Assessing the impacts of Industry 4.0 for workforecs in high-growth industries in the Philippines

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What is “Industry 4.0”?

INDUSTRY 1.0

Mechanization of industry using water and steam-powered machines

18th Century

INDUSTRY 2.0

Mass production with assembly line powered by electricity

19th Century

INDUSTRY 3.0

The advent of computers, the Internet, robots and automation, and electronics

1980s

INDUSTRY 4.0

First conceptualized to describe data exchange technologies used in manufacturing, this term is now widely used to refer to technologies applied across all sectors; technologies include cyber-physical systems, the Internet of Things (IoT), Artificial Intelligence (AI), cloud computing and cognitive computing

Today

Overview of study

Key question:

What are the challenges and opportunities for skills and jobs posed by Industry 4.0 in Cambodia, Philippines, Indonesia and Viet Nam, and what are the policy options?

Project components

- Analysis of Industry 4.0 on jobs and skills in two selected industries in each country, including employer surveys to understand their perceptions of the impacts of Industry 4.0 on jobs, tasks and skills
- Survey of training institutions to understand their readiness for supporting 4.0 skill development
- Assessment of policy approaches in each country to understand readiness for I4.0 and potential opportunities to strengthen approaches

Contents

The IT-BPO and electronics manufacturing industries were selected for this study: why?

Considerations for industry selection:

1. **Industries must be of high priority to the government, based on existing policies**
2. **Industries must fulfil the following criteria:**
   - a. Significantly contributes to national employment
   - b. Exhibits strong recent employment growth
   - c. Exports are internationally competitive
   - d. Relevant to Industry 4.0
3. **As far as possible, the two industries should be represented in both the manufacturing and services sectors**

Selected industries	Reasons
IT-BPO	• Significant contributor to national employment, GDP and exports • High potential for I4.0-enabled productivity gains, but threat of large disruption to jobs • Technology roadmap has been developed by IBPAP in consultation with government
Electronics	• Outlined as a key industry prioritized by the government for I4.0 adoption • Push to shift industry activities further up the value chain • Strong collaboration between industry, government and education institutes need to understand skilling impacts and priorities

How is Industry 4.0 relevant to both industries?

Industry	Finding	Source
IT-BPO	AI-enabled chatbot technologies can answer **80%** of routine questions by customers, bring about **99%** improvement in response times and reduce customer service costs by **up to 30%**	IBM (2017)
	By automating routine checks and responses to customer queries, robotic process automation (RPA) technologies have been demonstrated to reduce case processing time by **80%**	Auxis (2019)
Electronics	Early Industry 4.0 adopters in ASEAN demonstrated **30-50%** productivity gain and overall equipment effectiveness (OEE) improvement of **15%**	McKinsey Global Institute (2018)
	In ASEAN, IoT-enabled predictive maintenance technologies on the factory floor are estimated to bring about **10-40%** reduction in spend, **3-5%** improvement in equipment lifetime and **50%** reduction in equipment downtime by 2025	McKinsey Global Institute (2018)

Key insights on I4.0's potential impacts on the IT-BPO industry

I4.0 readiness

- Companies have a **good understanding** of I4.0, but **adoption is not advanced**
- Employers expect a **productivity increase by more than 25%** from I4.0

Impact on jobs and tasks

- **Potential net increase in jobs** due to strong positive income effects (+35%) offsetting negative displacement effects (-24%)
- Shift from routine to **non-routine, analytical work** (e.g. tailored customer service)
- **Technical customer facing jobs** will rise, while manual and admin jobs will decline
- **Women are likely to be more impacted** as they are more highly represented in admin jobs

