



Upskilling for shared
prosperity in Southeast Asia:
Fostering sustainable growth

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Foreword

Upskilling is the key to a prosperous future

Southeast Asia has enormous potential for skilled labour. It is home to the third-largest labour force in the world that is predominantly young. However, the region also faces the risk of leaving this potential untapped if it fails to create quality employment opportunities. It is critical that the region's workforce is equipped with the skills needed to shift to higher-value added jobs.

Technologies are constantly evolving, creating demand for a continually-improved workforce able to keep pace with the changing digital landscape. Despite the upfront cost of digital upskilling, there are significant benefits. Upskilling not only mitigates the structural unemployment resulting from skills mismatches but also bridges socio-economic gaps in knowledge and skills.

Given the pressing urgency for nations to mitigate climate change by transitioning to a net zero economy, a key component is to upskill workers for green jobs. The Asian Development Bank estimates that the transition to a green economy will add 30 million new jobs in Southeast Asia by 2030.¹

In the face of economic uncertainties, now more than ever, upskilling can provide opportunity for workforce agility to both the government and the private sector, to build a resilient workforce and thriving organisation.

This report highlights key areas of upskilling that the stakeholders need to focus on: digital upskilling and sustainability, as well as the potential impacts on the economy and employment. Ultimately, PwC sees four key sectors within Southeast Asia—manufacturing, agriculture, energy and utilities, financial services—as having significant potential for GDP uplift. To achieve this, governments and private sector players in Southeast Asia need to collaborate to address skills gaps and ensure the workers of tomorrow to be ready for future challenges as they pursue long-term prosperity.

The modern workplace requires an evolving workforce to stay relevant and competitive. It is essential for employees, employers and governments to have a growth mindset, to focus on being ready for future trends and challenges.



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Executive summary

Today, Southeast Asia is at an inflection point. As the world's fifth largest economy, its annual growth rate has outpaced global averages.² It is also home to a wealth of diversity, and a large share of the world's workers under the age of 30.³

Despite these unique advantages, Southeast Asia has struggled to sustain the development of its workforce participation and productivity. Over the past decade, labour force participation in some Southeast Asian countries has risen incrementally, while others have seen their rates fall significantly.⁴ The persistent gender gap—male labour force participation was found to be 9-29% higher than female across the markets—has only been exacerbated by COVID-19. The region's high informal employment rate, with about 244 million people or 78% of the region's workforce aged 15 and older without proper social protection,⁵ makes the workforce susceptible and vulnerable to crises and disruptions.

The region's long-held dependence on low-cost, low-skilled labour as a source of competitive advantage has hampered its ability to build an agile, future-ready workforce capable of responding to global trends.

This must change if Southeast Asia is to successfully transition away from labour-intensive economic activities towards knowledge-based ones, and achieve its potential.

This report is a call-to-arms for wide-scale upskilling efforts in Southeast Asia. To make the case for an upskilling revolution, we combined qualitative and quantitative research and analysis to explore key trends driving Southeast Asia's upskilling needs, existing initiatives and their potential benefits.

“The upskilling agenda to build a future-ready workforce with digital and green skills has never been more urgent. The public and private sectors across the region should work together to create an environment that enables upskilling so the region can reap the associated economic benefits.”

Martijn Schouten

Partner, Workforce Transformation Leader,
PwC South East Asia Consulting, PwC
Singapore

The report's key findings are:



The acceleration of digitalisation and the climate crisis is creating upheaval in industries. Increasing automation and the transition to a low-carbon economy in pursuit of net zero commitments may potentially lead to the decline of certain sectors and displace workers across a number of roles.



A dual-focus on digital and sustainability skills can deliver positive impacts to the economy and employment by ensuring a workforce's relevance and effectiveness. Upskilling could grow Southeast Asia's GDP by 4% by 2030—a cumulative boost valued at US\$250 billion—and unlock up to 676,000 new jobs.⁶



The **economic benefits** of upskilling will be especially felt in four key sectors: manufacturing, agriculture, energy and utilities, and financial services.



Upskilling **will empower many individual workers in informal labour sectors to move into more formal** and sustainable roles.



Upskilling **presents a great opportunity to promote diversity and inclusion across the workforce** and higher participation rates from the vulnerable groups such as females and people with disability.



The **pace of change will vary** between countries depending on economic maturity, existing skill levels and chosen approach. Most initiatives are now focused on digital skills, but **sustainability initiatives have the potential to add momentum.**



Effective collaboration between the private and public sectors will be critical to a successful transition.

Purpose and scope of the report

This report aims to assess key trends driving Southeast Asia's upskilling needs, existing upskilling initiatives and their potential benefits. Though this study presents the benefits of upskilling at both country and regional level, it is important to note that the region comprises diverse economic and cultural characteristics, as reflected by the GDP, demographics and labour force figures in Table 1.

In this report, 'upskilling' is defined as the practice of equipping a workforce with skills to participate in both the present and future economies in order to resolve current and potential skill mismatches. This definition is drawn from the joint World Economic Forum (WEF) and PwC report, ['Upskilling for Shared Prosperity'](#).⁷

This report highlights two emerging key trends in the region—the adoption of digital technologies and the increasingly prominent sustainability agenda—that are expected to bring about significant disruption and opportunity to the region's workforces.

The report also includes deep-dive analyses of upskilling's impacts on four key sectors—manufacturing, agriculture, energy and utilities, and financial services.

These sectors were selected for their significance to the region, in terms of GDP contribution and workforce involvement. The sector-specific assessment will look into how the two key trends affect these sectors as well as the impact and potential benefits due to upskilling. The report concludes with a list of recommendations for the private and public sectors to unlock opportunities for reform.

About the CGE Model

To assess the economic advantages of upskilling on national GDPs and employment rates, this report relies on PwC's Computable General Equilibrium (CGE) model to quantitatively estimate the benefits and impacts of upskilling interventions. The CGE model simulates scenarios whereby Southeast Asian countries upskill their workforces in line with the Organisation for Economic Co-operation and Development (OECD) industry leading practices. The model has been used to assess skills gaps in 12 countries and eight regions, modelling public and private sector activities across 12 industry sectors.

