PREPARING FOR AI
Developing insights for key Asian economies on the jobs and skills implications

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αlphaβeta
strategy x economics

Our research addressed 3 key questions related to how AI will impact the future of work in Asia

1. How could AI impact overall employment in Asia?

2. How could AI change the nature of work in Asia?

3. What are the challenges faced in harnessing benefits, and the actions to address them?

Main messages

- AI has the potential to have **positive impacts on worker productivity, incomes and satisfaction**

- AI could potentially **create more jobs than it displaces** in Asia, but disruption is likely and there may be net losses of jobs concentrated in specific sectors

- The **potential of AI technologies to create new jobs** has received limited focus in the media; however, some of the existing literature suggest that the positive impacts on the labor market could be significant

- To fully harness the potential benefits and mitigate the risks of AI for jobs and work in Asia, **an appropriate action agenda must address the unique challenges the region faces**

- Many Asian governments, businesses, and civil society organizations are pursuing innovative approaches to tackle these challenges, and there is a **significant opportunity to learn from each other**

Agenda

How could AI change the nature of work in Asia?

How could AI impact overall employment in Asia?

Challenges faced and action agenda

Many current perceptions of how AI will impact the future of work are not backed up by the current evidence base

	Perception	Supporting evidence
Productivity	The largest productivity beneficiaries of AI will come from digital sectors	✖
	The largest productivity gains from AI will be captured by high-income countries	✖
Incomes	Worker wages will decline as more work tasks become displaced by AI	✖
	Most of the income gains from AI are likely to only be received by workers who maintain their jobs	✖
	Low and middle wage jobs will be the hardest hit by AI	✖
Worker well-being	Workplace safety could be threatened by combining people with AI	✖
	Job satisfaction will deteriorate as AI will remove the most interesting components of jobs	✖

Traditional, non-digital sectors such as healthcare are expected to reap up to three times the productivity benefits of digital sectors

Projected GDP impact in 2030 resulting from AI-enabled productivity by industry sector in selected Asian countries, %

■ Digital sectors ■ Non-digital sectors

	High-income countries[1]	China
Health, education & public services	3.5	22
Consumer goods, accommodation & food services	3.0	13
Energy, utilities & mining	2.0	11
Technology, media & communications	1.2	13
Transport & logistics	1.1	8
Manufacturing & construction	1.0	10
Financial & professional services	1.0	12

~x3 (High-income countries) ~x2 (China)
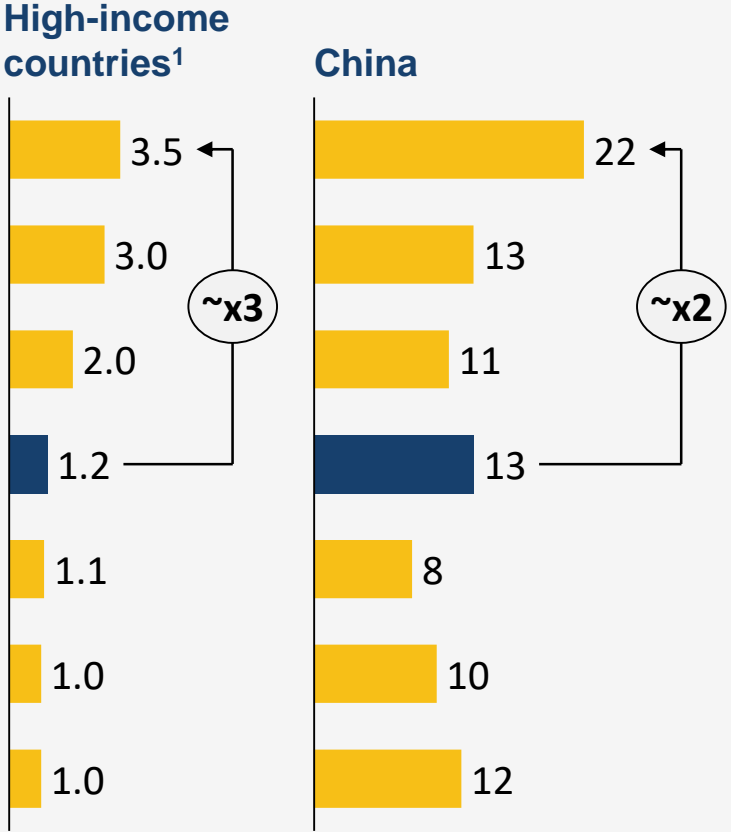
Middle-income countries like the Philippines could see the highest employee productivity gains of up to 52% in 2021

Projected rate of AI-enabled employee productivity gains by 2021 by country in Asia Pacific region[1]
%

Country	Value
Philippines	52
Malaysia	46
Indonesia	46
India	46
Thailand	41
New Zealand	39
Singapore	38
Australia	35
South Korea	31
Taiwan	30
China	28
Hong Kong	28
Japan	26

