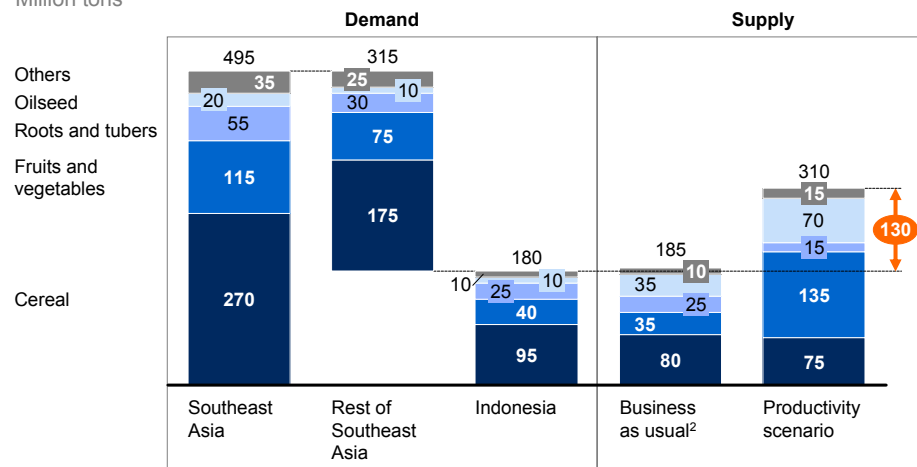
50 FAO projections take into account 26 commodities and commodity groups: banana, barley, cassava, citrus, cocoa, coffee, cotton, fibre, maize, millet, plantains, potatoes, pulses, rice, rubber, sorghum, sugar cane, sweet potato, tea, tobacco, vegetable oil and oilseed, vegetable, wheat, other cereal, other fruit, and other roots. Our projections include the top 20 commodities produced that cover 90 percent of all crop production by area and weight. They are banana, cabbage, cassava, chilli, citrus, cocoa, coconut, coffee, maize, mango, oil palm, pineapple, potatoes, rice, rubber, soybean, sugar cane, sweet potato, tea, and tobacco.

Exhibit 16

Indonesia could become a large exporter of agricultural crops by increasing the sector's productivity

Crop supply and demand, 2030¹

Million tons



¹ Rounded to the nearest five million tons.

² After accounting for post-harvest and value-chain waste.

SOURCE: Food and Agriculture Organization; Indonesia's Ministry of Agriculture; McKinsey Global Institute analysis

We have identified six levers Indonesia could pull to optimise production and revenue in agriculture and fisheries (Exhibit 17). If the crop mix were to be kept constant, revenue would be about \$165 billion. But shifting the mix toward high-value crops and pulling the other five levers could more than triple revenue from \$70 billion in 2010 to \$250 billion in 2030, representing growth of 7 percent a year. Improving smallholder yields, shifting production to high-value commodities such as oil palm and fruit and vegetables, and reducing waste offer the largest potential for increasing revenue.⁵¹

However, a number of barriers stand in the way of deploying these six levers (Exhibit 18).⁵² Across the board, there is a need for large amounts of investment in the sector, particularly for the improvement of infrastructure such as roads, cold-supply chains, and irrigation systems. Education and behavioural change is also needed to improve the productivity of farmers and fishermen. We now discuss each of the six levers, the barriers standing in the way of their adoption, and ways to overcome them. We examine progress in raising Indonesia's agricultural and fisheries performance thus far and what would need to be done to achieve a system-wide transformation.

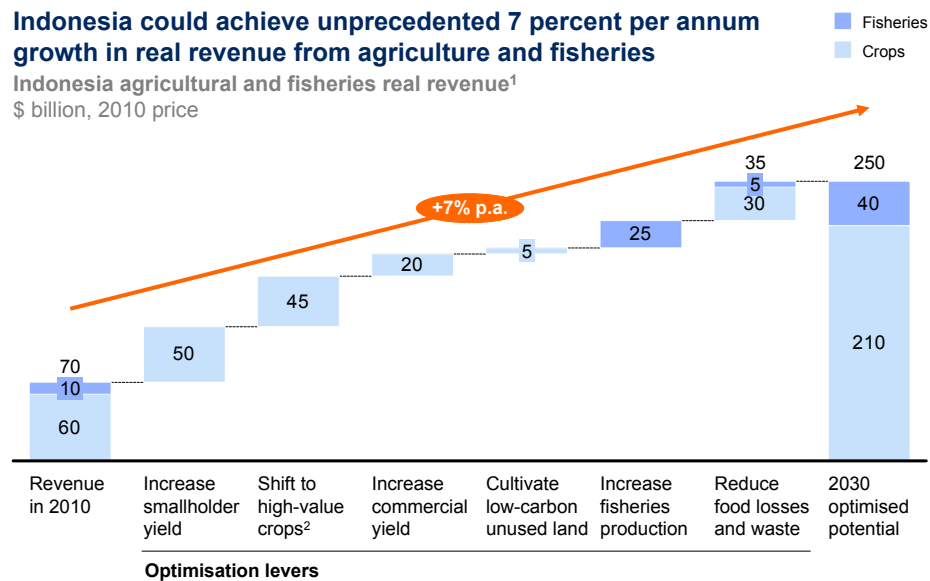
⁵¹ Projections assume constant 2010 prices for commodities.

⁵² For a description of the barriers, see *Resource revolution: Meeting the world's energy, material, food and water needs*, McKinsey Global Institute and McKinsey & Company's Sustainability and Resource Productivity practice, November 2011 (www.mckinsey.com/mgi).

Exhibit 17

Indonesia could achieve unprecedented 7 percent per annum growth in real revenue from agriculture and fisheries

Indonesia agricultural and fisheries real revenue¹
\$ billion, 2010 price



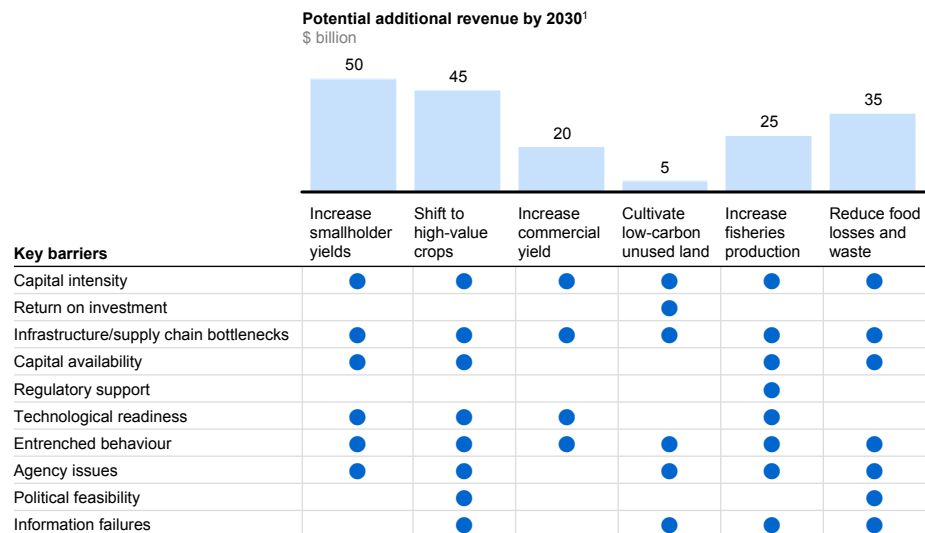
1 Rounded to the nearest \$5 billion.

2 Includes palm oil, fruits, and vegetables.

SOURCE: Food and Agriculture Organization; International Institute for Applied Systems Analysis; Ministry of Agriculture; Ministry of Marine Affairs and Fisheries; Ministry of Forestry; McKinsey Global Institute analysis

Exhibit 18

Achieving higher revenues from agriculture and fisheries will require overcoming a series of barriers



1 Rounded to the nearest \$5 billion.

SOURCE: Ministry of Agriculture; Ministry of Forestry; International Institute for Applied Systems Analysis; Food and Agriculture Organization; McKinsey Global Institute analysis

1. INCREASING SMALLHOLDER YIELDS

Agriculture production is dominated by smallholder farms. More than 90 percent of crops produced are cultivated by smallholders, with the notable exception of oil palm.⁵³ Current yield levels are low because of sub-optimal farm management systems and unfavourable economic conditions, particularly in the eastern part of Indonesia. On average, yields potentially could increase by more than 90 percent by 2030, or at a rate of about 3 percent per year. Of the major crops, we see the largest potential for yield increase in coffee, cocoa, and oil palm.

The management of smallholder farms is currently constrained by the inadequate supply of key inputs including technology (such as high-yielding seeds), irrigation systems, information on farming techniques, and access to credit. Additionally, small land plots prevent the implementation of more productive practices.

- **Technology.** One reason for technology gaps is that Indonesia's R&D spending is only 0.27 percent of agricultural GDP, compared with, for instance, 1.92 percent in Malaysia.⁵⁴ This has slowed the development of high-yielding cultivars that are resistant to local pests and changing weather conditions, as well as improved farming and post-harvest techniques and technology. Indonesia could explore whether to set up its own version of Brazil's Embrapa to develop appropriate technology and cultivars.⁵⁵ World Bank studies have shown that investment in R&D produces rates of return of 43 percent to 151 percent, while subsidies on private goods such as fertilisers have had a negative impact on growth in agriculture; thus subsidy levels, in particular, need to be addressed, as the industry is growing. These studies therefore suggest that Indonesia might consider shifting resources from relatively ineffective input subsidies to productive spending on true public goods.⁵⁶
- **Irrigation systems.** Irrigation systems are also inadequate and poorly maintained largely because no mechanism exists for recovering the costs of investing in them and there is little local engagement in their management. As a result, an estimated one million of the three million hectares of land watered by government irrigation programmes have had to be rehabilitated at least twice in the past 25 years.⁵⁷ In addition, advanced systems that conserve water resources, such as micro-irrigation, are very rarely deployed or used properly. There may be an opportunity to privatise some irrigation services and charge users for maintaining irrigation systems. However, this would have to be done carefully to ensure that smallholders' rights and their access to water are preserved, particularly given that the world is becoming more water-constrained and the agriculture sector is expected to account for more than one-third of water demand by 2030.

53 Ministry of Agriculture.

54 *Revitalizing agriculture in Indonesia*, World Bank, January 2010.

55 The Empresa Brasileira de Pesquisa Agropecuária (Embrapa, or Brazilian Enterprise for Agricultural Research) is a state-owned company with affiliations to the Ministry of Agriculture. The company focuses on research and development of sustainable agribusiness through knowledge and technology generation and transfer. Embrapa has pioneered more than 9,000 technology projects to develop Brazilian agriculture, including designing a tropical strain of the soybean and other crops that can thrive in Brazil's climate and other innovations of relevance for Brazil's unique circumstances.

56 Enrique Blanco Armas et al., *Agriculture public spending and growth in Indonesia*, World Bank policy research working paper number 5977, February 2012.

57 Ibid.

- **Extension services.** Indonesia's decentralised public agricultural extension system, in which experts travel to rural areas to educate farmers about improved practice including seedlings, farm management, and capacity building, is also facing problems. Although there is a large pool of 28,000 government extension workers, decentralisation has weakened the system, making it difficult to disseminate information or coordinate national and regional extension office activities.⁵⁸ Furthermore, the onus has fallen on local governments to provide funding for their extension offices, and many have chosen to place priority on other sectors, such as a manufacturing.⁵⁹ In order to understand how to improve the extension system, pilot districts could be selected to test interventions. Resources and technology, including information technology, could be provided to these districts and their impact measured to help determine which changes would be useful to roll out nationally. In addition, extension workers could be educated in cultivating high-value commodities, post-harvest management, and information and telecommunications technology. They could also be evaluated on their ability to improve the welfare of farmers and offered incentives, such as promotions, to encourage performance.

- **Access to credit.** Economic conditions are also limiting improvements in the productivity of smallholder farms. Requirements for obtaining credit from financial institutions are often a stumbling block for smallholders as they lack the necessary legal documents, such as a Business Location License and Tax Registration Number, to obtain loans. Banks usually avoid investing in agriculture, viewing it as a high-risk, long-term investment.⁶⁰ Risk-adverse farmers also do not have access to appropriate insurance plans to protect them from crop failure or price fluctuations, and this deters them from experimenting with inputs that could help them improve yields, such as crop protection chemicals and higher-yielding seed. Potential solutions include creating specific credit and insurance packages with Bank Rakyat Indonesia or other banks with experience serving the agricultural community. Microfinance organisations familiar with serving rural communities could also be involved. Smallholders' difficulties gaining access to credit are compounded by their unclear land titles, which make financial institutions less comfortable lending to them. There is a strong argument in favour of land reform that would clarify land titles and improve spatial planning and zoning (see Box 7, "Potential land reform in Indonesia"). Novel financing schemes are also being implemented in an effort to overcome this barrier. For example, in Kalimantan, commercial oil palm producers are assisting smallholders with credit to encourage them to replant older trees with low yields. The payment allows farmers to support themselves during the three to four years it takes for their plantation to mature. In addition, commercial farms provide employment on commercial plantation and training in good agriculture practices. Such initiatives led by the private sector can also be rolled out to other crops.

58 Djuara P. Lubis, *Agricultural extension in Indonesia: Current status and possible ways to meet emerging challenges*, Bogor Agricultural University, 2012.

59 Tri Margono and Shigeo Sugimoto, "The barriers of the Indonesian extension workers in disseminate agricultural information to farmers," *International Journal of Basic & Applied Sciences*, Volume 11, Number 2, April 2011.

60 "Feed the world: Towards a competitive and sustainable self-sufficiency and promotion of the prime commodities to become the world's choice," *Vision 2030 & Roadmap food sector development, 2010–2014*, 2nd Edition, Indonesian Chamber of Commerce, 2012.

Box 7. Potential land reform in Indonesia

Uncertainty concerning land tenure in Indonesia acts as a critical constraint on developing a more productive, inclusive, and environmentally resilient economy. Land in Indonesia is divided into forest estates, under the control of the Ministry of Forestry, and non-forest estates, under the aegis of district governments. But confusion about tenure of both types of land raises challenges:

- **Lack of coordinated spatial planning.** A majority of Indonesia's provinces do not have a legally binding spatial plan. As a result, local and central government may issue land rights that conflict with each other and affect the development plans of both levels of government. To illustrate, in the province of Central Kalimantan, 75 percent of all in-progress or granted palm oil licenses were in conflict with the latest spatial plan from Ministry of Forestry in May 2011. Compounding the problem, there is no central database for land rights.
- **Communal land rights are not formally recognised.** An estimated 33,000 villages fall within the adat system and are on or around forest estates, which are state-owned.¹ The Ministry of Forestry has made provisions that recognise and formalise such land ownership over the past decade by registering community licenses. However, by May 2011, only 47 villages were recognised as owning community or village forest with a total land claim of 100,000 hectares. As a result, almost all the 33,000 adat villages can be construed as illegal as they are located on state lands.
- **Land zoning rules do not take actual land cover into account.** In Indonesia's forest estate, 92 million hectares have forest cover, while 42 million hectares, or roughly 30 percent, are not forested.² This limits the potential for managing land in an optimal manner because non-forested land within the forest estate cannot be used for agricultural development. On the other hand, eight million hectares with forest cover are classified as "non-forest estate" and are therefore legally available for agricultural use. This area is therefore at high risk for deforestation.
- **Land parcels are highly fragmented and small, particularly on smallholder farms.** As land is passed down the generations, it tends to become divided into smaller parcels. Today, the Ministry of Agriculture estimates that the average rice farm has a land area of only 0.3 hectares.

International case studies show that there are opportunities to address these constraints. For instance, participatory mapping carried out by the Amazon Conservation Team in Brazil, Colombia, and Suriname has registered community ownership of 30 million hectares of community land since 1999 as well as recording thousands of indigenous place names and hundreds of indigenous villages and sites of cultural and historical importance.³

1 The adat system is a traditional land titling system. Land titles pass through generations verbally, and boundaries are marked by carvings in trees, rivers, or mutual verbal agreements across local communities; minister of forestry at the International Conference on Forest Tenure, Governance and Enterprise, July 12, 2011.