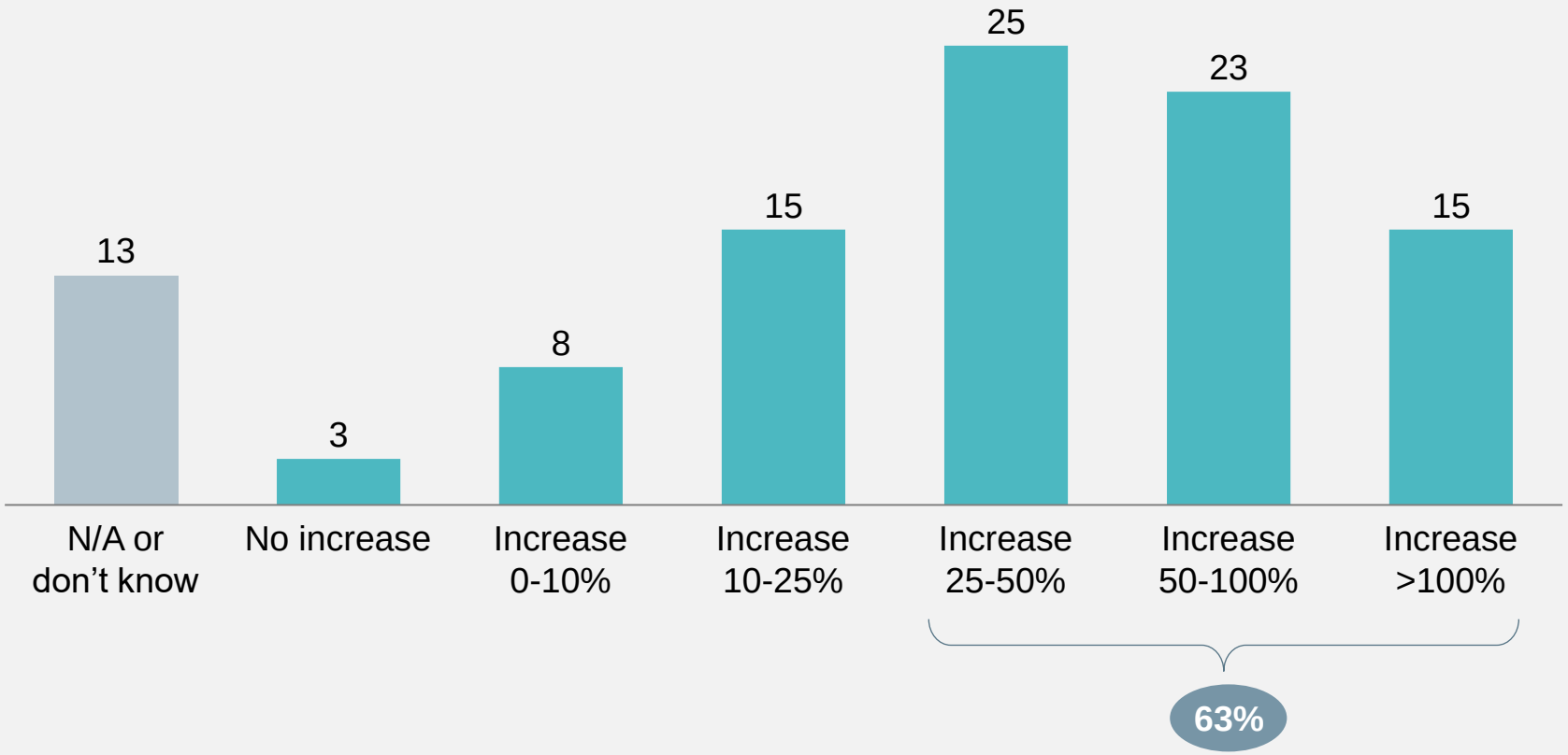
Impact on skills

- **Evaluation, judgement, decision-making and interpersonal skills** will rise in importance

Over 60% of employers in the IT-BPO industry expect a productivity increase by more than 25% from I4.0 technologies over the next 5 years

Expected productivity improvement due to I4.0 technologies in 5 years

Respondents, %



SOURCE: Employer survey on impact of I4.0 on the IT-BPO industry in the Philippines, n=40.