The CGE model can be tailored to assess the economic impacts of different policy interventions, and is widely used by international and national governments.

Table 1: GDP, population and labour force participation by Southeast Asian country

Country	GDP in current US\$ (billions, 2022) ^{8,9}	Population (millions, 2022) ^{8,9}	Labour Force Participation Rate (% , 2022) ^{10,11}
Brunei	18.5	0.4	64
Cambodia	28.3	16.0	76
Indonesia	1,289.4	274.9	67
Laos	16.3	7.5	41
Malaysia	434.1	33.1	66
Myanmar	53.9	54.8	59
Philippines	401.7	111.7	58
Singapore	423.6	5.3	70
Thailand	534.8	70.1	66
Vietnam	413.8	99.4	68

The demands of the digital present

Digital upskilling is a pressing but unmet need to close the skill gap and avoid displacement

In the past decade alone, emerging digital technologies such as artificial intelligence (AI), data analytics, automation and robotics have rapidly entered the mainstream thanks to plummeting adoption costs and an increasing number of use cases.

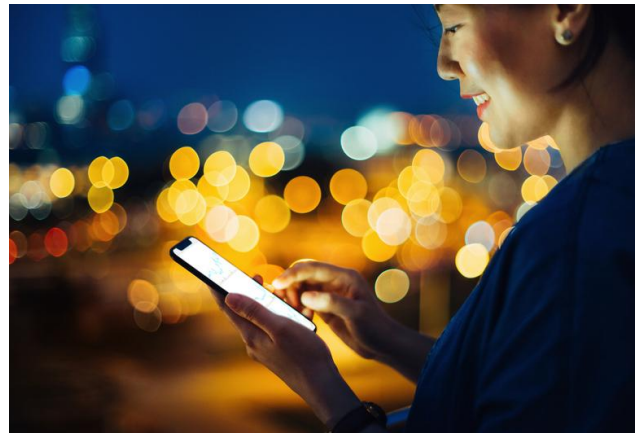
For most organisations and countries, digital disruption and transformation have risen to the top of the agenda—in the 2023 edition of [PwC's Annual Global CEO Survey - Asia Pacific](#), 71% of CEOs in the Asia-Pacific have invested in automation,¹² reflecting the importance of digital upskilling to meet the rising importance of digitalisation and automation. Across Southeast Asia, governments have launched ambitious plans to transform their economies and societies to capitalise on the surge of digital services adoption amid the pandemic.¹³

However, these benefits are not without their drawbacks. Research suggests that the rising adoption of automation could lead to 63 million job losses in Asia Pacific by 2040.¹⁴ Digital technologies are capable of creating more value and productivity without the need for additional labour inputs which has naturally led to employees' growing fears of being replaced.¹⁵ Women are especially at risk of displacement thanks to ingrained biases.¹⁶

Much of this change has already begun, but despite workers' fears, closing the door on digitalisation is not an option. In fact, digitalisation will also open many new, unforeseen doors as digital skills comprise a growing portion of jobs in Asia, particularly in Southeast Asian jobs.¹⁷ It is estimated that increased use of digital technologies can lead to about 65 million new jobs created yearly in Asia and the Pacific until 2025.¹⁸ In Indonesia alone, digital technology is projected to create 20-45 million new roles.¹⁹ There is a wealth of potential here, but to achieve it, Southeast Asia's workforces will need new digital skills and capabilities to avoid displacement.

Rethinking how companies upskill for digital

Most companies cite lack of talent as the reason they struggle to adopt new technologies—only 23% of supply-chain intensive companies agree they have the necessary digital skills to meet future goals.²⁰



[PwC's Annual Global CEO Survey - Asia Pacific](#)

confirms that 73% of CEOs in the Asia-Pacific region have made investment in upskilling the No. 1 priority in the next year.²¹ However, our [2022 Global Workforce Hopes and Fears Survey](#) found that only a small proportion of companies have made upskilling and reskilling a key workforce strategy. Among surveyed employees, 40% said their companies are upskilling to address skills gaps. Meanwhile, 39% expressed concerns of not being provided sufficient training in digital and technology skills.²²

It is not enough for companies to understand the need for a digitally-enabled workforce—they must also embody this thinking in their workforce management approach. This will require companies to make a mindset shift in how they think about work, and how they plan to equip their employees with new digital capabilities and skills. Doing so could enable companies to reap significant rewards in terms of maintaining their workforce's overall employability and economic competitiveness.

Digital upskilling can also be a key tool for local authorities to create employment opportunities and trigger a raft of knock-on economic benefits such as higher productivity and lower unemployment rates. The public-partnership 'Go Digital ASEAN' initiative offers an instructive example of this: after participating in the programme, 58% of surveyed respondents obtained employment in two months or less.²³

30% of workers are concerned that their roles will be replaced by technology, while 39% say they are not getting sufficient digital training from their employer ²⁴



The sustainability imperative comes into focus

The rising prominence of the sustainability agenda has been fuelled by existential threats posed by the climate crisis. The increasing incidence of extreme weather events and natural disasters has led to growing awareness and expectations at all levels of society of the need for action, especially in highly-vulnerable Southeast Asia. Studies estimate that as much as 37% of the region's GDP could be lost by 2048 due to climate change-related impacts.²⁵

Recognising the severity of climate change, local governments are accelerating efforts to fulfil their sustainability commitments. Indonesia and the Philippines, for example, are working to transition their energy production to renewable sources and end their dependence on fossil fuels by retiring coal plants ahead of time.^{26,27}

Regulators are also getting in on the sustainability agenda by setting minimum standards for sustainability reporting and disclosures in an effort to introduce more transparency and accountability on climate issues. For example, various stock exchanges in Southeast Asia have set guidelines and roadmaps for mandatory Environmental, Social, and Governance (ESG) disclosures and reporting for the listed companies. These are complemented by efforts from organisations such as the Task Force on Climate-Related Financial Disclosures (TCFD) to provide better guidance to companies, banks and investors on climate-related financial risk disclosures.²⁸

As stakeholders' expectations evolve, businesses are increasingly elevating sustainability to the top of their priority lists. Firms are taking steps to decarbonise their supply chains and rework their operations to account for economic as well as social and environmental impact.