2 Ministry of Forestry, Landsat Satellite Imagery 7 ETM+ year 2009/2010, interpretation in 2010, publication in 2011. Note that some of the non-forested areas can be high-carbon peat areas.

3 The Amazon Conservation Team, www.amazonteam.org.

- **Infrastructure constraints.** Public transport infrastructure providing access to markets is poor, with most developments concentrated in Java and Bali. As a result, transportation costs are high for both inputs and produce. Similar to the situation with irrigation infrastructure, lack of maintenance due to under-spending on transportation infrastructure has made costly rehabilitations necessary.⁶¹

2. PRODUCING HIGHER-VALUE CROPS

Increasing the revenue of farms could play a large part in increasing farmers' income and welfare. Switching to higher-value crops would bring them particularly substantial gains. With expected yield increases, we estimate that producing fruit, vegetables, and oil palm would earn more than \$5,000 per hectare in 2030, ten times as great as the revenue that could be achieved from growing a hectare of cereal crops such as rice and corn or estate crops such as coffee, tea, cocoa, and tobacco. We estimate that half of Indonesia's land could be used to produce fruit, vegetables, and oil palm. Our estimate is in line with the target set by Gapki, the oil palm industry body—that Indonesia could double production to 40 million tons by 2020.

The horticulture industry also has immense latent potential. We believe this subsector could grow at similar rates to the oil palm industry, offering significant potential for exports to neighbouring countries including Singapore. Horticulture production is particularly attractive in areas such as Java, where close proximity to densely populated urban areas provides excellent access to a growing market. However, a range of barriers in the way of extending horticulture would need to be lowered (see Box 8, "Expanding the horticulture industry"). Increasing horticulture production would make more fruit and vegetables available and thereby help to improve the average Indonesian diet.

61 Enrique Blanco Armas et al., *Agriculture public spending and growth in Indonesia*.

Box 8. Expanding the horticulture industry

Revenue from the production of horticulture products is higher than from many other crops produced today, but this activity is underdeveloped in Indonesia, leaving scope for a very significant increase in production. Today, only about 1 percent of all agricultural land is planted with fruit and vegetable crops and about 70 percent of all fruit sold in supermarkets is imported—a missed opportunity given that demand from the urban consuming class is growing strongly and the value per hectare is more than ten times that of cereal crops.¹

However, there are significant challenges in marketing and supplying products to consumers. Lack of adequate infrastructure and a developed cold-supply chain today prevents timely delivery and efficient post-harvest handling of these highly perishable products. An estimated 50 percent of production is lost after harvest. In addition, in some areas, middlemen tightly control the sourcing of products from farmers and the wholesale market and capture a significant portion of available margins. This practice depresses prices paid to producers, deterring farmers from producing larger quantities of higher-quality products.

Agricultural policy presents another challenge. Today, budget allocations and research grants aim largely at promoting national self-sufficiency in staples such as rice. In 2010, the Directorate-General of Horticulture received only 4 percent of the total budget allocated by the Ministry of Agriculture.² In the Indonesian Agency for Agricultural Research and Development (IAARD/Litbang), only about 6 percent of researchers study horticulture products.³ In addition, a series of cultural traditions and beliefs underlie a farmer's selection of crops. These need to be understood and respected through open consultation with communities.

To boost horticulture production, it is important to link producers with existing domestic and international markets. Regulators could help by incentivising the private sector to build cold-supply chains and removing obstructive trade and marketing barriers such as unfair competition. In addition, several proven models for boosting farm production (e.g., contract farming schemes) could be extended to horticulture. These include the development of high-yielding parent seeds, reliable provision of inputs, effective education of farmers, and guaranteed purchase of produce. Such approaches usually have the participation of large private food processing and retail companies. One example is the international supermarket chain Carrefour, which has contracted Bimandiri, a local wholesaler, to work with Makar Buah, a local farmers' association, to produce and supply melons to stores in the region that meet Carrefour's quality and safety standards. The agricultural input provider Syngenta has been brought in to provide credit and technical assistance to the farmers. These innovative partnerships have yet to show substantial impact but could be a promising vehicle for change.

1 Ministry of Agriculture.

2 Ministry of Finance.

3 Agricultural Science and Technology Indicators (ASTI).

3 INCREASING COMMERCIAL YIELDS

Commercial farms are common only in the oil palm sector. Their production levels today average an estimated 2.3 tons per hectare per year, far below the eight tons per hectare achievable in best-in-class commercial farms or the 11 tons per hectares produced on some experimental plots.⁶² Indonesia could increase oil palm production considerably by improving the management of commercial farms and genetic varieties. We estimate that commercial oil palm yields could improve by 150 percent by 2030, or 4.7 percent a year, to reach an average yield of 8.8 tons per hectare.

Commercial farms face some of the same barriers as smallholder farms, including poor upkeep of irrigation systems, older, lower-yielding cultivars and sub-optimal farm management. In particular, underinvestment in fertilisers and sub-optimal management of those fertilisers are leading causes of lower yields, even though commercial planters generally have the resources to acquire fertilisers.⁶³ Creating awareness of the value lost and conducting soil fertility testing would be critical to improving fertilisation and sustainable nutrient management. In addition, large private commercial farms could share the burden of R&D by co-investing in breeding new varieties and sharing the intellectual rights.

4. BRINGING UNUSED, LOW-CARBON LAND INTO PRODUCTION

Indonesia's Ministry of Forestry estimates that there are 22 million hectares of bush, shrub grass, and barren land across the archipelago. About 35 percent of this land is in Kalimantan and 15 percent in Papua. Part of this land used to be in agriculture production, having been developed by trans-migratory farmers over the course of the past century, but was later abandoned. We estimate that 30 percent of this land could be used for agricultural production—and its low carbon content would allow it to be developed in an environmentally sound fashion.

Realising this potential would involve clarifying both where available unused, low-carbon land is located and who does—or who can—have title over it. Both issues are sufficiently unclear to deter new investment. In order to understand where unused land lies and how it could be more economically employed, Indonesia could develop a degraded land bank that would provide a comprehensive overview of land and legal rights to such land in Indonesia. This effort would be a useful complement to Indonesia's current efforts on reducing emissions from deforestation and forest degradation (REDD+).⁶⁴ Determining the suitability of land for agricultural production would require consideration of other environmental aspects such as the area's biodiversity and rainfall. Finally, reform of land-titling mechanisms should take into account informal land ownership and land claims by indigenous groups.

62 Ministry of Agriculture.

63 "Indonesia: Palm oil production growth to continue," *Commodity Intelligence Report*, USDA Foreign Agricultural Service, March 2009.

64 An example of Indonesia's REDD+ effort is the Indonesia-Norway REDD+ partnership established in May 2010 with the aim of reducing Indonesia's emissions from the deforestation and degradation of forests and peat lands. Indonesia agreed to take action to reduce its forest and peat-related greenhouse gas emissions, while Norway agreed to support these efforts by making up to \$1 billion available on a payment-for-results basis.

5. BOOSTING THE PRODUCTIVITY OF SUSTAINABLE FISHERIES

The marine and fisheries sector will be crucial to Indonesia's economic growth, securing the livelihood of millions of Indonesians, and enhancing the food security of a nation that today relies on fish for more than 60 percent of its protein needs. The government recently set an ambitious target to double the sector's share of GDP from 3 percent today to 6 percent by 2014. While achieving this specific target will be very challenging, the overall 2030 goal of improving the performance of the sector and capturing as many gains as possible is important for Indonesia's food security and overall economic development; it will require considerable effort to increase the productivity of the fisheries industry.

One significant issue facing the industry is illegal, unreported, and unregulated fishing by a large number of foreign and unregistered domestic fishing vessels that fish in Indonesian waters but land their catches overseas, as well as unregistered national vessels. It is estimated that Indonesia loses \$4 billion annually to this unauthorised fishing.⁶⁵ The Ministry of Marine Affairs and Fisheries is well aware of this issue and is boosting efforts to improve monitoring, control, and surveillance through conventional methods such as increasing the number of patrol boats and more novel approaches in which, for instance, communities themselves conduct monitoring and report suspect activities to the authorities.

Maintaining the long-term sustainability of marine ecosystems and fish stocks is also important to achieving the productivity targets set by the government. Overfishing of many species, including economically important marine species such as yellowfin tuna, have been reported, and this poses significant risks to the long-term viability of the industry.⁶⁶ Accepting short-term losses may be required to ensure that fish stocks are able to recover to sustainable levels.

Determining the maximum sustainable yield for different fish species will be important not only to limit catches to sustainable levels but also to understand the potential to expand catches in underexploited areas. For example, experts believe that there is still scope to increase the catch of demersal fish species in a sustainable manner in eastern parts of Indonesia. Experts interviewed estimated an opportunity to expand the volume of fish caught by 20 percent to 2030. Combining biological models of maximum sustainable yield with models that analyse the economics of key players and fisheries, including their costs and revenue structure, can help to provide decision makers with additional insights; the biological and economic impact of different policies can be determined by modeling different management scenarios.

65 Achmad Poernomo et al., *Combating illegal, unreported and unregulated (IUU) fishing to attain food security and alleviate poverty: Initiative of Indonesia*, Southeast Asian Fisheries Development Centre, 2011.

66 Adam Langley et al., *Stock assessment of yellowfin tuna in the western and central Pacific Ocean, including an analysis of management options*, Western and Central Pacific Fisheries Commission, 2007; *Report of the thirteenth session of the Scientific Committee*, Indian Ocean Tuna Commission, 2010.

To implement a strategy for sustainable fisheries development and good fisheries management, the ministry may need to work with non-governmental organisations or fishing communities to educate them on sustainable fishing methods and the long-term effects of overfishing and poor fishing practices. Private-sector players could work with sustainable certification bodies such as the Marine Stewardship Council to ensure sustainable practices and to obtain certification and price premiums for products.⁶⁷

Aquaculture is another important opportunity for raising fish production. Only about 6 percent of the 17 million hectares that may be suitable for aquaculture in Indonesia is currently put to that use, according to the ministry. But the areas of these 17 million hectares best suited to expanding aquaculture (e.g., those that are not home to coastal communities or mangrove swamps) have not been clearly identified. Mangroves provide a host of ecosystem services with a high economic value such as storm and coastal community protection, nurseries for fisheries, and carbon sink. In Thailand, shrimp farm production has more than doubled, from 240,000 tons in 1996 to 507,000 tons in 2008, and around 200,000 hectares of mangroves have been cleared for farms. There, McKinsey has estimated that an additional \$260 million of economic and societal value could be obtained each year through adopting a more sustainable method of shrimp farming that does not degrade mangrove areas. Expanding the production of freshwater species, including tilapia, carp, and milkfish, can also prevent the degradation of mangrove areas that are typically found in brackish water.

We assume that Indonesia is able to expand aquaculture production as fast as Vietnam, where production volumes increased at 15 percent per year over 20 years.⁶⁸ Even at that very rapid rate of expansion, only 20 percent of the additional putative area suitable for aquaculture in Indonesia would be brought into production by 2030, leaving more than 13 million hectares untouched—this would allow Indonesia's seven million hectares of mangrove swamps to be left intact. Analysis would reveal suitable areas for expansion and the minimal level of government intervention required to kick-start the industry.

The productivity of aquaculture could be increased by improving brood stock for the breeding of seed and fry, bio-security protocols to reduce disease outbreaks, farm management, and feeding.

As in farming, marine fisheries and aquaculture need greater investment in related infrastructure, in particular cold-supply chains and adequate processing facilities. Currently most fisheries products are sold fresh or in unprocessed forms, with processed products accounting for only 8 percent of the total value of the industry. Businesses could work with local governments to establish fish processing plants at ports, enabling efficient purchasing of supply from fishing vessels as well as exports.

67 Cathy Roheim, Frank Asche, and Julie Insignares Santos, "The elusive price premium for ecolabelled products: Evidence from seafood in the UK market," *Journal of Agricultural Economics*, Volume 62, Issue 3, September 2011. This report produced evidence that sustainable products received premiums of 14.2 percent.

68 Fishstat, Food and Agriculture Organization.

6. REDUCING WASTE

Currently, Indonesia loses close to 30 million tons, or about 20 percent, of agriculture crops and almost 1.8 million tons, or about 30 percent, of fisheries products.⁶⁹ Losses occur both at the post-harvest stage and along the value chain as the product makes its way to the consumer. Losses are highest—at about 50 percent—in the case of perishable commodities such as fruit and vegetables. We estimate that the large gap between losses observed in Indonesia and industrial Asian countries, such as Japan, could be halved.

Improved harvest and post-harvest techniques are necessary to cut losses, as is investment in infrastructure including a cold-supply chain. One potential solution would be to form public-private partnerships between provincial governments and leading Indonesian food companies to develop pilot projects that test how best to facilitate investment in key areas such as silos and roads. Obtaining better information on the nature and extent of losses is also essential for designing steps that reduce losses and measuring the impact of any such initiatives. Here the Ministry of Agriculture could work with the FAO to map food wasted at different stages of the value chain and in different regions of Indonesia.

A CHANGE STRATEGY WITH CLEAR PRIORITIES IS THE KEY TO TRANSFORMING AGRICULTURE AND FISHERIES

A range of challenges must be overcome if Indonesia is to increase the productivity of its agriculture and fisheries sectors. However, we do not believe it is practical to attempt to tackle the myriad barriers all at once; a more effective route would be to design and then implement a change strategy that lays out clear priorities.

The experience of other countries demonstrates that the successful transformation of agriculture depends on all the links in individual agricultural value chains working well. A practical approach to transforming Indonesia's agriculture sector could be to sequence work on commodity value chains in order of their importance, selecting a small number of important commodities in key regions on which to concentrate resources at the outset, and then moving on to others in sequence over time. Diagnosing and addressing issues sequentially along the entire length of value chains is different from the more familiar approach of raising agricultural productivity by focusing on sector-wide production issues such as R&D, extension, or infrastructure across multiple commodities or even a whole country. However, the sequential and targeted approach can address all the bottlenecks within a system and has proven to be more effective in practice.

The choice of commodities or value chains to prioritise will depend on factors important to the country in question. These could include revenue potential, future demand, nutrient composition, or perceived competitive advantage. In Indonesia, horticulture products and oil palm are likely candidates because of their revenue potential and expected demand. After a commodity has been selected to prioritise, analysis of its value chain is necessary to reach an understanding of where improvements could be made and to define clear roles for public and private stakeholders in making those improvements.

69 Jenny Gustavsson et al., *Global food losses and food waste*, Food and Agriculture Organization, 2011.

Morocco's experience is an example of the targeted, sequential approach. The government implemented *Plan Vert*, which focused on producing high-value crops on irrigated land for export to Europe as a replacement for wheat. Getting stakeholders aligned behind the goals of such a trade-off required strong leadership. Private-sector players acted as aggregators in an "out-grower" programme. They took responsibility for facilitating access to inputs (e.g., seeds, fertilisers, and mechanisation) and advisory services for smallholders in return for the right to buy or market their output. To facilitate this arrangement, the government leased land and provided fiscal incentives to private-sector players. The government also took responsibility for facilitating the export of the resulting high-value crops by helping growers to meet European farm certification requirements and striking agreement with the European Union to expand tariff-free access for Moroccan producers. Although *Plan Vert* is still in its early stage of implementation, it has already shown some signs of success with \$2.6 billion in new investment and a 27 percent increase in real agricultural GDP between 2008 and 2011.⁷⁰

In Indonesia, this sequenced change programme is in the early stages of implementation, as part of the Partnership for Indonesia Sustainable Agriculture (PISAgro). The overall success of the programme will be contingent on the ability of the partnership to attract investment, create effective collaboration between the private and public sectors, and roll out the programme from pilot projects to the national level.