Legend:
- High income countries
- Upper-middle income countries
- Lower-middle income countries
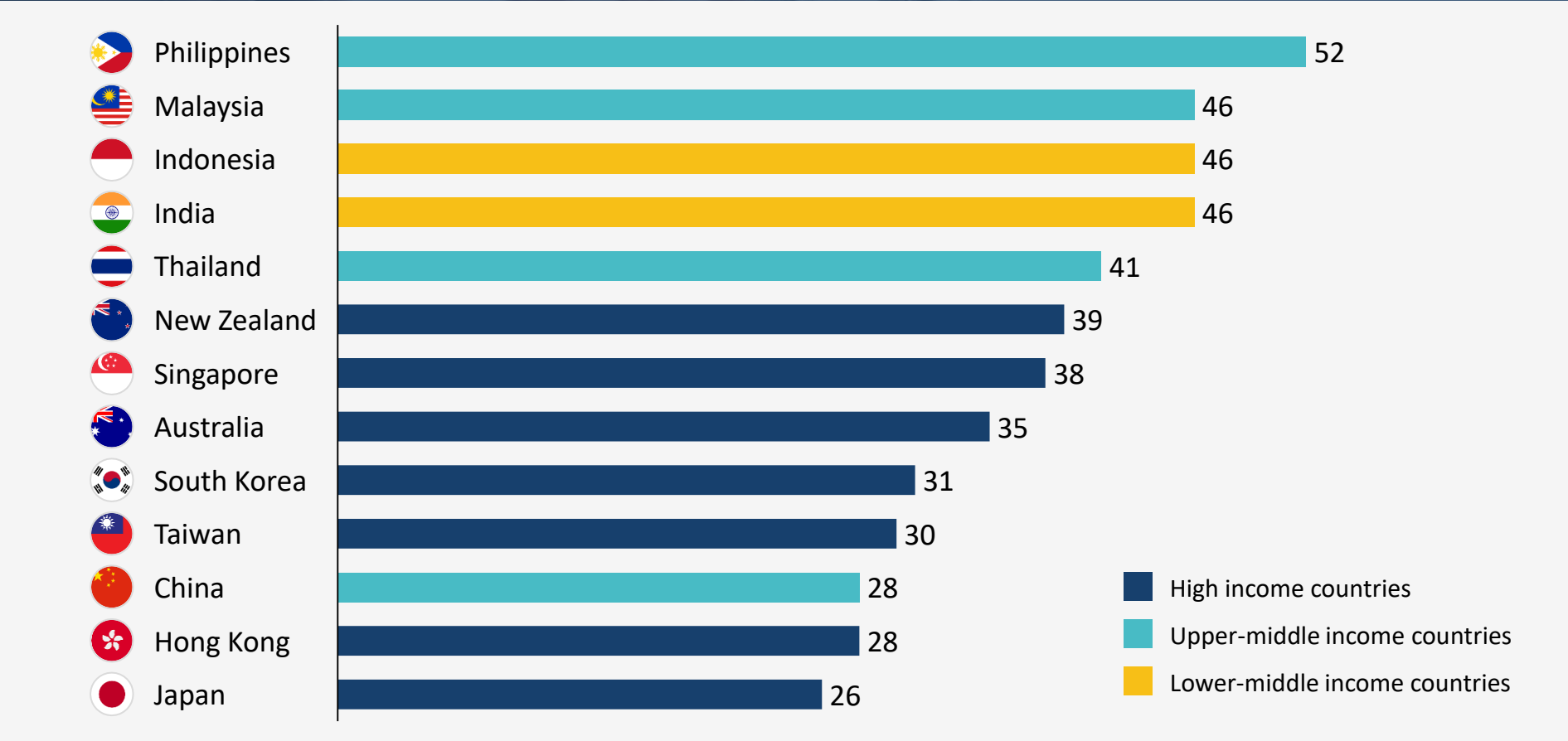
1. Income classification of country based on World Bank's classification. As of 1 July 2018, World Bank defined 'low-income economies' as those with a GNI per capita of $995 or less in 2017; lower middle-income economies are those with a GNI per capita between $996 and $3,895; upper middle-income economies are those between $3,896 and $12,055; high-income economies are those with a GNI per capita of $12,055 or more.

SOURCE: Microsoft-IDC APAC AI survey (2018); AlphaBeta analysis

A study in Australia shows that if low-skill workers learn to perform higher-order tasks, their real wages could be 10% higher by 2030

Shares of total wages and time spent on work taken up by automatable and non-automatable tasks in Australia (2015-2030), %
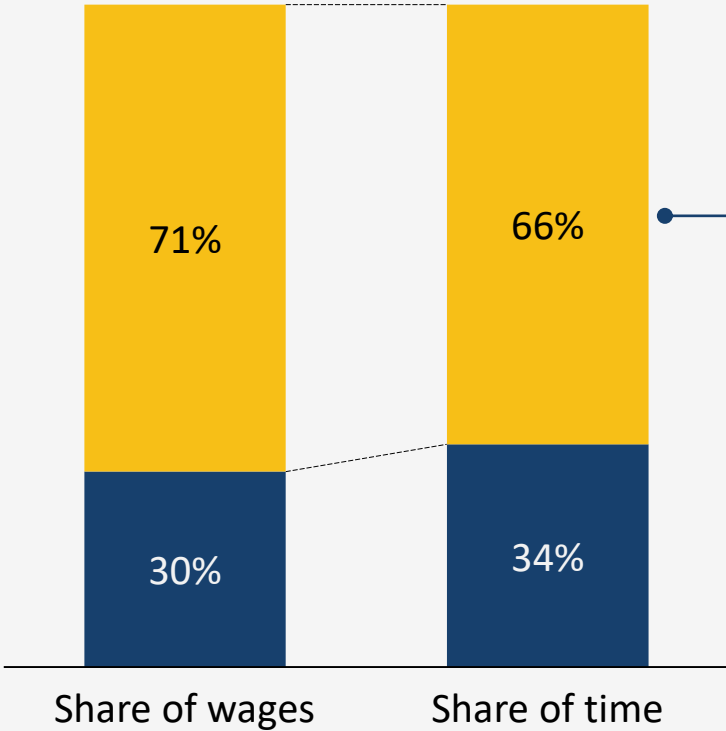
Non-automatable, 'uniquely human' tasks make up 71% of total wages, but take up only two-thirds of total time spent on work. If low-skill workers could re-allocate more time towards these tasks, their **real wages could increase by 10% by 2030, translating into an annual income gain of approximately A$6,000 (US$4,300) per worker**