The overall impact of I4.0 on jobs is likely to be limited as negative displacement effects are potentially offset by positive income effects

Modelled impact of I4.0 on number of jobs between 2018 and 2030 in the Philippines' IT-BPO industry

Displacement and income effects of I4.0 on jobs, 2018-2030, %

Effect	Description	Impact
Displacement	Job reductions due to labor-substitution effects of I4.0	-24
Productivity	Additional labor demand stimulated by revenue increases brought about by I4.0-enabled productivity gains	35
Net	Combination of displacement and income effects	11

Note: Change in jobs based on accelerated adoption scenario of Industry 4.0 technologies.
SOURCES: Industry employment – PSA, LFS 2017 and ILO; GDP/Output – PSA and IMF Article IV; STEP survey data; Employer survey on impact of I4.0 on the IT-BPO industry in the Philippines, n= 32+; Job portal data: jobs in the IT-BPO industry scraped from the job portal, 'Bestjobs.ph', over the period of July to August 2019.

Evaluation, judgement and decision making skills will likely be crucial as I4.0 technology deals with routine processes

Impact of I4.0 on the importance of different skills in the Philippines' IT-BPO industry between 2018 and 2030

Skills of increasing relative importance from 2018-2030
Skills with decreasing relative importance from 2018-2030
Skills with no change in relative importance

Importance ranking	2018	2030
1	Written and verbal communication	Evaluation, judgement and decision making
2	Management	Numeracy
3	Numeracy	Written and verbal communication
4	Social	Social
5	Evaluation, judgement and decision making	Computer literacy
6	Computer literacy	Critical thinking and active learning
7	Complex problem solving	Complex problem solving
8	Critical thinking and active learning	Management
9	Technical	Technical
10	Digital/ICT skills	Digital/ICT skills

SOURCES: Industry employment – PSA, LFS 2017 and ILO; GDP/Output – PSA and IMF Article IV; STEP survey data; Employer survey on impact of I4.0 on the IT-BPO industry in the Philippines, n= 32+; Job portal data: jobs in the IT-BPO industry scraped from the job portal, 'Bestjobs.ph', over the period of July to August 2019.

Key insights on I4.0's potential impacts on the electronics industry

I4.0 readiness

- Companies in the electronics industry claim to have a **good understanding of industry 4.0 and high adoption**
- Over half of companies expect **at least a 25% productivity boost** from I4.0

Impact on jobs and tasks

- **Potential net increase in jobs** due to strong positive income effects (+34%) offsetting negative displacement effects (-24%)
- Different to perceived wisdom, employers expect the relative number of **manual jobs to increase slightly**
- 16% **less time spent on routine physical tasks** (e.g., manual assembly)
- Job displacement effects are likely to **affect 25% more women** than men