INDONESIAN SMALLHOLDERS COULD POTENTIALLY MORE THAN TRIPLE THEIR INCOME

Smallholders could more than triple their income if they were to boost the productivity of their farms and shift to higher-value crops in the ways that we have discussed. In 2010, a typical farmer earned an estimated average of \$700 per year. Food crop farmers earned the least, while producers of horticulture, oil palm, and other cash crops earned significantly more. We estimate that the average farmer income could increase to reach \$2,300 a year.

Increasing agricultural production could stimulate both the upstream agriculture input and the downstream processing sectors. These industries could gain an estimated \$10 billion and \$120 billion of revenue, respectively. Total revenue from agriculture and fisheries and the upstream and downstream sectors related to agriculture could reach \$450 billion in 2030 (Exhibit 19).

The impact of pulling the six levers described earlier in this section would vary from province to province. Provinces in Java would achieve more than 30 percent of the total additional revenue (Exhibit 20). Within East, West, and Central Java, shifting land to high-value crops would achieve the largest revenue gains. With its better connectivity and access to densely populated areas, Java is particularly attractive for cultivating fruit and vegetables. In total, these provinces could increase their revenue from crop production by about \$51 billion.

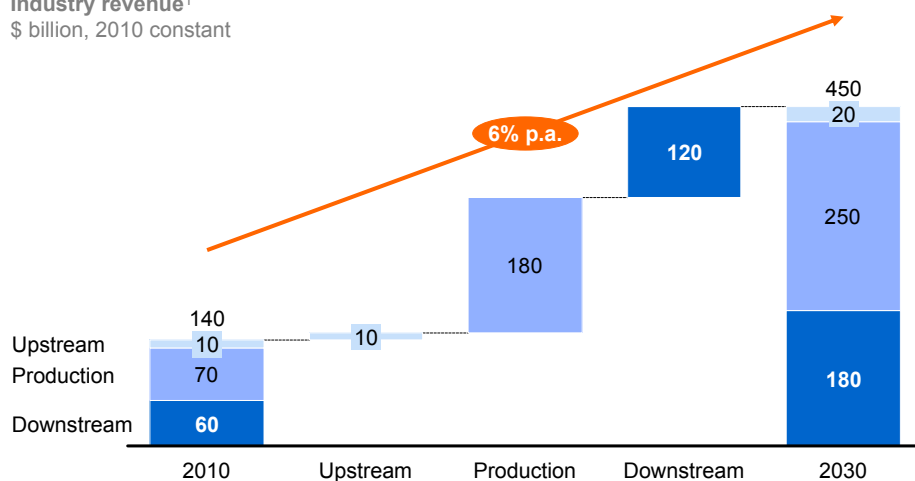
70 Morocco Ministry of Agriculture; World Bank Databank; *Putting the new vision for agriculture into action: A transformation is happening*, World Economic Forum's New Visions for Agriculture initiative with McKinsey & Company, 2012.

Exhibit 19

Revenue from agriculture and fisheries production and related industries could be \$450 billion by 2030

Industry revenue¹

\$ billion, 2010 constant



¹ Rounded to the nearest \$10 billion.

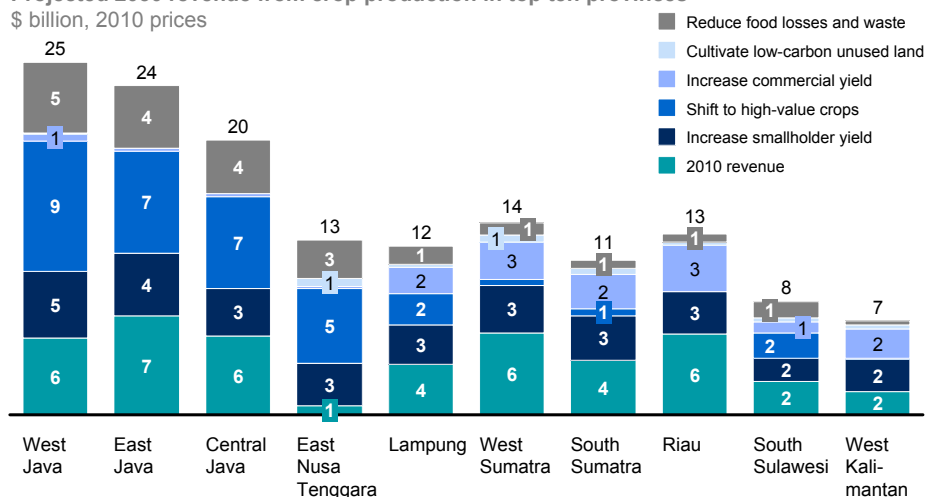
SOURCE: International Fertilizer Industry Association (IFA); ICIS Pricing; AMIS Global; Philips McDougall; Dataindo Inti Swakarsa (DIS-IBISWorld); Indonesian Food and Beverage Association (GAPMMI); Ministry of Industry; Ministry of Agriculture; International Institute for Applied Systems Analysis (IIASA); Ministry of Marine Affairs and Fisheries; McKinsey Global Institute analysis

Exhibit 20

The revenue gains from crop production vary according to the province

Projected 2030 revenue from crop production in top ten provinces

\$ billion, 2010 prices



Revenue increase from 2010

20

17

14

12

9

8

7

7

6

5

NOTE: Numbers may not sum due to rounding.

SOURCE: Food and Agriculture Organization; IIASA; Ministry of Agriculture; Ministry of Forestry; McKinsey Global Institute analysis

3.3 Create a resource-smart economy

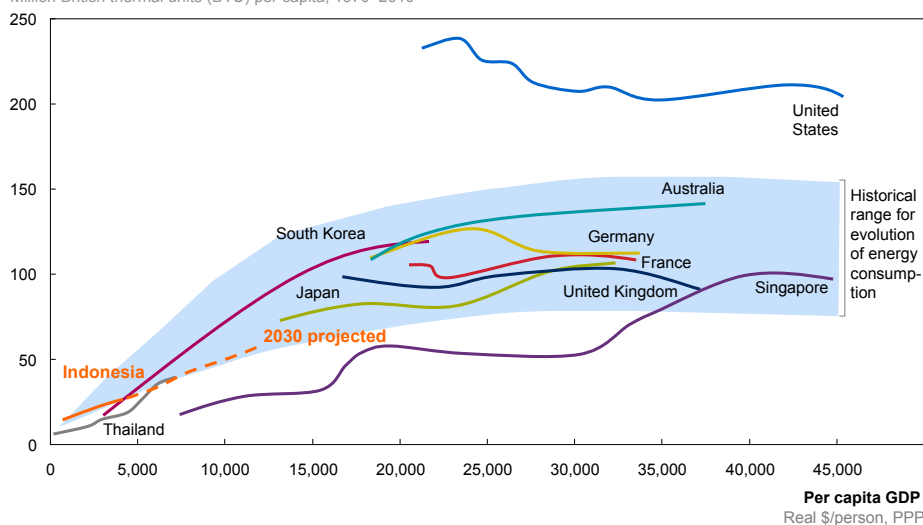
Indonesia is entering a period of resource-intensive growth during which demand for energy, materials, water, and other key resources is likely to increase rapidly as its consuming class grows (Exhibit 21).⁷¹ Demand for energy could nearly triple from six quadrillion British thermal units (QBTUs) today to 17 QBTUs by 2030. Demand for steel could soar by more than 170 percent from nine million tons to 25 million tons. Domestic and municipal demand for resources is also expected to rise. Expanding populations, particularly in cities, will make even more urgent today's need to expand access to clean water, basic sanitation, and reliable electricity supply. We estimate that 55 million of Indonesia's poorest people, accounting for 20 percent of the total population, will have no access to basic sanitation and that 25 million will lack access to water of a decent quality in 2030. In this section, we explore how to create a more resource-smart economy; having discussed agriculture in the previous section, we do not include that sector here.

Exhibit 21

Indonesia's economy will enter a resource-intensive stage of development in the period to 2030

Per capita energy consumption

Million British thermal units (BTU) per capita, 1970–2010



SOURCE: International Energy Agency (IEA); Global Insight; McKinsey Global Institute analysis

Soaring demand for resources without doubt risks opening up a larger gap with supply, thereby imposing even greater pressure on Indonesia's already stretched infrastructure. It also leaves a large share of the population still lacking access to basic resources and could potentially have broader economic repercussions (see Box 9, "Infrastructure challenges").

⁷¹ In this section, we consider Indonesia's energy, materials, and water needs between now and 2030. For the sake of simplicity, we have chosen to focus on energy (fuel and power), steel, and water needs, as these are the most critical resources Indonesia will need to drive its economy and meet the demands of a growing and increasingly urban population.

Box 9. Infrastructure challenges

In the mid-1990s investment in infrastructure in Indonesia amounted to nearly 8 percent of GDP. This class of investment plunged to around 3 percent after the Asian financial crisis before subsequently rising slightly to around 4 percent in recent years. However, this share is still considerably lower than that of around 7 percent in China, Thailand, and Vietnam, for instance.¹ This underinvestment is the main reason that more than a quarter of Indonesians lack access to electricity and 43 percent lack basic sanitation and that more than half of the country's roads are unpaved.² Executives name infrastructure as a major stumbling block for not only industry but also overall productivity.³ Any visitor to the country's capital will be familiar with the problem posed by 1.5 million vehicles using roads designed for one million. Traffic congestion alone costs the city an estimated \$1 billion a year in lost productivity. With the number of vehicles growing at ten times the rate at which road capacity is expanding each year, this obstruction to higher productivity will only get worse.⁴

1 *Indonesia economic quarterly: Current challenges, future potential*, World Bank, June 2011.

2 Indonesia National Electric Company (PLN) annual report 2011; World Development Indicators and Global Development Finance, World Bank Databank.

3 *Local economic governance: A survey of business operators in 245 districts/ municipalities in Indonesia 2011*, Regional Autonomy Implementation Monitoring Committee (KPPOD) and The Asia Foundation.

4 "Jam Jakarta: The race to beat total gridlock," *The Economist*, February 4, 2010.

But there is a positive side to this story. Rising demand and growing energy scarcity mean that prospecting for, and developing, innovative local energy sources will be increasingly profitable. In the energy sector alone, the opportunity could be worth an incremental \$140 billion in 2030 compared with today. Indonesia is home to 40 percent of the world's potential geothermal energy sources, which, if fully exploited, could generate up to 24 terawatt hours of energy. Coal will remain abundant despite growing local demand, providing opportunities beyond power generation including developing industries in coal-to-liquids and coal-to-olefins as the associated technologies mature and become economic. Unconventional gas (notably coal-bed methane) presents further potential in downstream commercialisation, including the production of liquefied natural gas and compressed natural gas as fuels, and further development of the petrochemicals sector. Strategic geographic opportunities also exist in hydropower, biofuels, biomass, and solar power, especially on islands or isolated areas without access to grids.

A decisive move to manage demand and increase the supply of resources, in as productive a way as possible, could head off even higher resource prices and greater environmental damage and maximise the value of the opportunity for the private sector.

GROWING DEMAND FOR RESOURCES WILL POSE FIVE KEY RISKS

The addition of 1.4 billion Asian members of the world's consuming class by 2025 at a time when the global supply of resources is already constrained will impose five main risks on Indonesia.⁷²

1. Higher, more volatile prices and limited resource availability may jeopardise economic growth

Because its economy is at a relatively early stage of economic development, Indonesia spends a fairly large share of its GDP on resources. Indonesia's energy bill amounts to about 11 percent of GDP, compared with Japan's 4 percent.⁷³ This leaves Indonesia particularly vulnerable to global energy price shocks and greater volatility that can dampen long-term economic growth by increasing uncertainty among investors. International investors already perceive Indonesia as riskier than its peers.

The availability of resources, such as natural gas for power generation and oil for industrial purposes, is also a concern. Indonesia's poor electricity distribution has hampered industrial growth in recent years and is a significant reason that manufacturing is not as developed in Indonesia as in neighbouring countries. In an Asia Foundation survey of 13,000 businesses in 2010 and 2011, about half reported experiencing power outages at least three times a week.⁷⁴ As a result, many businesses have to generate their own electricity or secure backup energy sources, raising their operating costs.

2. Rising energy subsidies could place an even greater strain on public finances

In 2011, Indonesia's government spent \$14.5 billion on energy subsidies, a sum that dwarfs public expenditure on education and health care combined.⁷⁵ If subsidies were to be maintained at this level, we project that taxpayers could face a subsidy bill of \$44 billion by 2030—triple the amount they pay for subsidies today.

Proponents of energy subsidies argue that there is a social benefit in making energy more accessible to lower-income groups. However, the government estimates that 70 percent of energy subsidies benefit the top 40 percent of households by income; the bottom 40 percent of households receive less than 15 percent of subsidies.⁷⁶ The direct benefit to businesses of energy subsidies also appears to be skewed toward foreign energy companies and a handful of large domestic energy players at the expense of often more entrepreneurial, smaller-scale Indonesian producers of geothermal or biomass energy. For such reasons, Indonesia's minister of finance recently stated his aim to decrease energy subsidies to zero over time.⁷⁷

⁷² Homi Kharas, *The emerging middle class in developing countries*, OECD Development Centre working paper number 285, January 2010.

⁷³ Statistical review of world energy 2011, BP.

⁷⁴ *Local economic governance survey 2011*.

⁷⁵ Indonesian National Budget (APBN) 2011, Indonesian Ministry of Finance.

⁷⁶ Indonesian Coordinating Ministry of Economic Affairs, 2008.

⁷⁷ Minister of Finance Agus Martowardojo, interview with Detik Finance, April 28, 2011, <http://finance.detik.com/>.

3. Increasing dependence on fossil fuels could harm environmental sustainability

On business-as-usual projections, Indonesia's dependence on fossil fuels will increase between now and 2030. We estimate that 66 percent of the country's primary energy demand will be met by oil and coal in 2030, compared with 51 percent today (Exhibit 22). As a consequence, Indonesia could have an unwelcome rise of 160 percent in carbon emissions from energy sources alone by 2030.

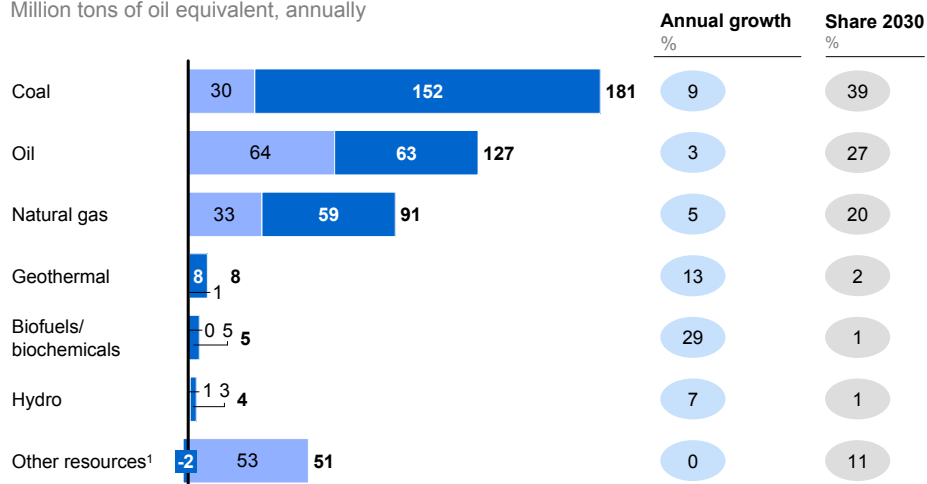
The particular features of Indonesia's climate and geography mean that continuing climate change over the next 20 to 40 years could have serious adverse effects, including reduced agriculture yields, flooding of low-lying coastal areas, and damage to fisheries through reduced coral reefs.

Exhibit 22

Indonesia's future energy and fuel mix will likely continue to be heavily dependent on oil and coal

Indonesian primary energy demand, 2030

Million tons of oil equivalent, annually



¹ Solar, fire wood, dung, and biomass for power (rice residues, sugar, rubber, palm oil, and agribusiness co-generation).