Chart labels:
- Share of wages: 71% Non-automatable, 30% Automatable
- Share of time: 66% Non-automatable, 34% Automatable

Legend:
- Non-automatable tasks (e.g. interpersonal, creative)
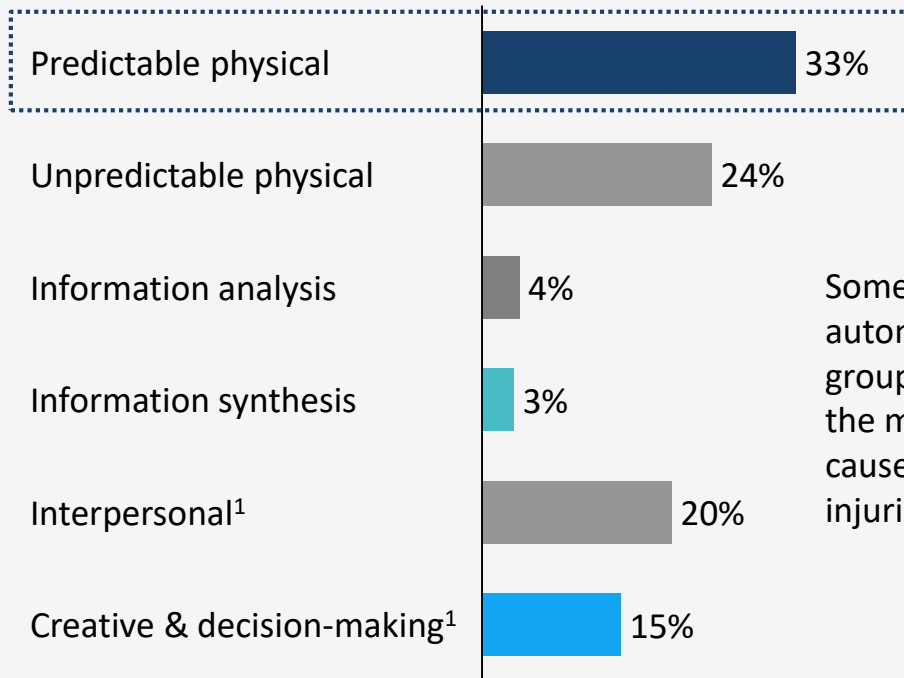- Automatable tasks (e.g. predictable physical)

A study in Australia shows that workplace injuries could fall by 11% as automation eliminates some of the most dangerous physical tasks in the economy

AlphaBeta's study in Australia showed that as injury-prone tasks become automated...

...workplace injuries could fall[2]

% of total days lost to injury in the economy (2015),%

Millions of work days lost to workplace injury (2015-2030),%

Task group	%
Predictable physical	33%
Unpredictable physical	24%
Information analysis	4%
Information synthesis	3%
Interpersonal[1]	20%
Creative & decision-making[1]	15%

Some of the most automatable task groups are also the most likely to cause workplace injuries
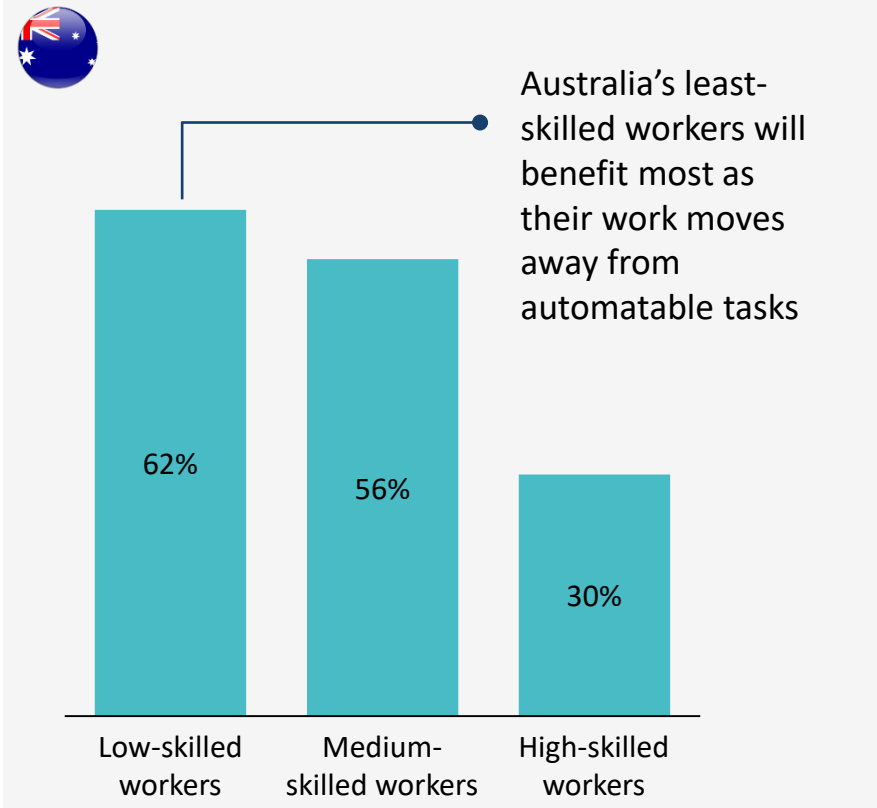
-11%