Businesses need to be careful to avoid greenwashing by making real investments in sustainability. The biggest investment opportunity to achieve sustainability genuinely and to credibly champion the agenda is through **upskilling.**

Parul Munshi
Partner, Sustainability Leader,
PwC South East Asia Consulting



Sustainability builds momentum for upskilling as the nature of work changes

As economies transition towards net zero, it is clear we will see significant changes to sectoral structures and job demographics. According to the International Labour Organization (ILO), roughly six million jobs in highly carbon-intensive sectors are at risk of disappearing by 2030; on the flip side, the right policies could lead to the creation of 24 million more 'green' jobs.²⁹ In Southeast Asia alone, the green growth opportunity is poised to create 30 million new roles as the demand for more sustainable solutions increases.³⁰ More specifically we expect to see a reallocation of jobs across sectors, where jobs will be lost in traditional carbon-intensive sectors, but new jobs will be created in carbon-neutral industries.

Through upskilling, organisations and governments can ensure workers to remain relevant, while capturing the opportunities presented by the green economy. This will need to be undertaken in a systematic way, targeting impacted worker segments, to enable a just transition.

Worker reskilling and redeployment will be critical to enabling the sustainability agenda and achievement of organisation and country net zero targets.



How is Southeast Asia upskilling its workforce?

Upskilling initiatives across the region vary with more focus on digital skills

A broad research of upskilling initiatives in Southeast Asia reveals a gamut of initiatives by governments working to equip local workforces as their economies digitalise and grow green.

Though each country is at a different stage in its upskilling journey, across the board, we found a stronger emphasis on digital skills over sustainability-related ones. This might be because the upskilling journey for those affected by sustainability trends tends to be more complex and progress more slowly than those focused on digital upskilling.

For example, the pathway for coal mining workers to transition to a career in a different industry following a decarbonisation agenda is more complex than the pathway for an insurance agent moving into a tech-focused role. For the coal miner, the trajectory is dependent on a larger number of factors such as existing skills, opportunities to reskill and demand from other industries.

Regardless, it's crucial that companies and governments work to mitigate the unavoidable impacts of the transition such as the loss of community livelihoods. Considering the complexities and uncertainties around the issue, broader social protection policies and safeguards are integral.

Given these complexities, it is crucial for governments and the private sector to act now and invest in upskilling for people in roles impacted by the sustainability agenda. Without this, countries in Southeast Asia could fail to make ambitious moves toward greening the energy sector, and be at risk of not achieving their net zero pledges to the Paris Agreement or their Nationally Determined Contributions (NDCs).



Upskilling initiatives (non-exhaustive)



Indonesia

- Indonesia has initiated a number of manpower planning studies into specific sectors including manufacturing, infrastructure and transportation in order to better understand their existing skills gap. PwC supported the development of a national human capital development plan for the infrastructure sector.
- Indonesia has also launched 'Kartu Prakerja', a platform designed to give job-seekers access to training and upskilling subsidies through e-wallet disbursements and partnerships with e-commerce and edtech platforms. The programme is also especially focused on disabled and female workers.³¹
- Indonesia's Ministry of Communication and Information Technology has initiated a number of training programmes in digital skills including Digital Leadership Academy which empowers top executives, policy makers and businesses to develop enabling policies towards digital innovation.³²



Malaysia

- Under the 2022 National Budget, the government allocated more than RM1 billion towards upskilling and reskilling initiatives.
- The government also launched Upskill Malaysia, a national platform that provides information on training and skills development programmes for Malaysians. The platform also provides information for training providers to obtain funding information and submit proposals aligned with upskilling initiatives assisted by ministries and agencies.
- One of the strategic areas on Green Technology Master Plan Malaysia (2017-2030) was to improve the workforce, knowledge, skills and readiness. The initiative includes capacity building and partnership with tertiary institutions. For example, the local construction labour force was upskilled in sustainable construction practices.³³

How is Southeast Asia upskilling its workforce?



The Philippines

- As part of its Industry 4.0 strategy, the Philippines Skills Framework (PSF) was launched to help upskill and re-skill workers in priority industries such as manufacturing and agriculture. PSF aims to equip workers to withstand future disruptions created by the adoption of digital technologies, access better employment opportunities and increase the nation's competitiveness. PSF provides correct information from industry stakeholders on relevant sectors, job roles, career pathways, skills descriptions and training programmes.³⁴



Singapore

- SkillsFuture Singapore (SSG) is a government-initiated nationwide movement to upskill Singaporean workers. The programme has played an integral role in ensuring workers stay up-to-date with the latest demands of various industries and to support national plans. For example, SSG supports the Singapore Green Plan through updating the national green skills taxonomy and providing insights on priority skills in demand for the green economy.³⁵
- A financial services industry association has been promoting reskilling and upskilling, while also facilitating intra-sectoral movements of talent to keep up with digitalisation trends.
- The Monetary Authority of Singapore (MAS) has set aside S\$400 million in grant funding from the Financial Sector Development Fund (FSDF) up to 2025 to support skills training and to develop more finance professionals and leaders in the Singapore workforce.³⁶
- PwC supported the development of an AI-enabled platform to automate the identification of skills adjacencies and skills gaps in order to help professionals understand potential upskilling pathways based on their career aspirations.



Although digitalisation becomes a topic across the sectors, there is still a gap in understanding what are the critical skills needed in the next 3-5 years.'