NOTE: Numbers may not sum due to rounding.

SOURCE: IEA; FACTS; ASEAN (Association of South East Asian Nations); McKinsey Global Institute analysis

4. Dependence on imported resources could threaten resource security

Indonesia is growing increasingly dependent on a few energy sources whose supply is declining even as demand for them climbs. For instance, we project that around 75 percent of Indonesia's demand for oil in 2030 will have to be met by imports, exposing the country to greater energy security risks.

Indonesia's dependence on foreign steel is also expected to grow as industrial expansion and increasing steel intensity in construction raise demand. In 2010, 87 percent of Indonesia's nine million tons of demand for finished steel was met by imports from a relatively small group of countries; Japanese imports alone accounted for 21 percent of all steel consumption.⁷⁸ Awareness of this risk is growing, and the government announced a plan to levy a 20 percent export tax on iron ores—and then dropped the idea.⁷⁹ Unless steel efficiency increases,

⁷⁸ *Indonesia steel industry 2011*, Emerging Markets Direct, 2011.

⁷⁹ "Indonesia sets June base price for metal ore exports," Bloomberg, June 4, 2012.

we estimate that 90 percent of Indonesia's estimated demand of 25 million tons for finished steel by 2030 will have to be met through imports, even if there are modest increases in the local production of iron ore and smelting.

5. A large share of the population will continue to lack access to basic resources

Indonesia's underinvestment in infrastructure is the main reason for poor levels of access to electricity and water and, as demand rises and resources become increasingly scarce, existing inequalities in access to basic resources such as water and electricity could persist. Today, Indonesia's electrification ratio—the percentage of households with access to electricity—stands at 74 percent, compared with 81 percent in the Philippines and 98 percent in Vietnam.⁸⁰ The issue is particularly acute in some remote regions, including East Nusa Tenggara, where about 63 percent of households lack access to electricity.⁸¹ The relative unreliability of electricity supply is a further complication. In 2011, the World Bank ranked Indonesia 161st out of 183 countries on the ease of securing reliable electricity supply, behind both the Democratic Republic of the Congo and Albania.⁸²

Improving access to safe water sources and basic sanitation is even more urgent. Today, a mere 17 percent of households in Indonesia have piped water.⁸³ Even taking into account other improved water sources (e.g., wells, bottled water), only 82 percent of Indonesians have access to safe water sources, a share similar to Bangladesh and lower than most other Asian economies.⁸⁴ Indonesia could have enough accessible, reliable, and environmentally sustainable water sources to meet water demand. However, according to research conducted by McKinsey as part of the 2030 Water Resources Group, Indonesian demand in 2030 will outpace this supply by 18 percent, or 13 billion cubic metres, based on existing water supply. This is because individuals in the growing urban population will use more water and the agriculture sector will need more water as an input in order to increase production and meet the demands of urban consumers (Exhibit 23).⁸⁵

Despite considerable efforts by the government and aid agencies such as AusAID to extend access, we estimate that 25 million Indonesians could still lack access to safe water by 2030 and more than double that number could lack access to basic sanitation unless more is done. Today, problems in securing access to water and sanitation are mostly confined to rural areas. But Indonesia's rapid urbanisation rate means that standards of water supply and sanitation could become even more problematic. By 2030, we estimate that 15 million urbanites may lack access to safe water, compared with ten million in rural areas.

80 Indonesia National Electric Company (PLN), *Annual report 2011*; International Energy Agency statistics.

81 National Electricity Company (PLN) press release, October 2011.

82 *Doing business in Indonesia 2012*, World Bank and International Finance Corporation, 2012.

83 *Independent evaluation of Australian aid to water supply and sanitation service delivery in East Timor and Indonesia*, AusAID, 2009.

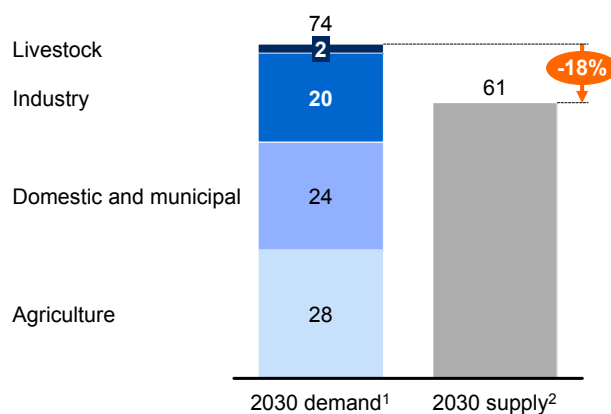
84 Statistics from the World Health Organisation (WHO)/United Nations Children's Fund (UNICEF) Joint Monitoring Programme for Water Supply and Sanitation, 2010.

85 *Charting our water future: Economic frameworks to inform decision-making*, 2030 Water Resources Group, 2009.

Exhibit 23

Indonesia could face a gap in its water supply of around 18 percent by 2030

Water supply and demand—2030 projection
Billion cubic metres



- 1 We measure demand for water in two ways: withdrawal and consumption. Water withdrawal is actual water abstracted for agricultural, industrial, or municipal use. However, there are return flows—some of the water withdrawn flows back to the basin and could be available for downstream use. Water consumption refers to withdrawals adjusted for return flows.
- 2 Based on existing water supply so this doesn't include planned but unfunded water infrastructure expansion. Assumed to be total renewable water resource including return flows that is accessible, 90 percent reliable, and environmentally sustainable.
- SOURCE: 2030 Water Resources Group; McKinsey Global Institute analysis

BOOSTING RESOURCE PRODUCTIVITY COULD SAVE RESOURCES AND HELP MEET DEMAND—BUT BARRIERS NEED TO BE TACKLED

Indonesia might consider how to become “resource-smart” to mitigate present risks and reap the full potential opportunity that it could seize from this sector. Integrated initiatives to shape the demand, supply, and distribution of resources, using a combination of innovative public-sector policies and private business strategies, would make a useful contribution. We estimate that by improving energy efficiency, Indonesia could reduce energy demand by as much as 15 percent and generate resource savings of up to \$47 billion a year as well as annual societal benefits of up to \$13 billion by 2030 (Exhibit 24).

In the power sector, Indonesia today loses about 10 percent of the power generated during transmission and distribution, compared with 4 percent in Malaysia and 6 percent in Thailand.⁸⁶ Yet Indonesia has scope to make better use of more efficient technologies such as supercritical coal and combined cycle gas turbines that could increase coal utilisation from today's average of 33 to 48 percent and deliver up to 300 terawatt hours in energy savings by 2030.⁸⁷ In transport, Indonesia could save up to 215 terawatt hours through measures including paving the half of roads that are unpaved today.⁸⁸ More savings could come from improving vehicle fuel efficiency and shifting urban consumers to more fuel-efficient light vehicles. In buildings, constructing more energy-efficient

⁸⁶ *Trends in global energy efficiency: Indonesia country report 2011*, ABB, 2011.

⁸⁷ See *Indonesia's greenhouse gas abatement cost curve*, Indonesia National Council for Climate Change, August 2010. It should be noted that although technologies such as these have positive returns on investment in the long term, the relatively large amount of capital investment required may inhibit uptake.

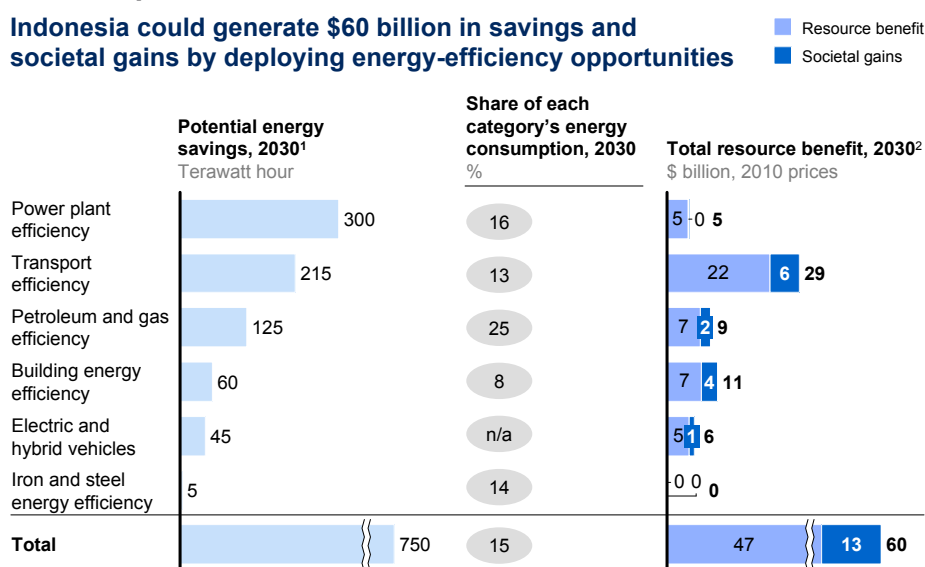
⁸⁸ Ibid.

buildings (and retrofitting existing structures) while Indonesia is rapidly urbanising could generate up to 60 terawatt hours in efficiency savings.

Improving water productivity could save up to 29 billion cubic metres of water a year by 2030, reducing demand for water in 2030 by about 39 percent compared with projected business-as-usual demand. Today, up to half of Indonesia's piped water supply is estimated to be lost in transmission.⁸⁹ Even in Jakarta, as much as 51 percent of water is lost.⁹⁰ Rehabilitating old and damaged water infrastructure to plug leaks could save up to 2.5 billion cubic metres a year, or nearly 20 percent of the shortfall in the water supply that we project by 2030 on current trends. But we estimate that the rehabilitation would require \$47 million a year in additional investment. Indonesia could also construct links between its river basins and transfer water from basins with a surplus to those with water deficits. Another measure could be to encourage the use of germplasms (e.g., seeds) in agriculture that are better adapted to regional water conditions; we estimate that could generate savings of up to two billion cubic metres of water a year and potentially increase yields.

Exhibit 24

Indonesia could generate \$60 billion in savings and societal gains by deploying energy-efficiency opportunities



1 Rounded to the nearest five terawatt hours.

2 Includes societal gains and resource gains. Societal gains represent the incremental savings once subsidies and carbon (priced at \$30 per tonne of carbon dioxide equivalent) are taken into account. Resource gains represent the direct savings based on current resource prices.

SOURCE: Indonesia's greenhouse gas abatement cost curve (DNPI); McKinsey Global Institute analysis

89 National Development Planning Agency (BAPPENAS) press release, 2011.

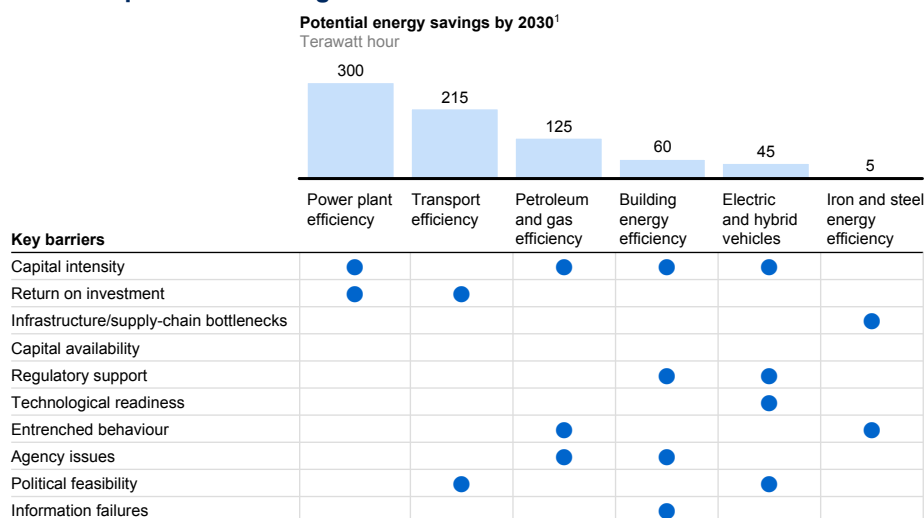
90 Achmad Lanti et al., *The first ten years of implementation of the Jakarta Water Supply 25-year concession agreement (1998–2008)*, Jakarta Water Supply Regulatory Body, 2009.

To realise the potential savings from energy efficiency that we have identified, a range of barriers would need to be overcome, including low rates of return and difficulties in accessing sufficient capital, as well as agency issues (Exhibit 25).⁹¹

Exhibit 25

Achieving the main energy productivity opportunities would require overcoming a series of barriers

ENERGY EXAMPLE



1 Based on current prices for energy and steel plus unsubsidised water prices and a shadow cost for carbon. Rounded to the nearest five terawatt hours.

2 Includes air, land, and sea transport.

SOURCE: Indonesia's greenhouse gas abatement cost curve; McKinsey Global Institute analysis

Possible ways to address these barriers could include the creation of incentives to address low internal rates of return on measures to improve resource productivity. About 65 percent of the measures we have identified, especially those that would make electricity generation and transportation more efficient, have internal rates of return of less than 10 percent.⁹² Policy makers could make subsidies conditional on users meeting power-efficiency targets, and they could provide tax rebates to households and business on their spending to improve energy efficiency in buildings. They can also help to mobilise capital by making investing in resource-efficient projects more attractive. One option would be to invest in, or facilitate, more public-private projects that increase energy efficiency, such as retrofitting energy-inefficient power stations or expanding public transport networks.

Another way to address failures is to collect and use information effectively, for instance by improving the collection and sharing of data on energy use. If sellers of newly constructed buildings were obliged to publish their energy ratings or car manufacturers to indicate clearly the fuel efficiency of vehicles, then potential purchasers could understand how much they could expect to spend on energy if they bought the item in question. The United States has introduced such measures; one-quarter of new buildings in 2010 had Energy Star ratings

91 For a description of the barriers, see *Resource revolution: Meeting the world's energy, material, food, and water needs*, McKinsey Global Institute and McKinsey & Company's sustainability & resource productivity practice, November 2011 (www.mckinsey.com/mgi).

92 *Indonesia's greenhouse gas abatement cost curve*, Indonesia National Council for Climate Change, August 2010.

indicating their energy efficiency.⁹³ In South Africa and Singapore, electrical appliances carry compulsory energy-efficiency ratings. Raising awareness of energy efficiency can also be effective. Surveys in developing economies including India and China have indicated a lack of awareness among business managers of measures they could take to use resources more efficiently. Some governments address this information gap by sponsoring energy-efficiency audits. For instance, in 2006 the US Department of Energy sponsored an assessment of steam systems and process heat in 200 facilities. More than 60 percent of the resulting recommendations—worth \$307 million in savings—were implemented within six months by the plants that took part in the assessment, and leaders at 90 percent of the participating plants said the audit played an influential or highly influential role in their decision to implement energy-saving projects.

INDONESIA NEEDS TO RAMP UP LOCAL SUPPLY OF RESOURCES

Indonesia's supply of resources needs to be significantly higher if it is to meet rising domestic demand. Take gas as an example—we estimate that, unless the nation exploits new gas assets, Indonesia will become a net importer of gas by 2019, while today it exports about one-quarter of this resource. But if Indonesia developed domestic primary resources including coal, geothermal, and biomass, we estimate that the energy market could be worth about \$210 billion in 2030, compared with \$70 billion today, excluding downstream activities such as petrochemicals (Exhibit 26).

We expect conventional energy sources to continue to provide about three-quarters of Indonesia's primary energy supply, arguing for continued investment in these forms of supply. However, we also find that five unconventional forms of energy could together meet up to 20 percent of Indonesia's energy needs by 2030. Geothermal energy, biofuels, biomass, and solar could grow rapidly to reach a total market value of about \$40 billion by 2030, while the market for the fifth "game-changing" energy source of unconventional gas (especially coal-bed methane) could reach up to \$20 billion by 2030. Developing such energy resources could reduce Indonesia's dependence on oil and coal by almost 15 percent and help reduce emissions by almost 10 percent compared with business as usual. Indonesia could use its abundance of renewable feed stocks to produce exports of biofuels and, potentially, bioplastics, at the same time as meeting local energy demand.