1.9 (2015)
1.7 (2030)
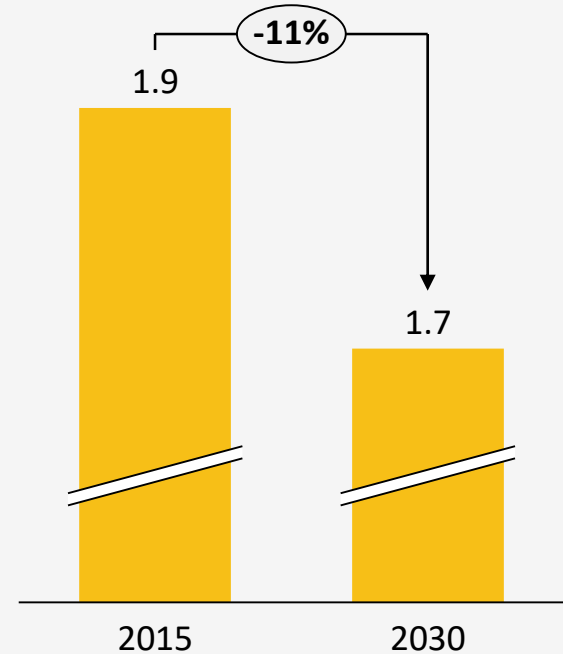
1. Whilst Interpersonal and Creative and decision making appear high, this is due to the disproportionate amount of time spent on these tasks in the economy
2. Figures adjusted to exclude increase in injuries due to labor force growth

SOURCE: AlphaBeta (2017), *The automation advantage;* AlphaBeta analysis

Studies in Australia and Japan have shown that AI adoption could increase job satisfaction levels by 20%, but the study in Japan showed that work stress could also rise
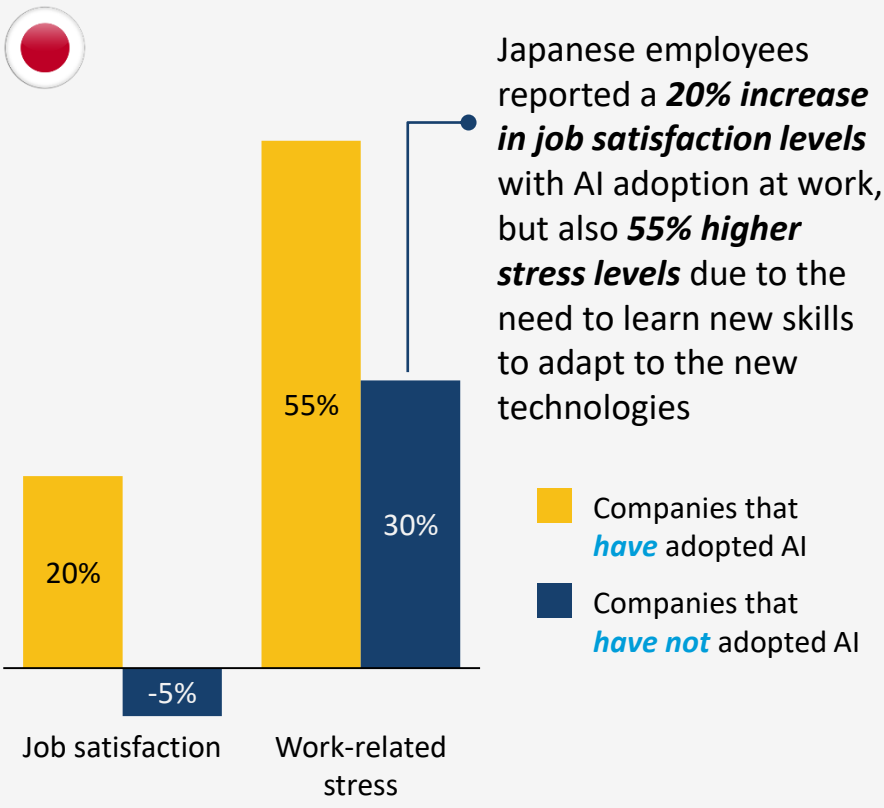
AlphaBeta's work in Australia showed that automating routine tasks will increase job satisfaction, particularly for low skilled workers...

...a survey of over 10,000 workers in Japan similarly reflected that job satisfaction does increase with AI adoption, but so does work-related stress

Estimated percentage of workers with improved satisfaction after AI adoption in Australia (2015-2030), %

% change in levels of worker job satisfaction and stress due to AI adoption in Japan (2017), %

Australia's least-skilled workers will benefit most as their work moves away from automatable tasks

Japanese employees reported a ***20% increase in job satisfaction levels*** with AI adoption at work, but also ***55% higher stress levels*** due to the need to learn new skills to adapt to the new technologies

Australia chart:
- Low-skilled workers: 62%
- Medium-skilled workers: 56%
- High-skilled workers: 30%

Japan chart:
- Job satisfaction: 20% (have adopted AI), -5% (have not adopted AI)
- Work-related stress: 55% (have adopted AI), 30% (have not adopted AI)

Legend:
- Companies that *have* adopted AI
- Companies that *have not* adopted AI

Agenda

How could AI change the nature of work in Asia?