Marina Tusin

Partner

PwC South East Asia Consulting, PwC Indonesia



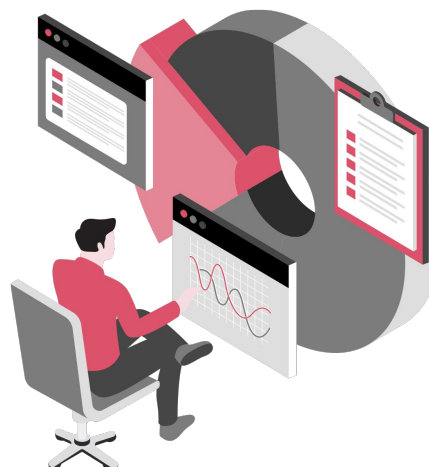
Thailand

- Thailand's Ministry of Labour partnered with Microsoft Thailand to digitally upskill 4 million people in an effort to support the key industries including manufacturing by creating new jobs and business opportunities. The first phase of the partnership has enhanced the digital capabilities of 280,000 Thai employees from 2020-2022, with plans in the pipeline to create 180,000 more employment opportunities.³⁷



Vietnam

- The Vietnamese government is currently working on a 'National Strategy for 4IR', a thorough roadmap that aims to provide high-level direction for areas like improving higher education and vocational training. In lieu of the roadmap's release, the government passed a resolution of active participation in Industry 4.0, which involves a commitment to upskill the nation by integrating digital skills into education programmes and developing high-quality human resources.³⁸



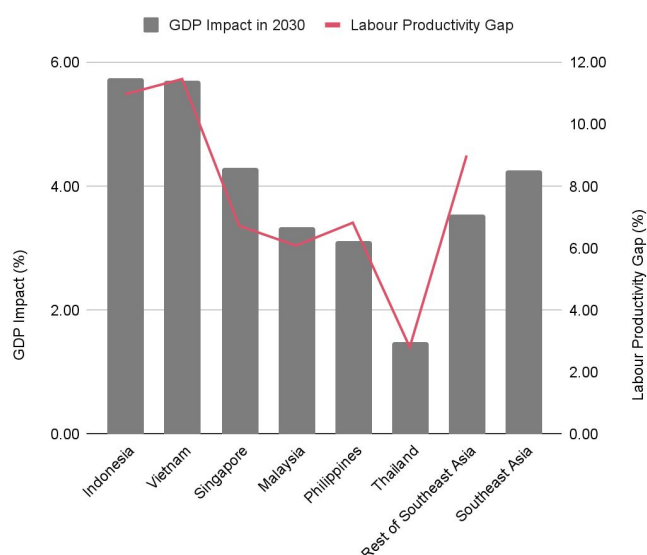
The impact of upskilling on national economies and employment

With the right investments from the public and private sectors, upskilling has the potential to elevate entire economies and drive immense productivity gains. Our global report [“Upskilling for Shared Prosperity”](#) revealed that firms in business and consumer services, as well as the manufacturing sector, stand to gain the most from upskilling.

To obtain a fuller picture of the benefits of upskilling to Southeast Asia, we used our proprietary CGE model to estimate each country's potential GDP uplift and employment gains. By using country-specific productivity gaps as a key input, the CGE model simulates the outcomes of scenarios in which Southeast Asian countries have managed to upskill their workforces in line with OECD industry leading practices by 2030.

The analysis shows that wide-scale investment in upskilling has the potential to boost the region's GDP by 4% or US\$250 billion, thereby unlocking up to 676,000 new jobs by 2030. The highest GDP uplift was registered in the countries with the largest productivity gaps, Indonesia and Vietnam. In terms of employment, the biggest gains would be felt in Indonesia, Vietnam and Philippines.

Fig 1. GDP impact in 2030 (%) vs labour productivity gap (%) by country across Southeast Asia



There needs to be a good linkage between learning skills and applying them in jobs / organisations to avoid upskilling fatigue.'

Veronica Bartolome

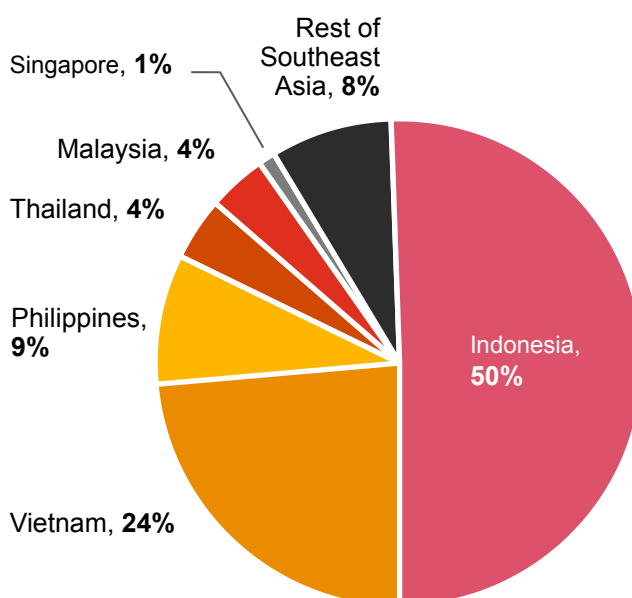
Partner

PwC South East Asia Consulting, PwC Philippines

Impacts of upskilling in Southeast Asia

- 4% relative boost to GDP in 2030
- US\$250 billion cumulative increase in GDP when skills gap is reduced by 2030
- 676,000 new jobs unlocked through new opportunities

Fig 2. Potential additional employment in 2030 due to upskilling by country across Southeast Asia



A sector-by-sector breakdown of upskilling's impacts

In manufacturing, agriculture, energy and utilities, and financial services sectors, the potential GDP uplift could amount to US\$136 billion, accounting for more than half of the region's overall potential

Across industries, the benefits of upskilling and reskilling will not be realised in the same way. Based on our analysis, these were the key findings:

- The extent to which upskilling increases sector-specific GDP will depend on new technology adoption, industry reliance on labour, and the expected change in demand for skills over time. For instance, manufacturing is currently characterised by low-wage workers who could benefit greatly from closing the skills gap.
- The sectors that stand to gain the most from upskilling are those that face the biggest risks of labour displacement due to automation or the net zero transition.
- Industries cannot take a one-size-fits-all approach to upskilling their workforce. Instead, these initiatives must be tailored to the specific technology and sustainability trends impacting each sector.