Some of these unconventional energy sources, including biomass, will require further advances in technology to become commercially viable on a large scale; others, including geothermal energy, already have attractive economics. Our analysis indicates that geothermal power generation costs about 6.7 US cents per megawatt-hour to produce, less than half the cost of diesel power generation at an estimated 15.3 US cents per megawatt-hour and slightly less than the cost of combined cycle gas turbine power generation of about 7.0 US cents per megawatt-hour. Geothermal power-generation facilities have zero fuel costs and a typical lifetime of 30 years, compared with 25 years for conventional power generation facilities.

93 *Energy Star and other climate protection partnerships*, 2010 annual report, US Environmental Protection Agency.

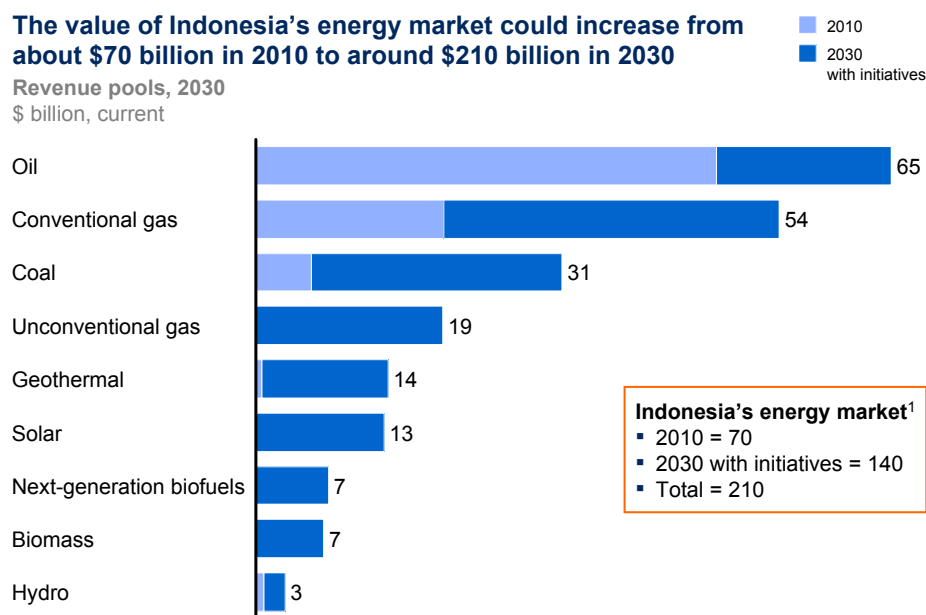
Indonesia still needs significant investment in its energy supply infrastructure if it is to connect to centres of demand. We estimate, for instance, that the current shortage of gas in Java (especially West Java) will grow nearly ten-fold by 2020 unless infrastructure is built to transport gas from regions with surpluses such as Sumatra and Kalimantan. Significant investment in gas transmission and distribution infrastructure, such as pipelines and liquefied natural gas re-gasification facilities, is necessary to ensure that Indonesia can meet demand for gas in Java.

Much of the investment required to boost supply is capital-intensive. We estimate that developing geothermal energy, for instance, would require triple the amount of capital expenditure per unit of power generated, compared with conventional methods of power generation. The exploitation of new sources of conventional energy will also entail higher development costs. Some new gas assets could cost almost four times as much to exploit as existing assets. It would be desirable if government support for such investment were to continue but in a more transparent and predictable manner.

Exhibit 26

The value of Indonesia's energy market could increase from about \$70 billion in 2010 to around \$210 billion in 2030

Revenue pools, 2030
\$ billion, current



1 Rounded to the nearest \$10 billion

SOURCE: IEA; FACTS; ASEAN; McKinsey Global Institute analysis

For some renewable technologies, including biofuels and solar power, operational expenses remain a barrier to investment. The government could attract investment through subsidy schemes such as feed-in tariffs.⁹⁴ These are currently used by at least 65 countries, including Taiwan and Malaysia.⁹⁵

Beyond direct support, it would be useful if the regulatory landscape were more conducive to the private-sector expansion of resource supply. Reforms to land law, for instance, could make it simpler and quicker for businesses to obtain land

⁹⁴ Feed-in tariff systems typically involve long-term contracts for power production with purchase prices based on the (typically higher) cost of generation. Tariffs are typically ratcheted down later on in the contract period.

⁹⁵ *Overview of the feed-in tariff system in Malaysia*, Sustainable Energy Development Authority of Malaysia.

titles and necessary approvals. Sector-specific reforms are also desirable. In coal mining, for example, coal contracts of work could be granted for longer periods to encourage exploration for resources in areas with more untapped resources such as Papua and Sumatra.

INDONESIA HAS IMPROVED CITIZENS' ACCESS TO RESOURCES BUT THERE IS MORE TO DO

We find that the biggest barrier in the way of providing more comprehensive access to water and electricity in Indonesia is underinvestment in infrastructure. The government has taken encouraging steps to address this problem, including naming infrastructure one of 11 national priorities and setting an infrastructure spending target of about \$200 billion in 2010 to 2014. The government's medium-term development plan anticipates that the federal government will fund 29 percent of this spending.⁹⁶ Reform of the regulatory environment is under way, including a recent law making it easier for the government to acquire land for infrastructure projects and new laws allowing for more private-sector participation in them.⁹⁷ The government is also aiming to build more support for public-private partnerships through measures including the establishment of an Infrastructure Guarantee Fund to assess public-private partnership projects and guarantee government obligations (see Box 10, "Indonesia could further encourage public-private projects in resources sectors").

In addition to creating a business environment more conducive to investment in infrastructure, the government could consider ramping up capacity for the generation of electricity, accelerating its Crash I and Crash II programmes, for instance, and delivering the water supply sustainably.⁹⁸ The experiences of China and Vietnam prove that government attention to providing basic resources can ensure near-universal access to them in a fairly short time. Extending existing grids is the most cost-effective solution to providing access to electricity and water in urban areas or large remote communities.

The government might consider investing in extending transmission and distribution networks on large islands that already have grids. For instance, it could extend Sumatra's grid to more areas in the southern provinces, where only 75 percent of households have access to electricity, and connect the grid to Java.⁹⁹ Similar programmes in South Africa extended access to 2.5 million households in less than seven years.¹⁰⁰ Over time, Indonesia could consider building transmission capacity in Kalimantan and Sulawesi. In areas where it is not feasible to extend access to the grid—including medium-sized islands and rural areas—renewable energy sources such as geothermal, hydroelectric, and biomass would be particularly appropriate for generating power and distributing it through mini-grids. In addition to improving access, mini-grids offer opportunities

96 Deyi Tan, *Indonesia infrastructure: A \$250 billion opportunity*, Morgan Stanley, May 2011; *Masterplan: Acceleration and expansion of Indonesia economic development 2011–2025*, Coordinating Ministry for Economic Affairs, Republic of Indonesia, 2011.

97 For example, law number 30/2009 on electricity services provision.

98 Crash I is a 10,000 megawatt-hour project managed by the Indonesian National Electric Company (PLN) consisting of a total of 35 coal-fired power plants with a focus on Java. Crash II is a 10,580 megawatt-hour project managed by PLN and the private sector. The energy mix in this case is based on hydro, geothermal, gas, and coal, and has a broader geographical reach.

99 Indonesian National Electric Company (PLN), *Annual report 2011*.

100 *Energy for a sustainable future*, The [UN] Secretary-General's Advisory Group on Energy and Climate Change, April 2010.

for developing smaller local and regional businesses and jobs, for example in collecting biomass from plantations, and reducing the environmental impact. However, realising this opportunity will require significant initial capital investment. Government loans could help, as they have in similar circumstances in Bangladesh and Tunisia.¹⁰¹ Indonesia could also consider how to develop off-grid solutions for the most remote communities on the archipelago. Solutions such as solar household systems or small-scale hydroelectric generators could be used to deliver power to single points of demand.

Box 10. Indonesia could further encourage public-private projects in resources sectors

Indonesia has successful public-private partnerships in the resources sector. For instance, the Central Java Coal-Fired Power Plant partnership offers a guarantee that covers the National Electric Company's obligations to investors and any government force majeure events, helping to allay institutional investors' perceptions of the riskiness of long-term infrastructure investment in Indonesia. The project has raised nearly \$3 billion in foreign direct investment, and the 2,000-megawatt facility is expected to improve access to electricity for 7.5 million people.¹ However, in general, take-up of public-private partnerships remains low, and Indonesia could consider several measures to tackle this.

- **Identifying a lead PPP agency.** Most countries have a single lead public-private partnership agency to achieve consistency and ensure the replication of best practice. In Indonesia, responsibility for partnerships is shared between the coordinating minister for economic affairs and the state minister for national development planning, creating duplication and coordination issues.
- **Deepening local bond markets.** Indonesia's debt market is relatively small—at about 15 percent of GDP—compared with the equity market. Indonesia's infrastructure requirements would be better served by non-bank financial institutions, such as insurance companies and pension funds, which have longer-term funding structures but that today have only about one-quarter of the government bond market.²
- **Revising the universal electricity tariff structure.** Today, Indonesia has a single tariff across regions despite the fact that low-density areas have higher production costs. Differentiated tariffs would help to cater for these regional variations (with any potential adverse equity impacts offset through more targeted welfare measures). Indonesia could also create mechanisms for more flexible tariff-setting so that they keep track of evolving production costs. Today, tariffs must be approved by policy makers, and the decisions are often politicised. Transparent, systematic tariff-setting mechanisms would make the electricity and water infrastructure sectors more attractive to private players.

1 *Success stories: Public-private partnership*, International Finance Corporation Advisory Services, 2012.

2 Edward Lee Wee Kok et al., *Indonesia in the super-cycle*, Standard Chartered Global Research, October 2011.

3.4 Invest in skill building

Indonesia has already made considerable progress on education and skills since the nation's independence after World War II. However, the supply of workers educated at the secondary and tertiary levels is still expected to fall short of demand, potentially preventing Indonesia from reaping the full benefits to growth offered by its young and expanding population. We estimate that to deliver our base-case annual GDP growth of 5 to 6 percent a year, Indonesia would need to boost its number of workers from 109 million today by an additional 43 million workers. The number of skilled workers needs to increase by a very substantial 60 million people from 55 million today to 113 million in 2030 (those with secondary or tertiary educational qualifications), assuming that productivity growth remains at historical rates, at the same time as addressing current concerns about the quality of education and the employability of recent graduates.

World Bank research suggests that human capital is a key hurdle standing in the way of developing a vibrant manufacturing sector in Indonesia. According to a World Bank survey, 84 percent of employers in the manufacturing sector reported problems in filling management positions and 69 percent found it difficult to source other skilled workers.¹⁰²

DESPITE GROWING NUMBERS OF EDUCATED WORKERS, SUPPLY IS LIKELY TO FALL SHORT OF DEMAND

The nature of Indonesia's workforce has changed dramatically since independence. At that time, nearly all Indonesian workers were informally employed in agriculture. Today, informal work still employs about 70 percent of the workforce, but the services sector has now overtaken agriculture as the economy's largest employer. Services account for 47 percent of all employment, compared with 39 percent in agriculture and 14 percent in industry. As the nature of the economy has changed, Indonesia has responded by vastly expanding education. As a result, since independence the adult literacy rate has risen from around 5 percent to 92 percent. Today, 95 percent of Indonesians of school age are enrolled in primary school, a level that matches or exceeds those in more developed Asian countries, including China and Malaysia. Annual enrolments in tertiary education have increased from around 5,000 at independence in 1949 to more than one million in 2010.

By 2030, we expect that one in five Indonesians will be in public or private education, including around 9 percent of the working-age population. Around 60 percent of those of working age will have at least a secondary school education, up from 50 percent today. We envisage 12 percent of the working-age population having a tertiary qualification by 2030, double the share today.

¹⁰² *Indonesia skills report: Trends in skills demand, gaps, and supply in Indonesia*, World Bank, 2010.

Nevertheless, in the face of strongly rising demand for skilled labour, we expect Indonesia to face a large skills gap. Growth in demand for semi-skilled and skilled labour will be especially high. We project that demand for workers educated to the tertiary level will more than triple from 2010 by 2030, and that demand for semi-skilled—those with secondary educational qualifications—will almost double to an estimated 88 million in 2030.

There are several reasons for this rising demand for more educated workers. First, agriculture has traditionally been the largest employer of less educated workers but, as agriculture's share of the Indonesian economy shrinks, we estimate that the sector will employ only 23 percent of the workforce in 2030, compared with 39 percent in 2010. Second, growth in service sectors will require more educated workers. We expect services to expand their share of the economy to 68 percent of GDP in 2030 from 49 percent today. Our analysis finds that, by 2030, these sectors will require 90 percent of their workforce to be semi-skilled or skilled, compared with an 80 percent share in manufacturing and only 40 percent in agriculture. We expect 70 percent of all semi-skilled and skilled workers to have jobs in services in 2030, with the finance, insurance, and real-estate sector alone requiring 2.2 million more workers educated to the tertiary level.

To meet this demand for skills, it would be useful for Indonesia to consider how to accelerate its output of graduates and increase the participation of women in the economy. We estimate that to meet demand for skills in 2030, Indonesia needs to increase the number of lower-secondary students produced by the education system by 2.7 percent a year, significantly faster than the 1.3 percent rate achieved between 1994 and 2010. The number of students educated to the upper-secondary level needs to increase by 3.7 percent a year, up from 2.2 percent, and Indonesia's output of university graduates needs to double, from 2.9 percent a year to 5.9 percent. On the second front of women's participation, today only 54 percent of women of working age participate in the labour force, compared with 64 percent of women in Thailand and 84 percent of Indonesian men in this age bracket.¹⁰³ If Indonesia were to increase female participation to the level of Thailand, 20 million semi-skilled to skilled workers could be added to the labour force (see Box 11, "Raising women's participation in the Indonesian labour force").¹⁰⁴

103 Indonesia's Central Bureau of Statistics; World Development Indicators and Global Development Finance, World Bank Databank.

104 A survey by Indonesia's Central Bureau of Statistics concludes that the women's participation rate could increase to the level of Thailand if women that had left the workforce but would like to return did re-enter the labour market. McKinsey research on the topic identifies a number of barriers preventing women from re-entering the workforce. See *Unleashing women's leadership in Indonesia survey*, Femina Group, May 10, 2012.

Box 11. Raising women's participation in the Indonesian labour force

Disparities between men's and women's participation in Indonesia's labour force are most pronounced at the professional level. McKinsey's recent work on women's participation in the Indonesian labour force indicates that, although 47 percent of entry-level professionals are women, that proportion dwindles to 20 percent of middle managers and only 6 percent of CEOs.¹ Moreover, the situation does not appear to be improving. Over the past 20 years, women's overall participation in the labour force has increased by a mere 0.7 percent to a current level of 54 percent.²

The case for increasing women's participation in Indonesia's labour force is one of not only equity but also economic necessity. First, higher female participation is a strong driver of economic growth. Between 1970 and 2010, the share of women in the US labour force increased by 11 percent, making the US economy 25 percent bigger than it would have been otherwise.³ Second, research has shown that businesses with more women in the workforce perform more effectively. Greater representation of women in top management positions correlates with better organisational health and improved business performance. This finding appears to resonate with Indonesian business leaders—71 percent of those surveyed recently by Femina Group believe that companies with greater gender diversity produce a better financial performance.⁴

1 *Unleashing women's leadership in Indonesia survey*, Femina Group, May 10, 2012.

2 Indonesia's Central Bureau of Statistics.

3 *Women matter*, McKinsey & Company, 2010.