How could AI impact overall employment in Asia?

Challenges faced and action agenda

How could AI impact overall employment in Asia?

	Perception	Supporting evidence
Jobs lost	AI is going to lead to mass unemployment in Asia across all countries and sectors	✖
Jobs gained	The job creation effects of AI are limited, and any jobs created will not be enough to offset those displaced	✖
	The jobs and skills in highest demand will be those that directly support AI development	✖
Workforce participation	AI could potentially reduce workforce participation by automating jobs	✖

The large variance of 7% to 49% in job displacement estimates for Japan is driven by differences in methodology and assumptions

Differing job displacement estimates for Japan in the literature

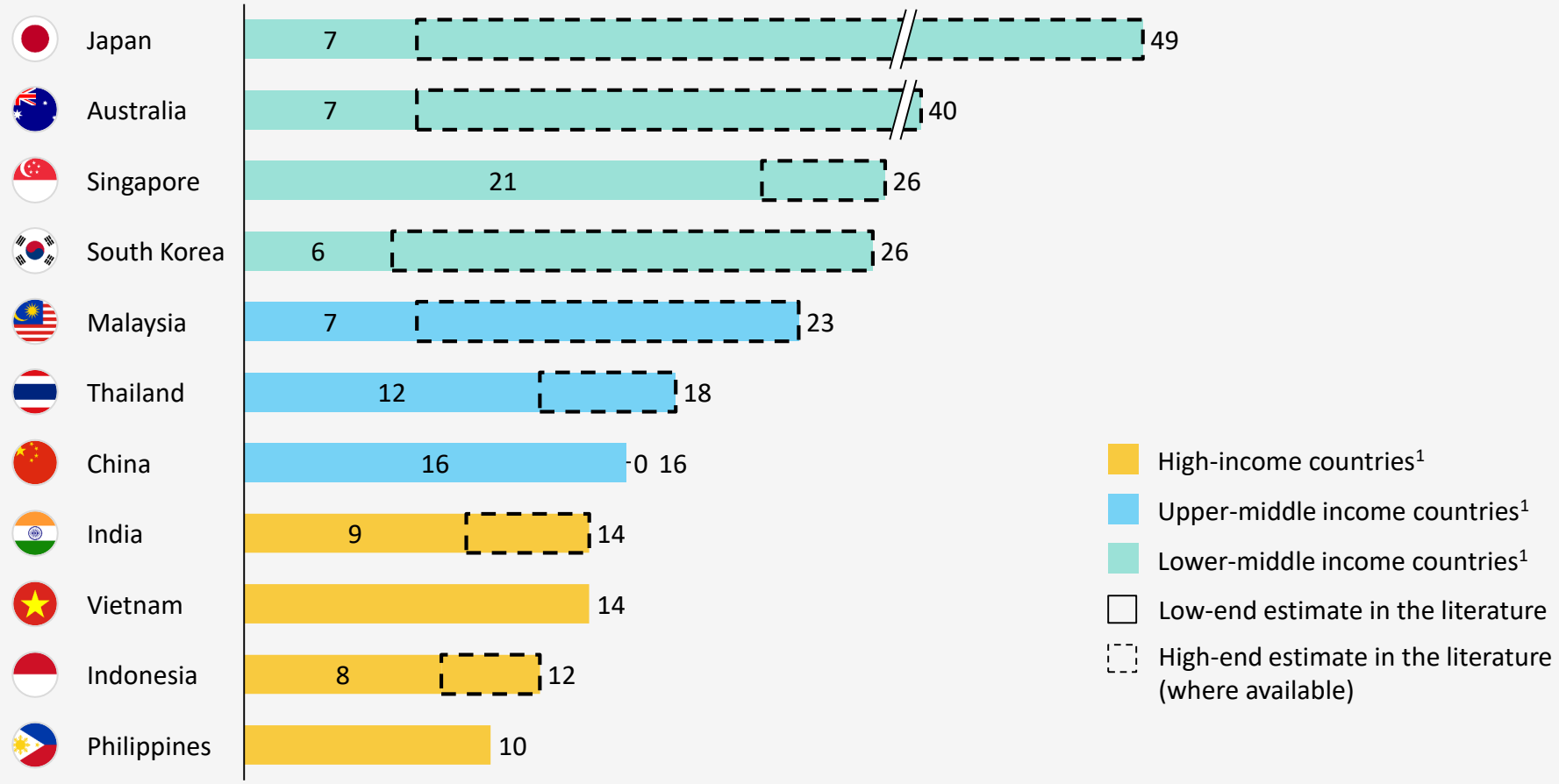| Source	Estimate	Methodology and Assumptions
Nomura Research Institute, Frey & Osborne (2015)	**49%** of jobs at high risk of automation by 2035	▪ **Occupation-based approach:** Based on share of occupations deemed automatable; identical task structures assumed for each occupation ▪ Assumed **current** level of technology
McKinsey Global Institute (2017)	**26%** of jobs displaced by automation by 2030	▪ **Task-based approach:** Based on estimated share of work activity hours for each task that could be reduced due to automation ▪ Assumed **future** level of technology
PriceWaterhouseCoopers (2018)	**24%** of jobs at high risk of automation by early 2030s	▪ **Task-based approach:** Jobs are deemed to be at high risk of automation if they consist of tasks of which 70% or more are automatable ▪ Assumed **future** level of technology
Arntz, M., T. Gregory & U. Zierahn (2016)	**7%** of jobs at high risk of automation by 2035	▪ **Task-based approach:** Jobs are deemed to be at high risk of automation if they consist of tasks of which 70% or more are automatable ▪ Assumed **current** level of technology