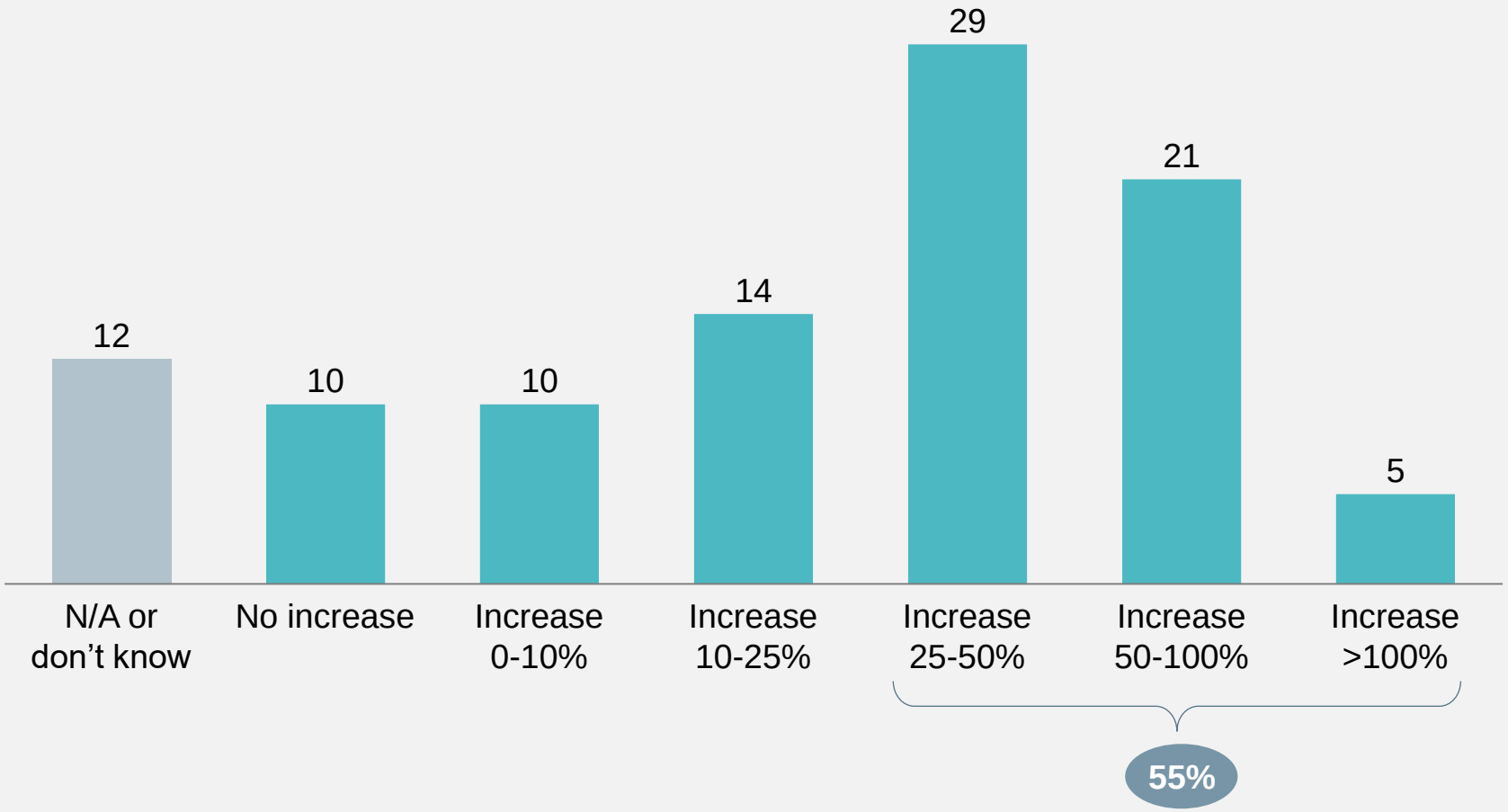
Impact on skills

- Numeracy, evaluation, decision-making and basic digital skills are likely to rise in importance

Over half of employers in the electronics industry expect a productivity increase between 25-100% from I4.0 technologies over the next 5 years

Expected productivity improvement due to I4.0 technologies in 5 years

Respondents, %



SOURCE: Employer survey on impact of I4.0 on the Electronics industry in the Philippines, n=41.

Overall, there is likely to be a net increase of 10% in the number of jobs in the industry due to I4.0 adoption

Modelled impact of I4.0 on number of jobs between 2018 and 2030 in the Philippines' Electronics industry

Displacement and income effects of I4.0 on jobs, 2018-2030, %

Effect	Description	Impact
Displacement	Job reductions due to labor-substitution effects of I4.0	-24
Productivity	Additional labor demand stimulated by revenue increases brought about by I4.0-enabled productivity gains	34
Net	Combination of displacement and income effects	10

Note: Change in jobs based on accelerated adoption scenario of Industry 4.0 technologies.
SOURCES: Industry employment – PSA, LFS 2017 and ILO; GDP/Output – PSA, McKinsey and IMF Article IV; STEP survey data; Employer survey on impact of I4.0 on the Electronics industry in the Philippines, n= 41+; Job portal data: jobs in the Electronics industry scraped from the job portal, 'Bestjobs.ph', over the period of July to August 2019.