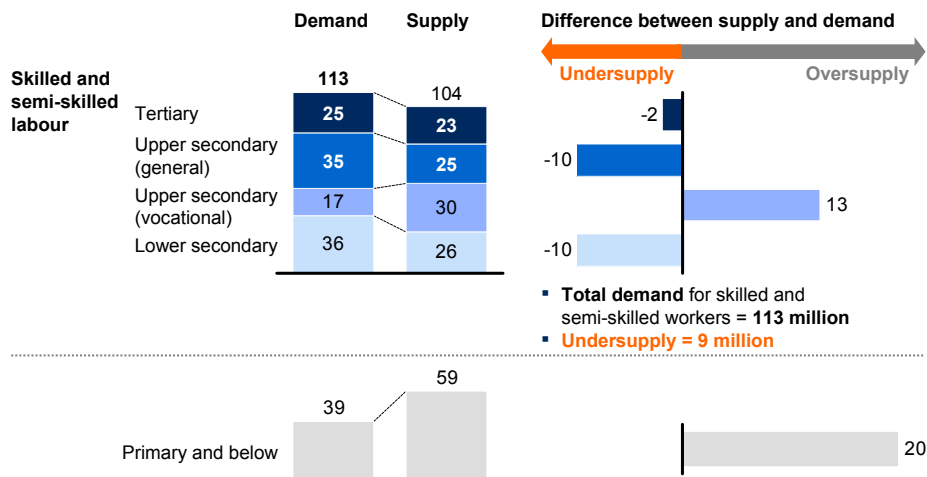
4 *Unleashing women's leadership in Indonesia survey*.

We believe that the female labour participation rate will continue its current rising trend and increase to the level of Thailand by 2030 but, in a business-as-usual scenario, this is not enough to close Indonesia's skills gap. We expect the gap between demand and supply to be nine million skilled people—that is, with secondary and tertiary educational qualifications. To put that number into context, it is nearly the population of Jakarta. Today, 60 percent of employers report difficulty in filling professional positions. More than 95 percent of employers expect that the skill levels required of their employees will need to rise over the next decade. The gap between supply and demand is acute for workers at the tertiary level. By 2030, we estimate there will be a shortfall of nearly two million tertiary-educated workers. Our estimates indicate that in 2030 Indonesia will be short of three million secondary- and tertiary-level graduates majoring in science or engineering, which is more than the current population of Surabaya, Indonesia's second-largest city. Sectors such as manufacturing, mining, construction, and professional services may experience difficulty in filling 40 to 50 percent of the posts that require a tertiary education. In addition, there will be an undersupply of almost ten million general upper-secondary graduates. In this case, the retail, hotel, and restaurant industry, which will hire 35 percent of its employees from this graduate group, will be hit the hardest. However, we project an oversupply of as many as 13 million vocational graduates by 2030 according to business-as-usual projections. This projection raises doubts about the government's stated intention of expanding vocational enrolments further so that they make up 70 percent of all upper-secondary enrolments (Exhibit 27).

Exhibit 27

Indonesia is projected to face challenges in ensuring that workers receive the right level of education

Workforce demand vs. supply, 2030 projections
Million workers



SOURCE: Indonesia's Central Bureau of Statistics; CEIC Data; United Nations Statistics Division; World Bank; The Economist Intelligence Unit; McKinsey Global Growth Model; McKinsey Global Institute analysis

Closing the skills gap will require significant investment and innovation. Assuming that the government continues to spend about 3 percent of GDP a year on public education, there could be a gap of \$8 billion a year by 2030 (given total demand for education in 2030 and assuming that the public cost to educate each student remains as a constant share of GDP/capital). Indonesian law compels the government to allocate at least 20 percent of the national budget to education, but actual spending has been well below this threshold. Between 2005 and 2010, the Ministry of Education's budget in relation to overall central government expenditure ranged from 8 to 13 percent.¹⁰⁵ Moreover, both central and regional governments have had difficulty spending their budgets.¹⁰⁶ For instance, about \$1.7 billion of the Ministry of Education's budget remained unspent at the end of 2010.

We do not believe that all of Indonesia's skills needs will be met by the public sector. We project that demand for private education in Indonesia will balloon with the market potentially growing nearly four-fold from \$10 billion to an estimated \$40 billion in 2030. We estimate that the number of students in private education will nearly double to 27 million by 2030 (Exhibit 28).

¹⁰⁵ Ministry of Finance.

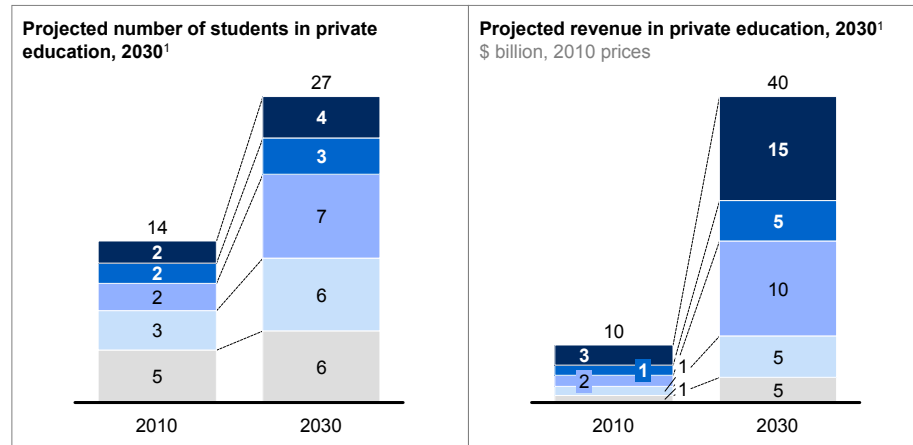
¹⁰⁶ Edward Lee Wee Kok et al., *Indonesia in the super-cycle*, Standard Chartered Global Research, October 2011.

Exhibit 28

We project a large increase in demand for private education

Million students

■ Tertiary
■ Upper secondary (general)
■ Upper secondary (vocational)
■ Lower secondary
■ Primary



¹ Assumes private-sector spending per student and public-sector spending on education rise at the same rate vs. per capita GDP. Private tuition costs at a 40 percent premium to public tuition.
NOTE: Total revenue figure for 2010 and all revenue figures for 2030 rounded to the nearest \$5 billion. Other numbers may not sum due to rounding.
SOURCE: Indonesia's Central Bureau of Statistics; CEIC Data; United Nations Statistics Division; UNESCO; McKinsey Global Growth Model; McKinsey Global Institute analysis

The way that public money on education is spent is at least as important as the total amount spent. McKinsey's international work on education shows that education outcomes do not always correlate to expenditure and that investment in teacher training has had a significant impact.¹⁰⁷

Even if Indonesia were to produce sufficient numbers of people educated at all levels necessary to meet the demands of the labour market, several other issues remain:

- Quality of education.** Several indicators suggest that the outcomes produced by the Indonesian education system need to improve. Indonesia's scores on standardised international tests are rather weak. For instance, on the Trends in International Mathematics and Science Study (TIMSS) tests in maths between 1999 and 2007, Indonesia's scores were below the international average and lagged behind all participating East Asian countries except for the Philippines. There were mixed signs of improvement on these tests—Indonesia's TIMSS scores were largely unchanged during this period although there was solid improvement on the OECD Programme for International Student Assessment (PISA) scores.¹⁰⁸ Indonesia's universities also lag behind institutions in Singapore, Malaysia, and Thailand in global university league tables.¹⁰⁹ The World Bank found in its assessment of skills in Indonesia that around 30 percent of employers mentioned the low quality of local training as the largest factor behind a perceived skills shortage.¹¹⁰ Almost one-third of

¹⁰⁷ *How the world's most improved school systems keep getting better*, McKinsey on Society and McKinsey & Company, 2010.

¹⁰⁸ Trends in International Mathematics and Science Study (TIMSS) International Data Explorer, United States National Center for Education Statistics.

¹⁰⁹ The Times Higher Education Supplement, 2011; QS World University Rankings, Quacquarelli Symmonds, 2011.

¹¹⁰ *Indonesia skills report: Trends in skills demand, gaps, and supply in Indonesia*, World Bank, 2010.

employers rated the quality of recent hires from secondary schools as below average or less, with most of the remainder being rated as merely fair.

- **Employability of graduates.** A number of measures indicate that graduate skills do not currently match those required by employers. The World Bank found 41 percent of employers reporting gaps in the ability of their skilled workers to think creatively and critically and a further 47 percent expressing the opinion that their skilled employees lack sufficient computer literacy. Language skills also appear to be an issue, with 48 percent of employers saying that their skilled employees lack proficiency in English. Even young Indonesians seem to agree with these assessments—56 percent report that they feel only somewhat prepared or poorly prepared to enter the workforce.
- **Educational equity in urban and rural areas.** Several studies show that Indonesia still faces an unequal distribution of education between urban and rural areas. A 2007 World Bank study showed that 37 percent of primary schools in rural areas had an undersupply of teachers, about 50 percent higher than schools in urban areas.¹¹¹ The shortage of teachers was even more serious in remote and border areas, where two-thirds of the primary schools lack sufficient teaching staff. Another survey showed that in rural areas only half of pupils at the secondary level are in school, compared with more than 70 percent in towns and cities.¹¹² These findings suggest that a large number of children of secondary-schooling age in rural areas leave full-time education after finishing primary school (at the age of around 14) to start work in agriculture or likely to move to urban areas for a job. However, because they are not equipped with adequate skills and education in comparison with local urban graduates, they will face fierce competition in searching for jobs and thriving in urban areas. Raising education levels in rural areas will require a major commitment from the government to allocate education funding and teachers in a more balanced way.
- **Rigid labour restrictions.** In 2003, the government introduced a manpower law that significantly enhanced labour rights and made the Indonesian labour market more flexible. However, the law also introduced rigid regulations relating to dismissals and generous provisions concerning strike action.¹¹³ For instance, severance payments are required by law to be worth at least 100 weeks of wages—effectively a tax on employment that disproportionately affects employment of tertiary-educated workers who are paid significantly more in the formal employment sector.¹¹⁴ As a result, companies have taken to employing workers on fixed-term contracts, which are required by law to last a maximum of three years with no possibility of extension. Contract workers also receive fewer protections under the law. The bifurcated labour market produced by the law is one reason for the Constitutional Court's recent ruling that the current labour regime is unfair and unlawful. The burdensome regulations and the uncertainty introduced by the court's ruling have affected investor confidence and appear to have contributed to Indonesia's anaemic employment growth recently. Over the past decade, employment has grown

111 F. Javier Arze del Granado et al., *Investing in Indonesia's education: Equity and efficiency of public expenditure*, World Bank policy research working paper number 4329, August 2007.

112 *Indonesia demographic and health survey, 2002–2003*, Badan Pusat Statistik-Statistics Indonesia and ORC Macro, 2003.

113 *Indonesia economic quarterly: Looking forward*, World Bank, September 2010.

114 *Labour law: Measure plus: Indonesia*, Business Growth Initiative, USAID, April 2011.

at an annual rate of only 1.9 percent, less than half the annual GDP growth of 5.2 percent.

- **Restrictions on hiring expatriate workers.** Strict regulations on the employment of expatriates and a lack of compliance guidelines mean expatriates and their employers are often unintentionally in violation of Indonesian labour law.¹¹⁵ At least 12 permits from different agencies need to be obtained for an expatriate worker to be hired. In addition, employers must hire an Indonesian “counterpart” for every expatriate hired to allow a transfer of skills, although, because “counterparts” are not clearly defined, it is not uncommon to find drivers employed as “counterparts” to corporate managers. Similarly unclear are the protections to which expatriate workers are entitled and whether these are different from those available to Indonesian workers.

THERE ARE THREE PRACTICAL WAYS TO IMPROVE THE QUALITY OF EDUCATION

Indonesia’s Ministry of Education has put in place a promising strategic plan to improve the quality of education.¹¹⁶ The plan includes teacher certification, improvements to pre-job and on-the-job training, and teacher development programmes. We see three priority areas that could complement efforts already under way as the Indonesian government moves to meet its human capital challenge by 2030.

1. Raise the standard of teaching significantly

Numerous observers consider raising the standard of teachers as a necessary foundation for a more educated and competitive Indonesian workforce.¹¹⁷ Recognising this need, the Indonesian government initiated a programme of reforms in 2004, including a major push to certify all teachers and double the base salary of certified teachers. However, we view several additional steps as necessary to ensure that teachers are better equipped to prepare students today for the workforce of tomorrow:

Make teaching careers more attractive to talented individuals by creating a more tailored and appealing teacher value proposition

- **Offer competitive compensation.** Before the 2004 reforms, Indonesian teacher salaries were lower in real terms than those in most other developing Asian countries, including India, the Philippines, and Sri Lanka.¹¹⁸ Under the 2005 Teacher Law, the salaries of certified teachers should have doubled, but the law has not been fully implemented and teachers still earn less than other civil servants. A more lucrative compensation scheme could attract higher quality candidates to apply to become teachers. For instance, in Singapore, teachers receive salaries comparable to those of entry-level accounting and engineering positions in the private sector during their four-year degree in education. This has enabled the Singaporean National Institute of Education

115 Susan E. Beaumont and Alvira M. Wahjosoedibjo, *Expatriate compliance issues in Indonesia*, Baker & Mackenzie, October 2010.

116 Indonesian Ministry of Education’s 2010–2014 strategic plan.

117 “From pre-service training to retirement: Producing and maintaining a high-quality, efficient and motivated workforce,” Volume 2 of *Transforming Indonesia’s teaching force*, World Bank, April 2010.

118 UNESCO Institute for Statistics, 2004/2005 data.

to recruit teachers exclusively from the top 30 percent of each cohort of graduates.

- **Emphasise professional development.** Indonesian teachers are not provided with regular training to upgrade their skills and often lack access to new knowledge and information. Providing teachers with regular in-service training and options to join different career tracks (e.g., in administration or research) could enhance the attractiveness of the teaching profession. For instance, research conducted by the Singaporean Ministry of Education has found that an emphasis on professional development (Singaporean teachers are entitled to 100 hours of such development a year) has made teaching more attractive as a profession and more highly regarded by society. In Finland, all teachers are required to complete a master's degree in service if they do not already have one. Steps like these have resulted in teachers becoming more ambitious and effective.
- **Raise the quality bar.** Research shows that there is an average 53 percentile point difference between students who are taught by teachers who themselves came from the top 20th percentile versus teachers who came from the bottom 20th percentile.¹¹⁹ This is why South Korea recruits teachers from the top 5 percent of performers in school and Finland chooses them from the top 10 percent of each cohort of graduates. Currently about 50 percent of the three million primary and high school teachers in Indonesia do not hold bachelor's degrees. A competency test taken by 281,016 teachers in 2012 produced an average score of 42.25 out of 100. According to the Department of Culture and Education, the low scores were largely due to the fact that many teachers are mismatched to the subjects they teach. Since the decentralisation of teachers' appointments in 2000, local governments have appointed and allocated teachers, but, especially outside big cities, local officials have experienced difficulties in matching teachers to the subjects in which they are qualified. With 30 percent of all teachers retiring from Indonesia's civil service over the next ten years, Indonesia has a unique opportunity to redefine its education system by targeting high-performing students to become teachers, raising the selection bar, and tightening the application process. Applicants for teaching positions in Singapore, for instance, undergo a four-step screening process that includes several interviews by boards of three experienced headmasters, each checking for the right attitude, aptitude, and personality.¹²⁰
- **Elevate the status of teaching.** Prominent teaching programmes targeted at high-calibre candidates such as Teach for America in the United States and the Mengajar (teaching) programme in Indonesia have had notable success in improving the status of the teaching profession (see Box 12, "Indonesia Mengajar"). Subject to proper evaluation of its impact and cost effectiveness, increasing the scale of Indonesia Mengajar could be an important additional opportunity to promote education equity in rural areas. Targeted marketing campaigns can also play a role in raising the status of teaching. The United Kingdom ran an intensive "Making a Difference" media campaign involving high-profile public figures aimed at creating public recognition of the contribution teachers make to society. Australia's Victorian Institute of

119 William Sanders and June Rivers, *Cumulative and residual effects on future student academic achievement*, University of Tennessee, 1996.