In this section, we explore the potential economic returns of upskilling in four key sectors: manufacturing, agriculture, energy and utilities, and financial services. These benefits are outlined alongside the observable impacts of digitalisation and sustainability trends on each sector. This analysis has been made in absolute and relative terms of GDP uplift by 2030, and also takes note of countries that can expect to gain the most benefits in absolute terms.

1 Manufacturing

- Manufacturing is one of Southeast Asia's most important industries, accounting for 36% of the region's overall GDP.³⁹
- As many as 19% of Southeast Asians work in a manufacturing role.⁴⁰ Women are a major segment, accounting for some 70% of textile and garment workers.⁴¹
- Upskilling in the manufacturing industry could generate as much as US\$64 billion (or 4% relative increase) by 2030, much of which will be seen in Indonesia and Vietnam.

Digitalisation is already widespread in the manufacturing sector as firms chase operational efficiency and greater revenues in an industry of ever-tightening margins. Automation is set to transform the industry—our estimates suggest that 45% of manufacturing roles will be automated by 2030.⁴² Human jobs will not disappear but shift towards designing, monitoring and training machinery. In line with net zero commitments, manufacturing is moving towards more environmentally-friendly processes.

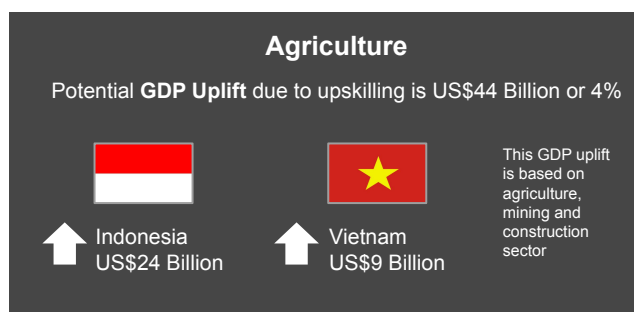
To remain relevant, manufacturing workers need to be upskilled in terms of: higher-order thinking skills, problem solving, data literacy, communication, sustainability risk and greenhouse gases (GHG) management, sustainability reporting, as well as green process design.



2 Agriculture

- Agriculture accounts for 11% of the region's overall GDP, and employs about 40% of the region's workforce.⁴³
- Agriculture is a significant contributor (13%) to Indonesia's GDP, and a major employer in Laos, Myanmar and Vietnam. In Cambodia and Laos, more than half of agriculture workers are women.⁴⁴
- Upskilling the agriculture industry could generate as much as US\$44 billion (or 4% relative increase) by 2030, much of which will be seen in Indonesia and Vietnam.

Amid rising food security issues, the agriculture industry has embraced digital technologies to improve crop productivity and quality. Advancements in AI, robotics and monitoring tools are helping farms redefine food production. These technologies are necessary for the future of agriculture and their disruptive forces are already being felt by workers, most of whom are in dire need of upskilling to handle the latest tools. This is especially evident in economies where large swathes of the population and economy are agriculture-based.



A sector-by-sector breakdown of upskilling's impacts

3 Energy and utilities

- Southeast Asia invests an average of US\$70 billion on energy annually.⁴⁵
- Regionally, energy demand has increased at an average annual rate of 3%.⁴⁶
- Upskilling in the energy and utilities industries could generate as much as US\$15 billion (or 3% relative increase) by 2030, much of which will be seen in Indonesia and Malaysia.

As countries across Southeast Asia pursue a net zero agenda, the transition to renewable sources of energy will require a related shift in desired skills and available jobs. For example, Shell Singapore will reduce 38% of its workforce in the Bukom manufacturing site as it pivots to renewable energy production,⁴⁷ while 1.8 million Indonesian, Filipino and Vietnamese workers could lose their jobs in the transition away from coal.⁴⁸

Yet, the emerging renewable energy industry has the potential to create 2.2 million new jobs up and down the supply chain, ranging from roles in manufacturing, transport, system design, installation, operation and maintenance.⁴⁹ Upskilling will be key to facilitating a 'just transition' for affected workers and communities, preparing them to support the transition into a greener economy.

Energy and utilities

Potential GDP Uplift due to upskilling is US\$15 Billion or 3%



↑ Indonesia
US\$4.2 Billion



↑ Malaysia
US\$3.9 Billion



There is a need to promote campaigns to increase awareness of the tangible outcomes as well as available resources and funding for such upskilling.'

Debra Ann Ovinis

Partner

PwC South East Asia Consulting, PwC Malaysia

4 Financial services

- A key driver of Southeast Asia's economic expansion, the financial services sector is a major contributor to national GDPs. More than 200,000 Singaporeans are financial services workers;⁵⁰ in Indonesia, the sector contributes as much as US\$47 billion to its overall GDP.⁵¹
- Upskilling in the financial services industry could generate as much as US\$13.3 billion (or 4% relative increase) by 2030, much of which will be seen in Indonesia and Singapore.

The financial services industry was among the first to wholly embrace digitalisation. Technology has made it possible to capture new flows of monetary transactions, improve financial inclusion, reduce costs and meet consumer demands. Given the outsized role technology plays in financial services today, it's vital that workers have the digital skills to meet growing demands.

These skills are not just about responding to the increased use of digital technologies in financial transactions—they are about meeting the growing need for green financing which can drive ESG and sustainability initiatives. The Monetary Authority of Singapore (MAS) estimates that as much as US\$200 billion in green investments will be needed yearly until 2030 to support businesses' net zero transitions in the region.⁵² However, 41% of investors say they are held back from embracing ESG investments because of the lack of expertise and qualified staff.⁵³ As financial institutions readjust to meet these new financing needs, there will be a growing demand for new talent who are able to combine compliance expertise with sustainability skills.