SOURCE: Nomura Research Institute, Frey and Osborne (2015); MGI (2017); PwC (2018); Arntz et al (2016); AlphaBeta analysis

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Job displacement estimates are larger in higher-income countries (e.g., 49% of jobs in Japan) than in lower-income countries (e.g., 10% in the Philippines)

Projections of shares of jobs displaced by AI and automation technologies across Asian economies derived from the literature, %

Country	Low-end	High-end
Japan	7	49
Australia	7	40
Singapore	21	26
South Korea	6	26
Malaysia	7	23
Thailand	12	18
China	16	0 16
India	9	14
Vietnam	14	
Indonesia	8	12
Philippines	10	

Legend:
- High-income countries[1]
- Upper-middle income countries[1]
- Lower-middle income countries[1]
- Low-end estimate in the literature
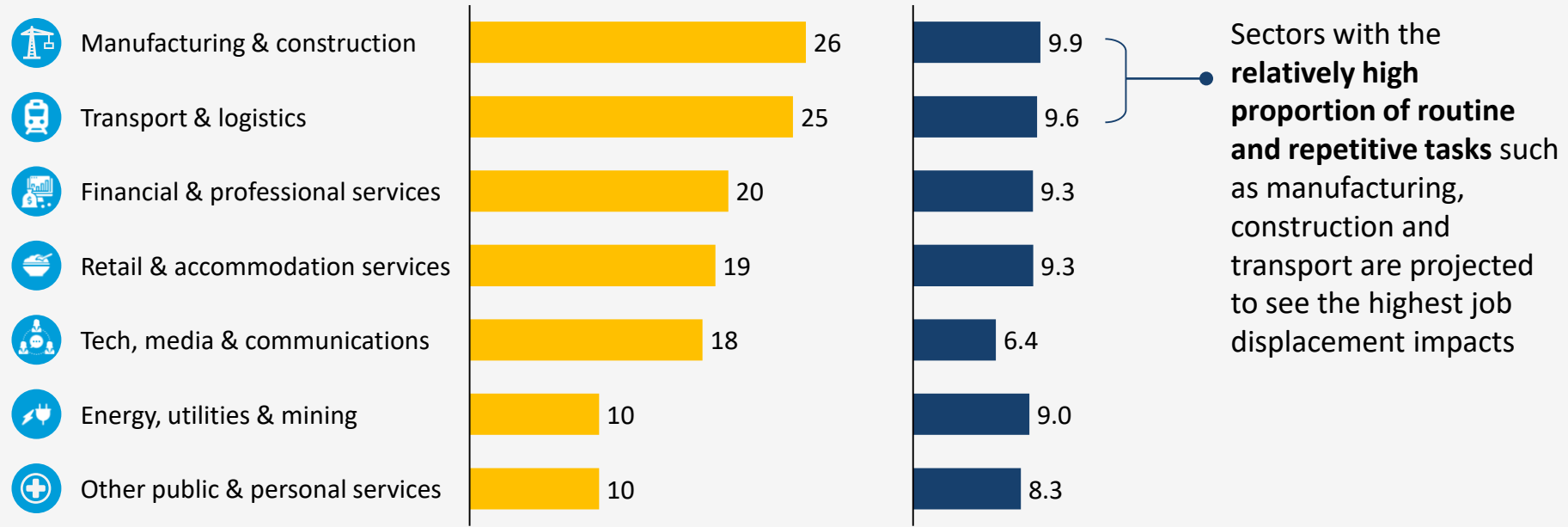- High-end estimate in the literature (where available)

Job displacement impacts also vary widely across sectors, ranging from 8-26% of jobs being affected

Projected share of jobs displaced by AI and automation technologies by sector across different Asian economies, %

Sources and scope of estimates:

🟨 PricewaterhouseCoopers (2018): Projection for high-income Asian economies to 2030[1]

🟦 Oxford Economics and Cisco (2018): Projection for ASEAN economies to 2028[2]

Sector	PwC (2018)	Oxford Economics and Cisco (2018)
Manufacturing & construction	26	9.9
Transport & logistics	25	9.6
Financial & professional services	20	9.3
Retail & accommodation services	19	9.3
Tech, media & communications	18	6.4
Energy, utilities & mining	10	9.0
Other public & personal services	10	8.3

Sectors with the **relatively high proportion of routine and repetitive tasks** such as manufacturing, construction and transport are projected to see the highest job displacement impacts

1. Countries studied include Japan, Mongolia, South Korea, Singapore and Taiwan.
2. Countries studied include Indonesia, Malaysia, Singapore, Thailand, Philippines and Thailand. To compare job displacement effects in ASEAN and high-income Asia based on the same sector groups highlighted in PWC (2018), simple averages of related industries were taken to derive the estimated share of jobs displaced for each of the sector groups outlined. For example, the estimate of 9.9% for 'Manufacturing & construction' was derived based on a simple average of 10.3% for manufacturing and 9.4% for construction.