120 Interviews, Ministry of Education, Singapore.

Teaching ran a media campaign in which celebrities wrote to thank teachers who had helped shape their lives and were sometimes reunited with them.

Box 12. Indonesia Mengajar

“Educating is the responsibility of those who are educated”—this was the spirit with which Anies Baswedan, also a rector of Paramadina University, established Indonesia Mengajar in 2009. The programme, which has much in common with the well-known Teach for America and Teach First programmes in the United States and the United Kingdom, recruits and trains top-performing young Indonesians to teach in schools in remote, impoverished areas. Successful applicants typically have advanced degrees from the country’s most prestigious universities and/or professional careers in leading Indonesian and international bodies. They undergo two months of intensive training on topics ranging from problem solving to techniques for adapting to rural life before being deployed to teach in some of the most remote locations in the Indonesian archipelago for a year.

In the process, the young teachers develop leadership skills and an understanding of remote communities, rural students gain a role model, village teachers receive exposure to new teaching techniques, and the host communities obtain a passionate educator. Participants have helped set up public libraries and given public classes on topics such as hygiene and sanitation. In the three years since its launch, nearly 20,000 Indonesians have applied to Indonesia Mengajar.

Implement rigorous standards and independent quality assurance to ensure students are taught the right skills at consistent levels across institutions

Measures could include:

- Setting minimum proficiency targets for schools and students, initiating a system of annual or semi-annual student learning assessments linked to lesson objectives, and tracking performance data to monitor progress, all of which are approaches that Chile has taken since 2001.
- Reviewing the educational outcomes and quality of all institutions and publishing results periodically, as the United Kingdom’s Ofsted and New Zealand’s Education Review Office do.
- Ensuring that all teachers meet minimum standards by continually monitoring them and providing coaching on the curriculum from specialists who visit schools and work with teachers in the classroom, an approach that the Brazilian state of Minas Gerais has adopted.
- Significantly improving the effectiveness of school management by professionalising school leaders. For instance, to develop teachers’ capabilities, Singapore’s Ministry of Education requires new school leaders (e.g., heads of department) to attend a 17-week Initial Leadership Programme resulting in a diploma that is then followed by an extended period of apprenticeship. Potential principals are required to attend a further six-month Leadership in Education Programme modelled on executive master

of business administration (MBA) programmes to prepare them to lead their schools effectively.¹²¹

2. Develop a more demand-driven curriculum

Indonesia could also consider how to improve the matching of educational provision to the likely needs of employers. Such an effort would require government to work closely with employers to design and update the curriculum, especially in vocational subjects, and employers to collaborate with educational institutions to deliver the training. In response to demand from employers, the curriculum should encourage critical and creative thinking, computer skills, and proficiency in English.

One model that Indonesia could emulate is the German dual system of apprenticeships in which young people can opt for classroom tuition combined with vocational training at a company, earning a small wage in the process. In the United States, 27 independent tech centres in Tennessee tailor curricula to meet the needs of local employers, developing them jointly with managers from local industries. The China Vocational Training Holding Company is China's largest provider of vocational education for the automotive industry, training 100,000 students in partnership with all the major car manufacturers.¹²² The Indonesian government could facilitate greater private-sector involvement in the education system by "catalysing" the formation of consortia to carry out vocational training and by providing capital to help them set up training institutions.

It would be useful if the government were to find ways to help young people to understand what potential employers need, perhaps by broadcasting employers' skill needs more precisely. Such information could help match young people more efficiently to promising employment opportunities and ensure that they can take relevant courses. AMS Career Guidance Centres in Austria provide a model for how to do this. At the centres, students can seek guidance on a variety of career questions including whether there is demand for workers in a particular industry. They can also receive gender-specific job advice. The quality of vocational courses and educators also needs to be transparent. In Brazil, the Provão National Graduation Course Ranking provides this assurance.

3. Develop new educational pathways

A study conducted by the Bank of Indonesia discovered that no significant structural changes in Indonesia's labour market over the past decade had taken place in part because of poor workforce mobility. Workers in the agricultural sector, which employs almost 40 percent of the workforce today, were found to be the least mobile due to their low levels of education and lack of skills.¹²³

As Indonesia's economy evolves, it will have to provide re-skilling opportunities to create a more agile workforce responsive to changing economic needs. In India, Dr. Reddy Foundation "LABS" retrain people with low skills and carry out "livelihood mapping" in order to tailor training to the local labour market and develop curricula in conjunction with private-sector partners. They also use an "interest inventory" test to categorise candidates and direct them to appropriate

121 Singapore National Institute of Education Web site.

122 The China Vocational Training Holding Company Web site.

123 Meily Permata, Yanfitri, and Andry Prasmuko, "The labour shifting in Indonesian labour market," *Bulletin of Monetary Economics and Banking*, Bank Indonesia, Volume 12, Number 3, January 2010.

courses. In 2009, the foundation trained 46,000 students and placed 37,000 of them with private-sector employers—an impressive 80 percent placement. Similar approaches are taken by Grameen LABS and Cisco Networking Training Academies across South Asia.

Indonesia could also look at other educational formats in order to extend provision to the broadest possible number of citizens. Technology can enable distance learning, as shown by the Web-based, interactive courses offered by the University of Phoenix in the United States. In the United Kingdom, the Open University has long offered distance learning to adults that gives these mature students a high degree of flexibility—a part-time, one-year degree can be taken over two years or a compressed three-year degree completed in two. The Open University uses a system of credit-based modules that allows students to choose how many courses to take each year so they can reach the total number of credits required to achieve a degree at their own pace. This has made the Open University particularly popular among mature students (78 percent of its students are over 25 years of age).¹²⁴ In Indonesia, the distance learning model has been implemented with some success through the Indonesian Open University, or *Universitas Terbuka* (UT), which has been running since 1984 and has graduated more than one million students. The university is making efforts to improve the quality of its teaching and was awarded the Quality Certificate by the International Council for Open and Distance Education in 2010. However, with about 80 percent of its student body being made up by teachers, UT's reach is still rather limited and largely one-dimensional. Another option would be to provide accreditation that recognises the non-formal education provided by some employers, as Chile does through the National System of Labour Competences Certifications, and South Korea through the Academic Credit Bank System.

124 The Open University Web site.

4. A \$1.8 trillion business opportunity by 2030

If the government and the private sector initiate a productivity revolution across the key sectors that we have discussed—namely consumer services, agriculture and fisheries, and resources—and meet the nation's skills challenge, Indonesia could create a very substantial opportunity for the private sector that we estimate could be worth as much as \$1.8 trillion by 2030, compared with \$0.5 trillion today (Exhibit 29).¹²⁵

Exhibit 29

Four Indonesian sectors offer a potential \$1.8 trillion business opportunity by 2030

Estimated annual revenue, 2030¹
\$ billion, 2010–11 prices

		Projected growth, 2010/11–30	Compound annual growth rate, 2010/11–30 %
Consumers	1,070	810	7.7
Agriculture and fisheries	450	310	6.0
Resources ²	270	200	7.0
Private education	40	30	7.2
Total	1,830	1,350	7.3

1 Rounded to the nearest \$10 billion.

2 Only includes upstream energy market, and savings and societal value from increased energy efficiency.

SOURCE: McKinsey Global Institute analysis

¹²⁵ This estimate does not cover the full range of opportunities within these four key sectors. For example, in resources, we have not included the potential of downstream activities such as petrochemicals or certain upstream activities like minerals or service industries build around the sector. The consumer opportunity that we have estimated does not include automotive sales, for instance.

- **Consumer services.** With an additional 90 million consumers expected in Indonesia, consumer spend in urban areas could increase at 7.7 percent a year to become a \$1.1 trillion business opportunity by 2030. The total opportunity could increase to \$1.5 trillion if Indonesia were to achieve the government's 7 percent annual GDP growth national target, a growth rate that would result in 125 million new consumers. There will be business opportunities across consumer services but the largest will be in financial services.
- **Agriculture and fisheries.** Revenue from these sectors, together with their related upstream and downstream industry revenue, could increase at a rate of 6 percent a year to reach \$450 billion by 2030. Increased agricultural production would stimulate growth in the agriculture input and downstream processing sectors. If both these sectors grow at the same rate as the agriculture and fisheries industry, they stand to gain \$130 billion a year from 2030. Within East, West, and Central Java, the largest revenue gains can be achieved by shifting land to high-value crops. With its better connectivity and access to densely populated areas, Java is particularly attractive for cultivating fruit and vegetables. In total, these provinces can increase revenue from crop production by about \$50 billion. Java would generate more than 30 percent of the combined revenue opportunity from production.
- **Resources.** In 2030, the Indonesian energy market could be worth about \$270 billion, including both the opportunity in new sources of energy and the savings from pursuing energy-efficiency measures. New sources of energy such as geothermal and biofuels could grow rapidly at rates of more than 10 percent a year to become a \$63 billion market. However, the largest potential of an estimated \$150 billion is likely to continue to come from oil, gas, and coal. Measures to increase energy efficiency could be worth \$60 billion in savings and societal value by 2030.
- **Private education.** Indonesia could develop large new education markets as it strives to match the supply of skilled workers to soaring demand. Our analysis suggests it would cost around \$70 billion a year to develop the new skills required to support the economy's growth trajectory. We project demand for private education in Indonesia will soar, with the market growing four-fold from \$10 billion today to \$40 billion in 2030. If this opportunity is realised, up to 13 million semi-skilled and skilled workers could be added to the labour force.

THERE ARE FOUR MAIN IMPLICATIONS FOR BUSINESSES AS THEY APPROACH INDONESIA

We believe there are four main implications of these opportunities for business:

- **Multinationals and local companies need to rethink their country footprint.** In 2011, 80 percent of foreign direct and local investment was confined to Java.¹²⁶ However, given that cities outside Java are projected to grow faster than Indonesia's capital, this geographically focused approach will no longer capture the full opportunities that Indonesia has to offer in the period to 2030. Companies need to build up detailed knowledge about a range of dynamic middleweight cities across the archipelago and rethink their footprint and strategy accordingly, allocating resources to match the shifting distribution of Indonesian growth. The fact that the Indonesian market has considerable infrastructure challenges and a highly dispersed customer base means that companies would do well to use new channels such as mobile banking in the financial services industry and take advantage of trends such as the increasing penetration of the Internet and mobile subscriptions.
- **Companies need to accommodate changing and more demanding consumer needs and behaviour.** The addition of 90 million members to Indonesia's consuming class with considerable discretionary spending power is an undoubted market opportunity. Companies need to get to know the consumer preferences and spending patterns of this expanding group to ensure that their products and services meet changing needs. Examples of new growth areas might include leisure facilities and more advanced financial products.
- **Businesses need to find new ways of partnering with government to address critical barriers to growth.** Businesses will need to work together with Indonesia's government to address many of the challenges ahead. However, cooperation between the public and private sectors is not easy, and businesses will need to learn from the failures and successes of past partnerships around the world. Understanding the priorities of central and local government, and determining how or whether these align with business priorities, is an ever-present imperative. One option would be to pilot partnerships through "lighthouse projects" that focus on a particular area (e.g., food waste) and/or defined geographical area before scaling up more broadly to help ensure that these projects assemble the right set of actors.
- **Businesses need to do more to develop and secure talent.** The public sector in Indonesia needs to invest in developing a pipeline of future talent, and businesses have a key role to play in working with government to provide training and financing. Wherever they operate, companies need to be more proactive in developing and securing high-performing talent, especially management talent with entrepreneurial drive. Past research conducted by McKinsey and the London School of Economics confirms a correlation for individual companies between a high standard of management with higher total factor productivity, a higher return on capital employed, and higher sales growth, regardless of the company's geography, sector, and size.¹²⁷

¹²⁶ BKPM, *Statistic of foreign direct investment realization based on capital investment activity report by location*, 2011.

¹²⁷ *Management matters*, McKinsey & Company and the Centre for Economic Performance, London School of Economics, 2005.



Indonesia's economy holds a great deal of promise in the years ahead, with important and sweeping local and international trends giving the nation a dynamic platform for future prosperity. The question now is whether Indonesia can make the most of its very positive hand. The imperative today is for Indonesia to manage the once-in-a-generation trends that set the parameters of its economic opportunity in a way that minimises risks and maximises the opportunity. Boosting the productivity of key sectors would be a useful centre of the nation's economic strategy to 2030. If policy makers are proactive in creating a productivity revolution, Indonesia's size, youth, diversity, and geographic location at the centre of the world economy's most dynamic region will offer very significant potential for investors and companies. Indonesia has a rich agenda that would sound an alarm call for those businesses and investors that have not yet woken up to the potential of the archipelago economy.

Appendix: Technical notes

This appendix outlines key aspects of the methodology employed in this report under the following headings:

1. Urbanisation: Urban GDP and population model
2. Consumer services: Consuming class, urban household distribution and expenditure model
3. Agriculture and fisheries
4. A resource-smart economy
5. Skill building

1. URBANISATION: URBAN GDP AND POPULATION MODEL

The urban areas in the database refer to integrated urban areas rather than specific city jurisdictions, aggregating cities (*kota*) and districts (*kabupaten*) into a single urban centre where appropriate. We used Indonesia's Central Bureau of Statistics (BPS) definitions of urban and rural areas to make this classification. The GDP and population size statistics used in this report will reflect not just the city centre but also the whole of the district in which the urban centre is located.

We constructed a model to forecast GDP for different regions by using GDP data per area from 2002 to 2010 to estimate the compound annual growth rate as base for future projections. To project population sizes, the compound annual growth rate of the population from 2000 to 2010 was used, where available, or alternatively from 2007 to 2008, and applied to the size of the 2010 population. We used the year-on-year growth of the urban population from 2009 to 2010 to project the urban share of the population in 2030, with the rural share treated as the residual. Finally, we allocated urban GDP in 2030 based on the forecast population split with an adjustment to reflect higher average urban incomes based on income data from the 2010 Population Census.

GDP and population data came from BPS and the 2010 Population Census. The data set covers more than 400 cities and districts, or more than 90 percent of Indonesia's GDP and population. We used the United Nations Population Division's forecasts to estimate Indonesia's total population and McKinsey's Global Growth Model to forecast the urbanisation rate.

2. CONSUMER SERVICES: CONSUMING CLASS, URBAN HOUSEHOLD DISTRIBUTION AND EXPENDITURE MODEL

We developed our consuming class and urban household forecasts by employing the same methodology, which is the basis for the expenditure model.

We estimated urban household income segments by taking household income distribution data from the McKinsey Indonesia Consumer and Shopper Insight (CSI Indonesia 2011) model as a basis for our projections. The survey covers household income segments and their respective expenditure at detailed product categories based on 5,000 households in 44 cities in Indonesia. We combined these data with growth rates for different household income segments as well as per capita estimates from the Canback Global Income Distribution Database (C-GIDD) adjusted for overall GDP growth.

The results of the McKinsey Indonesia Consumer and Shopper Insight survey for household distribution fall within the mean of other estimates of household distribution. Using Bank Indonesia classifications of low-income households earning less than 20.4 million Indonesian rupiah, middle-income households earning between 20.4 million and 65.6 million rupiah, and high-income households earning more than 65.6 million rupiah in today's values, we estimate that 33, 58, and 10 percent of households will fall within the low-, medium-, and high-income households groups, respectively. Our findings fall between those of Susenas, the socio-economic survey from BPS, which estimates 66 and 34 percent of low- and middle-income households, the Economist Intelligence Unit's projection of 20, 59, and 21 percent for the three income classes, and Bank Indonesia's projection of 22, 61, and 17 percent, respectively.

We use C-GIDD data for personal income estimates. These data are in line with other organisations' estimates of personal income. Using the World Bank's classification of low-income individuals with annual income of less than \$720, middle-income individuals of between \$720 and \$7,200, and high-income individuals of more than \$7,200, we use C-GIDD data that estimates that 10, 84, and 6 percent of the population fall into the low-, middle-, and high-income brackets, respectively. These estimates are higher than those of Standard Chartered Bank at 43, 57, and 0.2 percent for the three income brackets but in line with forecasts by economists interviewed in the course of this work.