Financial services

Potential GDP Uplift due to upskilling is US\$13.3 Billion or 4%



↑ Indonesia
US\$6 Billion



↑ Singapore
US\$2.3 Billion

Unlocking regional transformation through upskilling

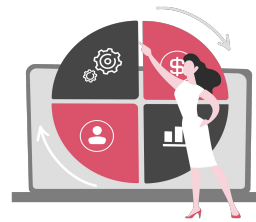
As a region with countries at different stages of economic development, upskilling will yield different impacts across Southeast Asia. More developed economies like Singapore require upskilling to stay competitive in the global market while in developing countries such as Indonesia, Thailand and Vietnam, upskilling has the potential to transform economies. In driving a regional workforce agenda, governments can work together to spur regional reforms in order to transition away from cheap, low-skilled labour as a form of competitive advantage towards a complete regional ecosystem of high-tech manufacturing and knowledge-based services. Doing so could result in improvements in labour force participation as well as significant economic growth, especially among developing countries. To achieve this, there are a few focus areas that will yield the biggest impacts.



Ensure a “reskill / upskill first” social protection for the workforce impacted by digitalisation and low-carbon transition.

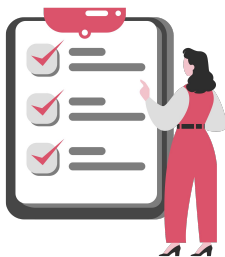
Government intervention in future skills programming has an important role

to play in reducing skills mismatch amid the emerging digitalisation and sustainability trends. This is an increased challenge in the region as geographies and underdeveloped infrastructure of isolated areas limit access to services including the internet. In pushing for wide-scale upskilling and learning initiatives, financial incentives for the workforce that will need to transition and are at risk of unemployment will be required. Additionally, a robust governance structure and plan is needed to ensure the financial incentives reach their intended beneficiaries effectively.



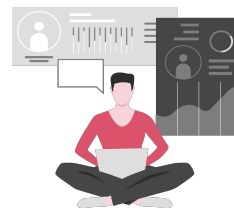
Holistic strategy and policy framework for targeted upskilling for vulnerable populations and informal sectors. A strong upskilling agenda requires a holistic framework with the

government at the helm to ensure success. With a clear strategy and framework, upskilling can be routed towards minimising the skills gap within priority segments of the population who are identified as groups of people who are disadvantaged (e.g., vulnerable groups) or working in the informal sector. Heightened response is needed to address the relatively higher digital and sustainability skills gap of these groups. Southeast Asian countries could also share leading practices and expertise to leapfrog upskilling capabilities within each individual country.



Focus the upskilling investment on the priority sectors. Countries need to identify the impacts linked to investing in different sectors and prioritise based on their national strategic plan and their Sustainable Development Goals (SDG)

or net zero commitments. At a regional level, we found that workforces in the manufacturing and agriculture sectors in Southeast Asia have yet to embrace digitalisation despite facing the biggest risks of displacement by automation. Considering the significant size of both sectors’ workforces, investing in upskilling their workers could create sizeable GDP uplift and protect many from displacement. If upskilling is not a priority, there is a risk of reducing investment yield as the resources required to upskill will be spread too thin.



Strategising sector-specific upskilling in line with existing talent gaps and industry trends. While it is challenging to identify and narrow current and future skills gaps, establishing an overarching strategy and focus areas

can help industry players better understand where the biggest shortfalls are. To do this, visibility of emerging skills and the capability / capacity gap in human resources in specific sectors is required to develop a practical strategy to build the required upskilling infrastructure needed to upskill nation-wide. While the long-term strategy is to upskill (“Build”) capabilities in the country, in the short-term, countries in Southeast Asia can tap into the regional talent pool and unlock the opportunity of potential talent mobility within the region (“Borrow”) to temporarily address the talent gaps or develop the upskilling infrastructure required to upskill local talents sustainably.

The role of public-private partnerships in upskilling

It is crucial for governments and the private sector to collaborate on upskilling and reskilling

Effective collaboration between the private and public sectors is going to be critical to build an ecosystem that can support successful upskilling and reskilling initiatives effectively and at scale. There needs to be a common vision across governments, industries and the education sector to develop comprehensive national upskilling agendas. Governments, industries, trade unions and education institutions will need to work together to reform education systems and rethink skills training to benefit more people. The joint WEF and PwC report, '[Upskilling for Shared Prosperity](#)', has identified four key areas that



The government should help in escalating conversations between businesses and the education sector on prioritising vocational and higher education curricula that truly prepare students for the challenges of the future.'

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demand new approaches to upskilling and urgent action by governments, businesses and other stakeholders.

Fig 3. PwC and WEF's call to action for stakeholders to work together towards upskilling

All stakeholders

Build a strong and interconnected ecosystem committed to a comprehensive upskilling agenda and give people the opportunity to participate

- Map the evolving job landscape and forecast future skills demand
- Collectively determine a set of indicators that measure the quality of employment at the industry, national and subnational levels
- Establish a common research framework to understand the dynamics and projections labour markets and skills mismatches
- Identify policy levers that succeed in guiding labour market transformation and the provision of good jobs

Business

Anchor upskilling and workforce investment as a core business principle and make time-bound pledges to act

- Develop a clear "people plan" using a people-centric approach in which technology is aligned to the needs of workers and society
- Make long-term commitments to upskilling employees
- Promote multidisciplinary collaboration (with diversity of perspectives) across internal and external stakeholders
- Work with labour representatives to ensure good jobs and agree to workers; forums and common standards



Education providers

Embrace the future of work as a source of reinvention to normalise lifelong learning for all

- Prioritise vocational and higher education curricula that are "just in time" rather than "just in case", working with business
- Scale up the provision of self-directed learning and nano-degrees for lifelong learning
- Build bridges between national qualifications systems and lifelong learning so skills are recognised
- Connect schools and places of learning with each other



Government and public sector

Adopt an agile approach to driving national upskilling initiatives, working with business, non-profit and the education sector