Numeracy, evaluation, decision-making and basic digital skills are likely to rise in importance

Impact of I4.0 on the importance of different skills in the Philippines' electronics manufacturing industry between 2018 and 2030

Skills of increasing relative importance from 2018-2030
Skills with decreasing relative importance from 2018-2030
Skills with no change in relative importance

Importance ranking	2018	2030
1	Written and verbal communication	Numeracy
2	Management	Evaluation, judgement and decision making
3	Evaluation, judgement and decision making	Technical
4	Numeracy	Basic digital skills
5	Social	Written and verbal communication
6	Computer literacy	Management
7	Complex problem solving	Complex problem solving
8	Critical thinking and active learning	Critical thinking and active learning
9	Technical	Social
10	Digital/ICT skills	Advanced digital skills

SOURCES: Industry employment – PSA, LFS 2017 and ILO; GDP/Output – PSA, McKinsey and IMF Article IV; STEP survey data; Employer survey on impact of I4.0 on the Electronics industry in the Philippines, n= 41+; Job portal data: jobs in the Electronics industry scraped from the job portal, 'Bestjobs.ph', over the period of July to August 2019.

Contents

Key insights from training institute surveys

Positive

1. Most training institutions feel **well equipped for Industry 4.0**, although additional financial and technical support will be needed
2. **86%** of training institutions communicate with employers at least 2x/year
3. **Strong alignment** between trainings institutions and employers on the skills that will become more important with I4.0
4. **Active engagement** with employers - with curriculum input and apprenticeships being most common

Areas requiring attention

1. Almost **half** of all training institutions review and update their curricula less than annually
2. Training institutions provide courses to teach I4.0 relevant skills and technologies, but the uptake of I4.0 in the classroom is **largely limited**
3. On average, workers in the electronics manufacturing industry receive **less** training than those in the IT-BPO industry
4. **Over 70%** of training institutions find it difficult to fill student vacancies, mostly as a result of a lack of price competitiveness
5. **90%** of training institutions believe graduates to be adequately prepared for job market, but only **52%** of employers

Contents

The Philippines's national skills policy framework was assessed in relation to I4.0 – both in terms of "the what" and "the how"

Policy assessment	Description
"The What": ***What is the Philippines doing today?***	▪ Analysis of the Philippines's **broad approach to Industry 4.0**, including targets, strategies and actions ▪ Analysis of the Philippines's **policies for jobs and skills related to Industry 4.0**, and possible gaps
"The How": ***How is the Philippines doing it?***	▪ Analysis of **implementation approaches of Industry 4.0 job and skill policies**, taking into account the roles of different actors such as government, industry and training institutions

Philippines has a strong focus on MSME tech adoption, ensuring TVET quality, and skills training and certification – but there are further areas to consider

Policy area	Current policies	Further areas to consider
Stimulate Industry 4.0 adoption and worker reskilling efforts	▪ Govt aims to more than **double R&D expenditure** from **0.2%** of GDP in 2017 to **0.5%** by 2022 ▪ **'Science for Change Program'** to double science scholarships ▪ **Tax incentives** of up to **50%** offered to employers participating in 'Dual Training System'	▪ Measures to tackle I4.0 adoption barriers for MSMEs (e.g., cost) ▪ Partnerships between industry and academia/research institutes ▪ Incentives for private sector to contribute to skills development of workers
Create new flexible qualification pathways	▪ **Community-based training** based on skill requirements of local employers ▪ **Curricula adjustments for I4.0** – e.g., IBPAP's partnership with CHED to establish a systems thinking course in universities ▪ **Skills certificates** to recognize TVET training of individuals without degrees	▪ Focus on I4.0 in current lifelong learning programs ▪ Mechanisms allowing flexibility in updating educational curriculums to reflect industry need
Build inclusiveness in I4.0 skilling approaches	▪ **'JobStart' program** provides out-of-school youth with industry-relevant skills through a **10-day** training course and internship opportunities ▪ **'TESDA Online Program'** provides free online TVET courses – reached **1.1 million** users within 4 years	▪ Limited R&D spending ▪ Weak incentives for employers and workers to invest in skills development