For the expenditure model, we estimated 2010 urban expenditure, matching the categories included in the CSI Indonesia survey and triangulating against national accounts data. We forecast 2030 urban expenditure by multiplying estimated number of urban households in 2030 per income segment with average expenditure per household in each income segment and for each product category in 2011.

3. AGRICULTURE AND FISHERIES

3.1 Bringing unused degraded, low-carbon land into production

Data from the Ministry of Forestry were used to determine the amount of land under different types of land cover for each province.¹²⁸ All bush, shrub, grass, and barren land was used as a proxy for unused, degraded, low-carbon land.

Based on expert interviews, we assumed that 30 percent of all unused low-carbon land was able to be brought into production (with the other 70 percent deemed unsuitable due to unfavourable agro-ecological conditions that preclude using the land for crop production or the fact that settlements are already established in those areas and that their inhabitants are unwilling to use the land for agricultural production).

3.2 Smallholder and commercial farm yield improvements

Fourteen crops (rice, cassava, oil palm, maize, rubber, coconut, sugar cane, sweet potato, potato, soybean, cocoa, coffee, tea, and tobacco) and one crop category (fruit and vegetables, comprising banana, orange, pineapple, cabbage, chilli, and mango) made up 90 percent of both the total volume of agricultural goods produced and the agricultural area planted in 2010. We selected these 14, together with the fruit and vegetables category, to represent national agricultural crop production in the country.

We used data from the International Institute for Applied Systems Analysis (IIASA) and the agro-ecological zone assessment of the Food and Agriculture Organization (FAO) to determine the maximum yield possible on rain-fed land for cassava, cocoa, coconut, coffee, maize, oil palm, rice, soybean, sugar cane, sweet potato, tea, and tobacco under three types of farm management: IIASA does not have data for all 14 of the crops we have selected.¹²⁹ Three archetypes of farms were used to estimate yield improvement opportunities.

- **Low-level inputs/traditional management.** This farming system is largely subsistence rather than market-oriented. Production is based on traditional cultivars (if improved cultivars are used, they are treated in the same way as local cultivars), labour-intensive techniques, no application of nutrients, no use of chemicals for pest and disease control, and minimum conservation measures.
- **Intermediate-level inputs/improved management.** This approach aims to produce crops for both subsistence and commercial sale. Production is based on improved varieties, on manual labour with hand tools and/or animal traction, and some mechanisation. It is medium labour-intensive; uses some fertiliser and chemical pest, disease, and weed control; adequate fallows; and some conservation measures.
- **High-level inputs/advanced management.** This system aims mainly to produce for commercial sale. Production is based on improved, high-yielding varieties, is fully mechanised with low labour intensity, and uses optimum applications of nutrients and chemical pest, disease, and weed control.

¹²⁸ Ministry of Forestry, Landsat Satellite Imagery 7 ETM+ year 2009/2010, interpretation in 2010, publication in 2011.

¹²⁹ Günther Fischer et al., *Global agro-ecological assessment for agriculture in the 21st century*, International Institute for Applied Systems Analysis and Food and Agriculture Organization, 2002.

To determine the current levels of farm management level, we took 2010 smallholder and commercial yields for each crop in each province, drawing on information from the Ministry of Agriculture (with comparisons to IIASA's yield potential data). The modelling then assumed that current yields could be improved to the next farm management level by 2030 and assumed an additional 1.1 percent annual improvement in yields derived from genetic improvement, a figure based on historic yield improvement rates secured through genetic research. Finally, we assumed that smallholder farms can achieve 70 percent of this potential opportunity, while commercial farms can achieve 80 percent.¹³⁰

If current yields in a crop already exceed the maximum IIASA potential (possible if irrigation is used), we assumed that yields for that crop could increase only by the factor derived from genetic improvement (1.25 percent a year). For crops where IIASA data were missing, we applied the historic average yield improvement rate for the province.

We tested the resulting yield potentials with experts from the Ministry of Agriculture and made some minor adjustments (see Exhibit A1 for the estimated 2030 yields for different crops in various provinces).

Exhibit A1

Estimated yield of crops in different provinces, 2030

EXCLUDING PAPUA

Tons per hectare

	Crop	Cassava	Cocoa	Coconut	Coffee	Corn	Fruits and vegetables	Oil (palm)	Potato	Rice	Rubber	Soybean	Sugar cane	Sweet potato	Tea	Tobacco
	Average yield	24.46	1.48	1.72	1.59	6.34	26.99	5.15	21.52	7.10	2.04	3.06	8.04	13.60	1.52	0.86
Aceh		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Low
Bali		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	High
Banten		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Bengkulu		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Yogyakarta		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Jakarta		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Gorontalo		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Jambi		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Low
West Java		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Central Java		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
East Java		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
West Kalimantan		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
South Kalimantan		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Central Kalimantan		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
East Kalimantan		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Belitung		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Lampung		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Maluku		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
North Maluku		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Nusa Tenggara West		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Nusa Tenggara East		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Riau		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
West Sulawesi		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
South Sulawesi		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Central Sulawesi		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
South East Sulawesi		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
North Sulawesi		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
West Sumatra		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
South Sumatra		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
North Sumatra		High	Low	Medium	High	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium

SOURCE: IIASA; Ministry of Agriculture; McKinsey Global Institute analysis

130 D. B. Lobell et al., "Crop yield gaps: Their importance, magnitudes, and causes," *Annual Review of Environment and Resources*, Volume 34, Number 4, 2009.

3.3 Shifting production to high-value commodities

We calculated revenue per hectare of each crop by multiplying crop yields and prices. We estimated future demand by using historical demand growth, adjusted for expected changes resulting from increasing incomes. These calculations suggested that oil palm and horticulture crops (fruit and vegetables) should be selected as high-potential, high-value agricultural commodities.

For each province, we assumed that at least 45 percent of the agriculture area in 2030 would be planted with oil palm and horticulture crops. If more than 45 percent of the area of a province had already been planted with these crops in 2010, then the 2010 crop mix was used for the 2030 projections.¹³¹

Because crop prices are highly unpredictable and projections for prices inaccurate, we assumed that prices remain constant at 2010 levels (based on national average prices).¹³² For each province, we assumed that the 2010 ratio of oil palm to horticulture by area remained constant to 2030 (i.e., if no oil palm had been planted in the province in 2010, then none would be planted in 2030).

3.4 Increasing fisheries production

By 2030, we assumed that 20 percent of the potential additional aquaculture area in Indonesia is put into production and that the rate of marine capture increases by 20 percent. We based these assumptions on the current plans of the Ministry of Marine Affairs and Fisheries and the growth seen in comparable countries (e.g., Vietnam). For simplicity, we assumed that real prices remained constant.

Capture and aquaculture data come from the Aquaculture Statistics of Indonesia and Capture Fishery Statistics of Indonesia, Ministry of Marine Affairs and Fisheries. Information on maximum potential comes from the Ministry of Marine Affairs and Fisheries and a report by M. L. Nurdjana.¹³³ Data are from 2010.

3.5 Decreasing food waste

We based the amount of food lost both immediately post-harvest and throughout the rest of the supply chain on data from the FAO for “South and South East Asia”.¹³⁴ We compared current loss rates with those in “Industrialised Asia” and assumed that the gaps between Indonesia and industrialised Asia could narrow by 50 percent for perishable goods and 80 percent for non-perishable goods for post-harvest waste, and 50 percent for all products in the rest of the supply chain. Post-harvest loss rates were reduced from 15 to 13 percent for fruit and vegetables, 7 to 5 percent for cocoa, coffee, palm oil, and sugar cane, and 7 to 4 percent for coconut, rubber, soybean, tea, and tobacco. Rates for cereal and root crops remained at 6 percent as loss rates in industrial Asia were no better than in Indonesia. Value-chain loss rates were reduced from 35 to 23 percent for fruit and vegetables, and from 10 to 8 percent for cocoa, coconut, coffee, palm oil, rubber, soybean, sugar cane, tea, and tobacco. Value-chain loss rates remained constant for root crops at 21 percent.

131 Data on 2010 production and area planted come from the Ministry of Agriculture's Agriculture Statistics database.

132 Price data come from the Ministry of Agriculture's Agricultural Producer Price Statistics report, 2010.

133 M. L. Nurdjana, *Indonesian aquaculture development*, Indonesian Ministry of Marine Affairs and Fisheries.

134 Jenny Gustavsson et al., *Global food losses and food waste*, FAO, 2011.

4. A RESOURCE-SMART ECONOMY

4.1 Demand and supply

- **Energy.** We forecast energy demand in two steps. First, we estimated overall energy demand using a regression analysis of historical relationships for each sector (industrial power, residential power, commercial power, metals and steel, chemical, minerals and mining, consumer goods, construction, agriculture/pulp and paper, other industrial demand, road transportation, aviation, navigation, residential, commercial/public, and energy industry own use) and economic growth. Second, once we estimated final energy demand, we determined the equivalent primary energy demand for oil, coal, and gas.
- **Steel.** We based 2030 steel demand estimates on McKinsey's Basic Materials Institute model. The model uses a bottom-up demand projection based on the World Steel Association's short-term outlook for 2011 to 2012. Beyond that, we projected steel demand based on estimated relationships between economic output and steel intensity.
- **Water.** Our water demand estimates draw on previous work by the 2030 Water Resources Group.¹³⁵ The model covers agriculture, industrial, and municipal water requirements to 2030. For the agricultural sector, we estimated water demand using FAO estimates and internal analysis of land use. We based industrial and municipal water demand on historical relationships between water demand and economic output and population changes. We based surface water supply estimates on the IFPRI IMPACT-WATER model. It uses representative reservoir models, data on historical surface water flows and surface water variability, and estimates of the ability of infrastructure to meet water demand. The model explicitly takes into account temporal fluctuations in water demand (e.g., crop cycles and seasonal precipitation). The model also takes into account spatial constraints. To estimate groundwater supply, we used data on the renewable ground water per region.

4.2 Productivity

- **Energy.** We used the Indonesian National Council on Climate Change's Greenhouse Gas Abatement Cost Curve to calculate opportunities for increasing energy productivity in six sectors (power, transportation, cement, petroleum and refining, agriculture, and buildings).¹³⁶ The cost curve shows a range of actions to improve energy efficiency that are possible with today's technology or with technology that is likely to become available by 2030. Operating expenditure is assessed as a real amount to be paid in each year, and capital expenditure is accounted as annualised repayments. The interest rate used is the actual long-term bond rate of 4 percent, based on historical global averages. Given the long horizon of approximately 25 years, estimates are necessarily subject to a margin of error. Macroeconomic variables such as the lifetime of assets, interest rates, oil prices, and exchange rates have the highest impact on results and error margins. Individual cost estimates per lever are of lower significance and will not substantially distort overall results for each lever. The cost of implementing abatement levers is considered part

¹³⁵ *Charting our water future: Economic frameworks to inform decision-making*, 2030 Water Resources Group, 2009.

¹³⁶ *Indonesia's greenhouse gas abatement cost curve*, Indonesia National Council for Climate Change, August 2010.

of the transaction costs, involving such aspects as information campaigns and training programmes.

- **Water.** We drew on previous McKinsey analysis of water productivity levers in India to identify the biggest levers in Indonesia and to identify the key barriers to realising these efficiency opportunities. For major opportunities, such as repairing damaged water distribution networks, we calculated potential savings individually. We drew on the following sources for this analysis: a 2009 report from 2030 Water Resources Group; the National Development Planning Agency (BAPPENAS), 2011; and data from Global Water Intelligence.

5. SKILL BUILDING

5.1 Supply of human capital

We used a two-step approach to estimate the supply of human capital in Indonesia. The first step involved estimating the size of the working-age population to 2030 using data from the United Nations Population Division. We then segmented the working-age population by the level of educational attainment for each year up to 2030 using the following formula:

$$W_n = W_{n-1} + G_n - F_n - R_n$$

Where, for each educational group,

- W = working-age population with relevant educational attainment
- G = graduates with relevant educational attainment in a given year, which we assume to be the product of relevant age cohort $\times$ years ago, enrolment ratio, and graduation ratio
- F = graduates with relevant educational attainment seeking further education in a given year
- R = retiring workers with relevant educational attainment
- n = year
- x = average length of education

This second step involved estimating labour force participation rates, which were split along two dimensions: gender and highest level of educational attainment. We assumed that labour force participation rates for men remain unchanged but that those for women rise. We based the increase in female participation on the share of women today who are not in the labour force but who would like to join the labour force if barriers were removed.¹³⁷

¹³⁷ SASKERNAS (National Workforce Survey) conducted by the Indonesian Central Bureau of Statistics.

We assumed that enrolment rates continue to rise as they have done historically between 2002 and 2010. However, we capped enrolment rates at a maximum seen in benchmark countries with developed education systems (e.g., Singapore and New Zealand). We assumed that the attrition rates between grades (i.e., graduates from one level not moving to the next level of education) fall (in line with historical information), and capped this decline at the minimum seen in benchmark countries with developed education systems (e.g., Singapore and New Zealand). We assumed that graduation rates remain unchanged from today (2002 to 2010 average); we assumed that ratios of university graduates by discipline remain unchanged from today (2008 to 2010 average), and that the number of students in private education continues to rise at the same rate observed between 2003 and 2011. Historical educational data (e.g., enrolment rates, graduation rates, attrition rates between grades, and so on) largely came from CEIC Data and BPS but also from the United Nations Educational, Scientific and Cultural Organization (UNESCO).

5.2 Demand for human capital

We projected 2030 demand for human capital using three steps. First, we calculated growth in output by sector, based on historical output growth by sector in Indonesia for 2002 to 2011, which we then scaled to base-case national GDP growth of between 5 and 6 percent per annum. Second, we estimated aggregate sector employment using average sector productivity growth figures from a number of benchmark countries to estimate Indonesian annual sector productivity growth and applying this growth rate to existing productivity figures. We then used 2030 productivity data to estimate sector employment. Third, we used benchmarks from Brazil and Malaysia to estimate the breakdown of sector employment by the highest level of educational attainment of workers in Indonesia.

We made several key assumptions in the model. For the 2030 sector productivity growth projections, we assumed that the productivity in each sector grows at the rate seen in benchmark countries that have achieved the leap in per capita GDP that Indonesia would have to achieve between 2010 and 2030 to deliver the 5 to 6 percent annual GDP growth envisaged in the base case. To break down sector employment by the highest level of educational attainment, we used Malaysia in 2005 and Brazil in 2010 as benchmarks because at those times these countries were at a level of per capita income similar to the level Indonesia could reach in 2030, according to our macroeconomic projections.

Data on historical sector GDP, sector productivity, and sector employment (split by the highest level of educational attainment) came from CEIC Data and BPS. Benchmark productivity data and education levels of the workforce by sector came from the Economist Intelligence Unit and from relevant national statistical organisations including Malaysia's Department of Statistics.

5.3 Educational spending

We calculated the required level of public spending on education using the average cost to educate a student to a specified educational level and multiplying this by the number of students to be educated at each level. We estimated private educational spending in the same manner.

For simplicity, we assumed that the real average cost to educate a student to a specified level of education is the same relative share of the economy as the 2008 to 2010 average, drawn from national accounts figures. While expenditure per student may need to rise in relative terms in order to improve the quality of the education, there may be offsetting cost improvements from urbanisation and the increasing scale of educational provision. We assumed that the number of students in private education continues to grow at the same rates as from 2003 and 2010 and that private educational spending per student comes at a premium of 40 percent versus public educational spending per student.

Educational spending and private education figures come from the UNESCO Data Centre, accessed in May 2012. Cost figures come from the World Bank.¹³⁸ The historical numbers of students come from BPS.

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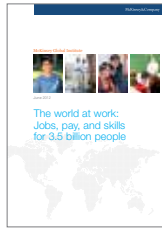
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