SOURCES: Oxford Economics and Cisco (2018), *Technology and the future of ASEAN jobs;* PWC (2018), *The macroeconomic impact of Artificial Intelligence;* AlphaBeta analysis

AI is likely to have a larger impact on task rather than job displacement

Impact of AI and automation on Australian workers

Expected fall in average weekly work hours spent on automatable tasks from 2015-2030

Workers changing jobs

29%
(35 minutes)

71%
(1 hour 25 minutes)

Workers changing tasks
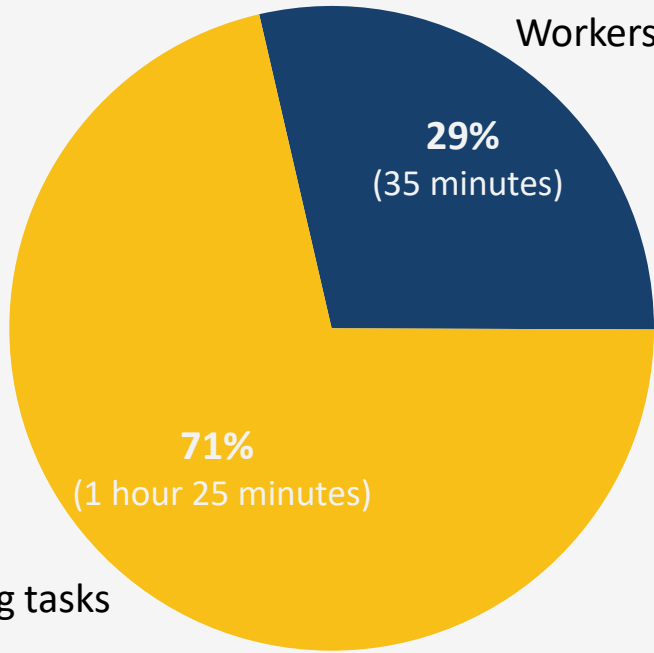
The study showed that automation technologies were expected to lead to **2 less hours of routine and manual work in an average Australian work week by 2030**. Of this expected reduction in work time, two thirds (71%) could come from people doing the same job, but completing fewer manual and routine tasks on the job. **Less than one-third (29%) of the impact was estimated to lead to people changing jobs**

AI could create new jobs through three channels: directly within the AI sector (direct effect), indirectly in other related sectors (spillover effect), and at the broad economy level (income effect)

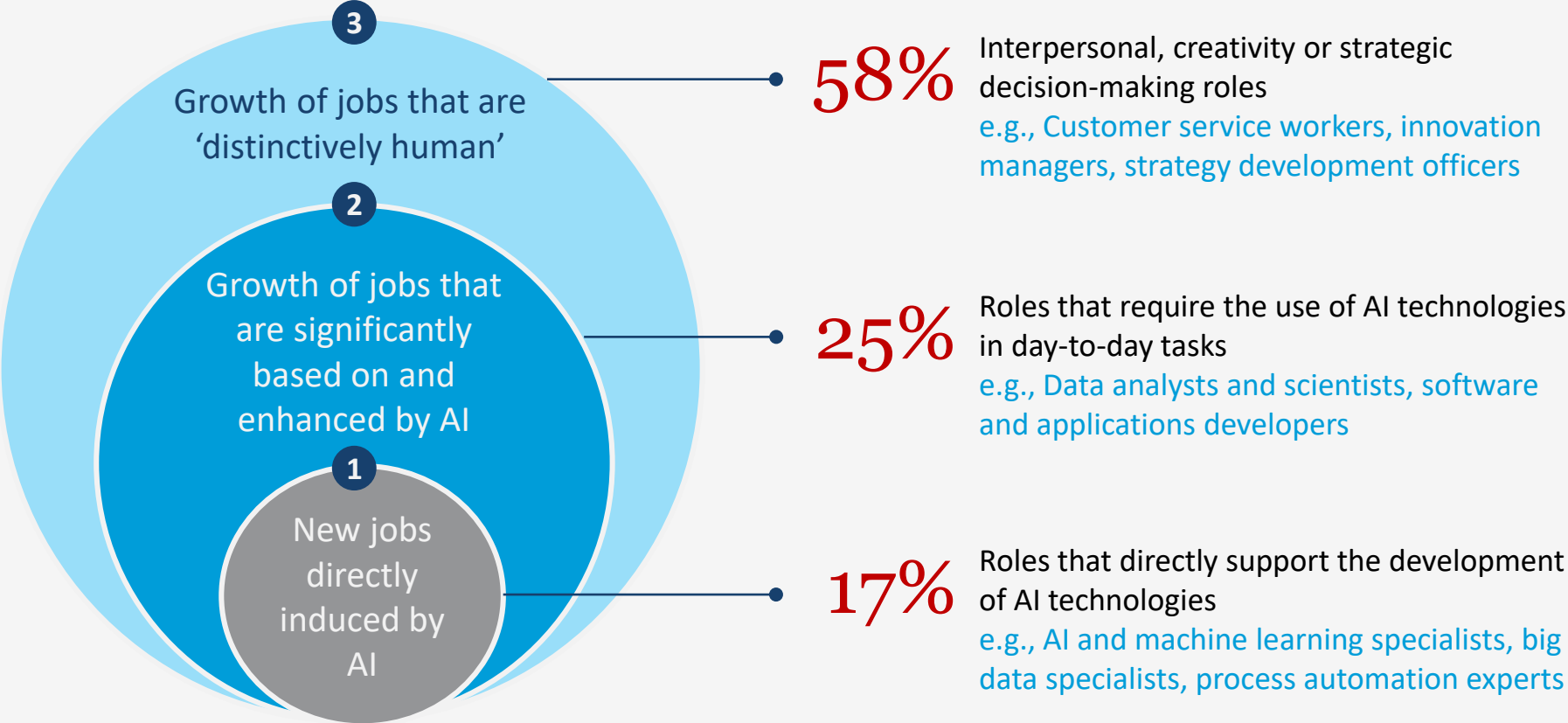|	Description	Evidence in Asian countries
Direct effect (in tech sector)	People will be required to **create, maintain and improve AI technologies**	ICT jobs supporting AI development have been growing the fastest in Singapore, with data scientist jobs in particular growing by **17 times** over the period 2013-2017
Spillover effect (in related sectors)	People will be required to take up **new jobs that do not exist today, which involve supporting the adoption of AI** in situations where it does not completely replace humans (e.g., assistants at automated airport check-in and supermarket checkouts)	With the wave of automation technologies occurring in India over the past decade, jobs that experienced the fastest growth during this period were those supporting the deployment of automation technologies (e.g., CNC operators and programmers)
Income effect (economy-wide)	People will be required to produce the **higher level of goods and services** that will be demanded in an economy where AI-enabled productivity gains have led to increased incomes through cost savings	A study for China reflected strong income effects that could more than offset displacement effects, resulting in net job gains of **12%** by 2037