- Prioritise funding for upskilling in national recovery plans
- Recognise the economic, skill-building and inclusion potential from government-sector employment and associated supply chains
- Support and provide incentives for green investments and technology innovation
- Nurture a pipeline of industrial investment projects via a bottom-up approach
- Encourage broad transparency of the types of skills and jobs that each economy is most likely to need in the medium and long term



Leadership drives the upskilling agenda

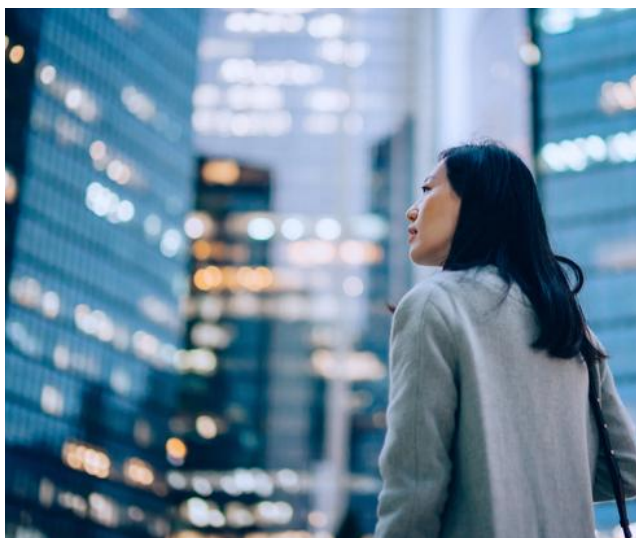
Leaders in public and private sectors need to take actions to address future skill mismatches

As industries across Southeast Asia undergo disruptive changes to the workforce, leaders in both public and private sectors have a shared responsibility to ensure their workforces and industries are prepared to handle future shocks. Without the right preparation, economic development could be at risk. Collaboration must form from the starting point of this journey and will inform decisions at the stages.

The public sector needs to set the vision and strategy of upskilling within the country, based on the long-term economic plans and current state of the infrastructure and the workforce. Without a strong hand on the wheel, resources will naturally spread to those who are already primed to be upskilled rather than those who need it the most. Strong governance also ensures that once a plan is put into place, it gets executed effectively, from the city centres to the isolated village in the mountains.

The private sector in turn needs to provide the resources that it has; experience and expertise, as well as their reach that sometimes go even deeper than the government in isolated areas, to support the upskilling of a workforce, develop a mutually beneficial relationship of providing opportunities to those who need it and train a workforce that is capable to face the challenges of the future.

At this juncture, to evaluate their readiness for future changes, the private and public sectors should ask themselves these three key questions:



Upskilling initiatives should be aligned with strategic goals defined for the country- while pursuing quick wins, the government should also look at long-term plans to uplift the capabilities of the nation.'

Dr. Pirata Phakdeesatayaphong

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1 Do we have the necessary foresight and resources to develop a future-ready workforce?

Leaders must consider the key trends impacting their sectors as well as their implications on workforce supply and demand in the future. By anticipating these needs through skills-based strategic workforce planning, leaders position themselves to navigate uncertainties and build a response plan.

2 Do we have a concrete plan, aligned with the vision, with a clear governance structure, guidance and frameworks in place?

This plan and governance structure should be feasible and manageable while also making it easy for stakeholders to hold leaders accountable. Leaders must also ensure the sustainability of their initiatives beyond execution by ensuring sufficient financial and institutional capacity.

3 Do we have an ecosystem that enables our workforce and businesses to embark on upskilling journeys?

The right ecosystem will not only incentivise people to pursue upskilling but also engender a strong sense of purpose that will drive positive outcomes. Leaders must ask what types of support their employees need to start this journey and foster employability and a learning culture.

Now is the time for transformational change



In the context of a rapidly digitalising economy and a growing focus on environmental sustainability in a post-COVID-19 world, there are a few key challenges faced by the Southeast Asia region when it comes to workforce planning, needs and expectations:

- **The pace at which skills need change is only accelerating and without action, the gap will only get bigger.** Many organisations find it hard to anticipate their future skills needs as the pace and scale of disruptions caused by evolving technologies and the push to meet net zero commitments have been uneven and hard to predict. This makes it more important than ever for businesses to take a strategic approach to workforce planning in order to accurately identify business changes emanating from these disruptions and rapidly translate these into future skills requirements. In order to effect long-lasting change, there must be a paradigm shift towards transformation, led by governments together with key private sector actors.
- **The disruptions will impact various segments of the workforce differently.** Sectors and organisations will be impacted differently given their exposure to changes driven by new and emerging technologies, and the impacts of net zero commitments. As such, there is a need to double down on upskilling, especially for vulnerable workers including women and people with disability.
- **Upskilling can contribute to the journey towards a more diverse, equitable and inclusive workplace.** Access to upskilling through formal education and on-the-job training should not be one-off events but occur repeatedly throughout workers' careers.
- **If left unchecked, future employment will grow in the most fertile spots, but not necessarily where it is needed most.** A systematic, holistic and targeted skills development response is crucial to the future of Southeast Asia. To ensure no one is left behind, local regulators and governments must develop the social policies necessary to safeguard skills development and social inclusion in tandem with the changes brought about by digitalisation and the net zero transition.
- **To realise large scale upskilling all key stakeholders have a role to play across an interconnected ecosystem.** Across the board, the path to a future-ready workforce lies in the hands of transformational leadership working collaboratively in multi-stakeholder partnerships to generate synergy and impact.





At times, the upskilling challenge may seem too big to tackle. Like most changes, the development of upskilling capabilities is a long and exponential process. If action is not taken today, Southeast Asia will lose the chance to leapfrog other regions in becoming leaders in both emerging technologies and sustainability. It will not have the people with the right skills for jobs that will propel the region forward to reach its net zero targets and Sustainable Development Goal (SDG) commitments.

The economic gap between countries who successfully upskill their workforce and those who do not will simply grow. By breaking down the challenge into a set of priorities and setting a clear strategy, funds can be channelled in a targeted manner, rather than a widespread disbursement that may end up being underutilised.