While there are areas of effective policy implementation such as strong industry-institution partnerships, there are several areas for improvement

Dimension	Effective areas	Areas for improvement
Clarity and robustness of plans	▪ Increasing focus on I4.0 in national economic and skills strategy (e.g., I3S, NTESDP) ▪ Forward-looking policy based on global trends in I4.0 adoption and impacts	▪ Inadequate local evidence base and data backing policy directions
Strength of coordination	▪ Strong alignment within industry sectors on skills required and training opportunities ▪ Coordination between industry and education and training sectors	▪ Currently no one single I4.0 roadmap across different govt ministries ▪ Limited coordination across different levels of government
Alignment of financing & incentives	▪ Government financing commitments well aligned with strategic priorities	▪ Limited R&D spending ▪ Weak incentives for employers and workers to invest in skills development

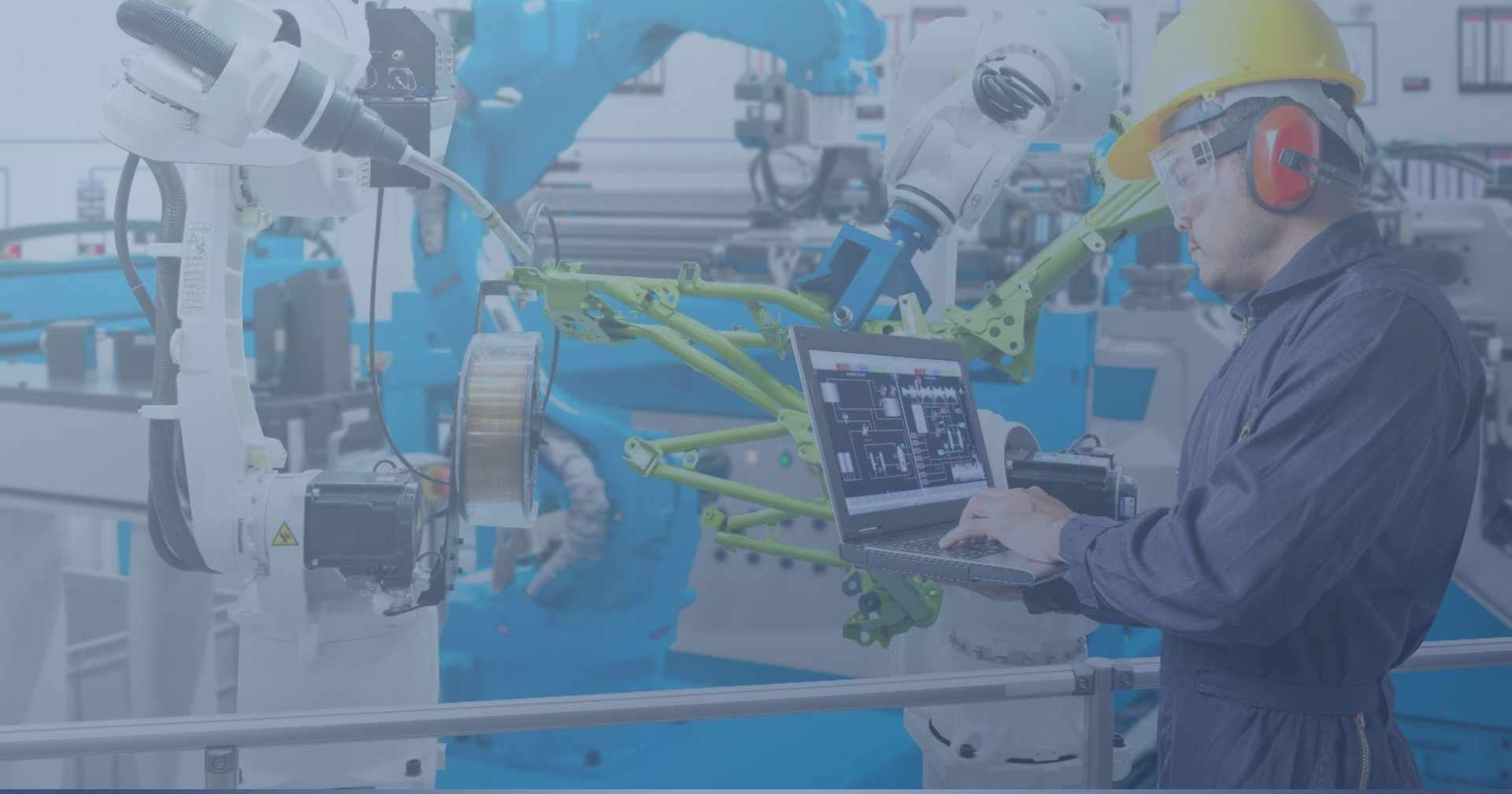
Contents

Recap of challenges facing the Philippines in relation to 4IR

Area		Key challenges	Factoids
Industry-level analysis 	1	Large displacement of workers in certain industries, with large gender implications	Up to **24%** of jobs could be displaced by 4IR technologies in IT-BPO and electronics
	2	Large shift in tasks and skill requirements	Workers in IT-BPO could spend **16%** less time on routine physical and routine interpersonal tasks
	3	Significant ramp up of on-the-job training, particularly for analytical skills	Roughly **60%** of new trainings related to 4IR will need to be delivered on-the-job
Training institute survey 	4	Lack of frequent updates of curriculum	**46%** of training institutions surveyed review and update their curricula less than annually
	5	Limited adoption of 4IR technologies in the classroom	Only **15%** of training institutions are using virtual learning platforms
	6	Mismatch on skill expectations	**90%** of training institutions believe graduates to be adequately prepared for job market, but only **52%** of employers