SOURCE: Literature review, AlphaBeta analysis

Jobs that directly support AI development could account for less than a fifth of 'in-demand' positions, while almost 60% could be positions that require interpersonal, creative or strategic decision-making tasks

Projected distribution of in-demand job positions in an AI economy over 2018-2022 period[1], %

3 Growth of jobs that are 'distinctively human'

2 Growth of jobs that are significantly based on and enhanced by AI

1 New jobs directly induced by AI

58% Interpersonal, creativity or strategic decision-making roles
e.g., Customer service workers, innovation managers, strategy development officers

25% Roles that require the use of AI technologies in day-to-day tasks
e.g., Data analysts and scientists, software and applications developers

17% Roles that directly support the development of AI technologies
e.g., AI and machine learning specialists, big data specialists, process automation experts

While technological skills will continue to be important, soft skills such as higher cognitive, social and emotional skills will be critical

Top ten 'in-demand' skills identified by business leaders in Asia Pacific[1]

Legend: 🟧 Higher cognitive skills 🟦 Social & emotional skills 🟩 Technological skills

% of surveyed business leaders who believe skill will be important over 2018-2021 (%)[1]

Rank	Future skills in demand (2022)	%
1.	Quantitative, analytical and statistical skills	51
2.	Digital skills	51
3.	Adaptability and continuous learning	49
4.	Critical thinking and decision making	47
5.	Creativity	44
6.	IT skills and programming	44
7.	Entrepreneurship and initiative-taking	42
8.	Project management	41
9.	Communication and negotiation skills	41
10.	Interpersonal skills and empathy	39

1. 1,605 business leaders in the Asia Pacific region were surveyed. They were asked the question, "Which of these skillsets do you see most commonly available in the workforce today, and which do you think is most needed 3 years from now in the AI-enabled workplace?" 15 countries were included in the survey:

Agenda

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Challenges faced and action agenda

We have identified 7 key challenges that could limit the benefits of AI in Asia

	Challenges faced in Asia	Key facts
1	**Relatively low and uneven adoption of AI across firms and workers**	A survey of over 3,000 APAC business representatives revealed that only 41% of organizations have started using AI
2	**Lack of awareness by workers about the reskilling benefits and opportunities**	86% of workers in Asia think their education is sufficient for them to stay employed; a fifth were not willing to undergo training
3	**Inability or reluctance of governments and employers to implement and/or fund worker retraining programs**	India's TVET system can train less than one-quarter of the 13 million people entering the labor market each year
4	**Risk of underserved groups not participating in the benefits**	People with disabilities in Asia face on average a 20% lower employment rate than the overall population
5	**Lack of effective, scalable lifelong learning models**	Employers in Asian countries believe that their workers would require an average of 103 days of retraining (almost 40 percent of working days in a year) between 2018 and 2022 in order to keep up with the anticipated pace of AI adoption
6	**Educational curriculums struggle to keep pace with evolving skill needs**	70-80% of Thai graduates are not skilled enough to meet industry demands
7	**Social protection exists for jobs, not people**	Health insurance and other benefits are typically designed for employees who remain with a single employer for many years

Best practice approaches and lessons learnt were identified to develop an action agenda for AI in Asia

Action agenda		Key action	Examples of countries in Asia where governments, industry and/or civil society actors have implemented action
Stimulate greater AI adoption and worker reskilling efforts	1	Ensure strong and even adoption of AI across firms and workers	
	2	Build awareness of reskilling benefits, critical skills and training opportunities	
	3	Incentivize and encourage employers to retrain their workers	
	4	Foster close collaboration between governments, industry and civil society to create relevant and effective nation-wide retraining frameworks	
Promote a shift in emphasis from qualifications to skills	5	Establish effective and skills-focused lifelong learning models	
	6	Ensure relevance of educational curriculums to emerging skill needs	
	7	Encourage focus on skills rather than just qualifications in both recruitment and national labor market strategies	
Build inclusiveness to extend AI benefits to all workers	8	Build inclusive models that allow underserved groups to benefit from AI	
	9	Create social protection mechanisms for flexible workers	