Instead:

- Develop key governance structures to ensure that action is being taken effectively
- Prioritise key sectors that drive the region's growth
- Identify the skills gap in those sectors
- Develop clear strategies to bridge the gap for everyone, especially those who are most vulnerable
- Execute by developing a strong ecosystem

The real litmus test of our determination to carve out a better future will lie in our ability to foster transformational leadership capable of taking bold decisions that emphasise the needs of a wider range of stakeholders over the primacy of shareholders. We need resilient leaders to step up to the plate and leave a sustainable legacy.



“

By giving people opportunities to build the skills they will need to participate in the future workplace, we can start to create more inclusive and sustainable economies where no one is left behind.’

Upskilling for Shared Prosperity report
WEF & PwC



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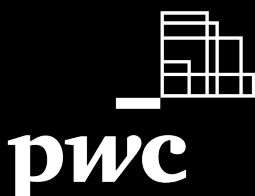
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The model's approach

The CGE model can be tailored to assess the economic impacts of different policy interventions. The model has been used widely by international and national governments of various countries. The model is highly flexible, offering a single and robust integrated economic environment to assess net impacts on macroeconomic variables like GDP and employment. In this report, The CGE model does not evaluate a specific policy or intervention as the interventions relate to skills development.

The analysis uses PwC's CGE model to quantitatively estimate the benefits and impacts of upskilling interventions. The model simulates the scenario whereby Southeast Asian Countries upskill their workforces following the OECD industry leading practices. The OECD industry leading practices predict that skills gaps are to be closed by 2030. This in turn will deliver higher labour productivity and an uplift in GDP in the future.

The conventional approach to perform the CGE modelling is separated into three stages.

- **Stage 1:** Literature analysis on existing evidence on the relationship between skills development, closing the skills gap, productivity and economic development.
- **Stage 2:** Data research and analysis on labour productivity uplifts associated with reducing skills gaps across various countries, which is fed into the CGE model.
- **Stage 3:** CGE modelling to assess the aggregate economic impact, by GDP and employment, of these labour productivity uplifts across Southeast Asian countries.

Note that the approach does not distinguish between the effectiveness of one country's upskilling initiatives versus another's. Some countries will be better equipped and more successful in tackling long-term skills challenges than others over the next 10 years based on a long list of factors, such as governance effectiveness, country demographics, appetite to invest in skills, among others. For the purposes of this analysis, it is assumed the countries make the same progress.

Key parameters

The baseline data used to project the potential benefits and impacts is from 2020. The model estimates the potential upskilling benefits and impacts to GDP and employment of six Southeast Asian countries, including Singapore, Indonesia, Malaysia, the Philippines, Thailand and Vietnam.

The model then simulates the impact of the upskilling interventions based on industries that cover a diverse range of public and private economic activities. In this analysis, the sectors include manufacturing, agriculture, energy and utilities, and financial services.

Data sources

The Global Trade Analysis Project 10 (GTAP 10) is the main data source; it is compiled and regularly updated by an international network of economists and coordinated by the Center for Global Trade Analysis at Purdue University. The GTAP contains a reconciled set of intra-country and international trade data from 141 regions and 57 sectors. For example, the analysis relies on GTAP data as trade and supply chain interactions between different industries, as well as consumption behaviour of households and governments.

The values of key parameters in the model are taken from the GTAP database. These parameters have been aggregated across the eight regions and 12 sectors. To find the exact values of these parameters, 'Behavioral Parameters' by Hertel and van der Mensbrugghe is recommended for reading. Their chapter is a record of the base documentation in the GTAP 10 database and includes thorough annexes of the various parameters present in each country and sector. These values have been directly input into the model of the analysis in this report.

Notes:

1) Skills gaps measure the number of workers who cannot participate effectively in the economy because they lack skills to participate in the workforce.

2) Note that the model does not look at how each country reaches the OECD standard industry practice targets. Instead, the approach aims to highlight specifically the economic effect of reducing skills gaps, while acknowledging the distinctiveness of global economies.⁵⁴

The model's assumptions

The model's impact and benefit estimates are conservative because they only reflect closing currently observable skills gaps. Note that other benefits of upskilling exist that are not captured quantitatively. These are related to, for example, innovation and the creation of new types of jobs. These economic gains would take the form of skill enhancements, leading to the improved matching of people's skills with the jobs created by the Fourth Industrial Revolution—boosting global productivity by 3%, on average, by 2030.

Additionally, the analysis in this report draws upon the forecasts from the Joint WEF and PwC report in 2021 'Upskilling for shared prosperity' for context and validation— a global perspective on upskilling if COVID-19 was avoided. Therefore, to make the analysis of Southeast Asia comparable within the global context, we have assumed the same conditions.

Other key model assumptions include the following:

Model features	Description
Recursive dynamics	Tracks the evolution of economic variables over time
Labour market	Allows labour market entry and exit, human capital accumulation and productivity reductions as workers move between sectors
Tax system	Stylises taxes across regions into a select number of categories to facilitate consistency
Economic agents	Assumes economic agents are rational and maximise their utility in each period; over time, they demonstrate adaptive expectations, i.e., they adjust their expectation of the future in line with past and current economic conditions
Imperfect competition	Allows Cournot (quantity) interactions in each industry to provide a better reflection of economic reality
Government closure rules	Assumes government addresses fiscal surplus / deficit at the end of each period; the international model closes government budgets following the Harberger rule, i.e., giving a lump sum transfer to households if there is a surplus, or a tax if there is a deficit

In this analysis, the economic benefits are assumed to follow an 'S shape' over the period modelled. This reflects the lagged impact of upskilling initiatives on labour productivity. During the early stage, GDP growth will be lower due to the time it takes for initiatives to roll out. As time passes, initiatives will translate into productivity gains. As a result, the skills gap will shrink over time as the proportion of labour able to meet labour market demand increases. Subsequently, it will become harder to close the gap due to diminishing returns to upskilling investment. This defines the assumed shape of GDP growth and the plateau. Therefore, once the skills gap is closed, lifelong learning will form an integral part of sustaining the new economy.

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