Policy assessment 	7	Lack of flexible skill certification programs	Strong focus on traditional qualifications
	8	Lack of awareness of training opportunities	**48%** of workers stated that they did not know what courses to take for retraining
	9	Lack of incentives for investment by firms in worker training	Affordability of training courses highlighted as largest barrier for reskilling in the Philippines
	10	Lack of social protection mechanisms for vulnerable workers	**<40%** of private sector workers contribute to unemployment insurance
	11	Lack of integrated 4IR and skills policy, and coordination between government departments	There is currently no single consolidated 4IR strategy, and national policies very much reside within single government departments

There are a range of relevant best practices that could be adopted to tackle these challenges

Recommendations	Common challenges	Examples of countries where recommendation implemented
1 Develop 4IR transformation roadmaps for key sectors	▪ Lack of understanding of 4IR by businesses ▪ Large displacement of workers in certain sectors, with large gender implications ▪ Limited awareness of training opportunities ▪ Lack of integrated 4IR and skills policy, and coordination between government departments	
2 Develop a series of industry-led TVET programs targeting skills for 4IR	▪ Significant ramp up of on-the-job training, particularly for analytical skills ▪ Mismatch on skills expectations	
3 Explore opportunities to increase curriculum responsiveness	▪ Lack of frequent updates of curriculum	
4 Upgrade training delivery through 4IR technology in classrooms and training facilities	▪ Limited adoption of 4IR technologies in the classroom	
5 Develop flexible and modular skill certification programs	▪ Lack of flexible skill certification programs	
6 Implement an incentive scheme for firms to train employees for 4IR	▪ Lack of incentives for investment by firms in worker training	
7 Formulate new approaches and measures to strengthen inclusion and social protection in the context of 4IR	▪ Lack of social protection mechanisms for vulnerable workers	



Thank you for your time