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# Artificial Intelligence and the Philippine Labor Market: Mapping Occupational Exposure and Complementarity

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**ABSTRACT:** This paper combines labor force survey microdata with measures of occupational AI exposure and complementarity to examine the potential impact of recent advancements in AI on the Philippine labor market. We find that around one third of workers are highly exposed to AI with around sixty percent of those also rated highly complementary, indicating potential productivity gains. College-educated, young, urban, female, and well-paid workers in the services sector are most exposed. Business process outsourcing (BPO) is identified as the sector with the highest proportion of jobs at risk of displacement. Addressing regulatory gaps, infrastructure needs, and workforce reskilling is crucial to maximize benefits and mitigate negative impacts.

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# Executive Summary

This paper examines the potential impact of recent advancements in artificial intelligence (AI) on the labor market in the Philippines. The Philippines faces unique challenges and opportunities due to its large BPO sector—a significant contributor to the national economy. We build on the occupational classification framework proposed by the Cazzaniga et al. (2024), which is in turn based on the work of Felten et al. (2021) and Pizzinelli et al. (2023). Felten et al. develop an AI exposure index capturing the overlap between AI capabilities and occupational tasks, while Pizzinelli et al. introduce an AI complementarity score assessing how AI might enhance or replace human roles, considering required skill levels and societal context. By combining these measures, occupations are categorized into high exposure/high complementarity, high exposure/low complementarity, and low exposure groups. The primary innovation of this paper is linking these classifications to the specific circumstances of the Philippines by merging the AI exposure and complementarity scores with microdata from the Philippine Statistics Authority's October 2022 Labor Force Survey, comprising over 180,000 observations, 80,000 of which are tagged as “employed”. This approach provides a granular analysis of occupations potentially affected by AI and correlates AI exposure with demographic indicators.

We find that around one third of occupations in the Philippines are highly exposed to AI, meaning that many of the tasks could be performed by AI technologies. 61% of these highly exposed jobs are also rated as highly complementary, suggesting that AI is likely to augment rather than replace these roles, potentially increasing productivity. The remainder (14% of the total workforce) hold jobs with low complementarity, making them susceptible to displacement by AI. College-educated, young, urban, female, and well-paid workers in the service sector are most exposed to AI. These groups however also tend to occupy roles with high complementarity, indicating they may be better positioned to leverage AI advancements as the nature of work evolves. While BPO workers are classified as highly exposed with low complementarity, they represent only about 3% of the total workforce. Nonetheless, the BPO sector's significant contribution to the economy—accounting for 7.4% of GDP in 2023, similar in magnitude to remittances—means that changes within this industry are macro-critical and may have spillover effects on the broader economy.

The Philippine government has recognized the transformative potential of AI and is actively working to harness its benefits for national development, despite the absence of a comprehensive legal framework. The National AI Strategy Roadmap, first introduced in 2021 and updated in 2024, outlines a strategic vision for integrating AI across various sectors to boost competitiveness, foster research and development collaboration, and prepare the workforce for future jobs while ensuring responsible AI governance. Complementing this initiative, the Trabaho Para sa Bayan Act aims to align education with industry needs and generate job opportunities amid technological change. Additionally, several bills are under consideration to establish regulatory and developmental bodies for AI, reflecting a proactive stance toward AI development and regulation.

Despite these efforts, challenges persist, including regulatory gaps, inadequate infrastructure, workforce reskilling needs, and limited AI adoption due to cost concerns. Addressing these issues is crucial for the Philippines to fully leverage AI's economic and societal benefits. The analysis in this paper can inform strategies to mitigate negative consequences, such as job displacement, and maximize positive outcomes, such as increased productivity and the creation of new job categories. Investments in education and training programs focused on AI and digital skills are essential to prepare the workforce for the future. Furthermore, developing a regulatory framework that ensures the ethical use of AI and addresses issues related to labor market transitions is imperative, drawing on lessons from global best practices.

# I. Introduction

Recent advances in the development and public availability of artificial intelligence (AI) are likely to significantly transform economies across the globe. One of the most notable advancements is the development of generative AI models, such as OpenAI's GPT-4 and Google's Gemini. These models have revolutionized natural language processing, enabling machines to understand and generate human-like text with unprecedented accuracy. Their output has wide-ranging applications, including in content creation, coding, and problem-solving, which could allow businesses to automate tasks, enhance customer service, and optimize decision-making processes. As a result, industries ranging from healthcare to finance are beginning to integrate AI-driven tools into their operations, promising efficiency gains and innovation opportunities. Recent advances build on a long history of research and development which is outlined in greater detail in box 1.

This paper studies the potential impact of these rapid technological advancements on the labor market in the Philippines. As AI systems become more capable and readily available, they are likely to replace or significantly alter many job roles, particularly those involving routine and repetitive tasks. The Philippines, with its large business process outsourcing (BPO) sector, faces unique challenges and opportunities. The BPO industry, a significant contributor to the country's economy, might experience shifts as AI-driven chatbots and virtual assistants handle more customer service tasks. However, AI could also create new opportunities, fostering growth in tech-driven industries and necessitating a workforce with advanced digital skills.

We follow the occupational classification proposed by Cazzaniga et al. (2024) which is in turn based on work by Felten et al. (2021) and Pizzinelli et al (2023). This strand of the literature considers occupations to be a list of tasks. Felten et al. (2021) develop an AI “exposure” index that captures the overlap between the capabilities of recent gen-AI tools and the tasks required for each occupation. Pizzinelli et al. (2023) develop an AI complementarity score which considers the required skill level for each occupation as well as its societal context to evaluate how shielded each job is from AI-driven replacement. Combining these two measures, each occupation can therefore be categorized as either “high exposure/high complementarity”; “high exposure/low complementarity”; and “low exposure” where the median exposure or complementarity score respectively serves as the cutoff value between the high and low categories.

The main innovation of this paper is to connect the findings from the academic literature on occupational AI exposure and complementarity to the specific circumstances of the Philippines. We merge the above-mentioned classification of occupations with labor force survey microdata provided by the Philippine Statistics Authority (PSA). We use the October 2022 vintage of the Philippine labor force survey which contains 183,602 observations of 52 variables. By using microdata rather than aggregated data from the International Labor Organization (ILO), we obtain a more granular picture of the distribution of occupations potentially affected by AI and are also able to correlate AI exposure with other demographic indicators.

We find that around one third of occupations in the Philippines are highly exposed to artificial intelligence. This means that their jobs entail tasks which can now be performed by AI. 61% of those highly exposed jobs are however also rated as highly complementary, meaning that artificial intelligence is likely to support rather than replace the worker, potentially increasing their productivity. The remaining low complementarity jobs, which represent 14% of the total workforce, are at risk of being replaced by AI.

Looking at other socioeconomic indicators recorded in the labor force survey, we find that college educated, young, urban, female, and well-paid workers in the service sector are most exposed. However, these

characteristics also correlate with complementarity, suggesting that these workers may also be better placed to take advantage of AI as the nature of work evolves.

While BPO workers are classified as highly exposed with low complementarity in our analysis, BPO sector employees only make up about 3 percent of the total workforce. They therefore have less influence on the aggregate numbers than one might have otherwise expected. Having said that, the nature of work in the BPO sector will undoubtedly undergo substantial shifts in the wake of AI adoption and there may be spillovers to other parts of the economy which would not be captured by the analysis in this paper. Given the size of BPO sector revenues (7.4 percent of GDP in 2023, and similar in magnitude to remittances), changes in the BPO sector will therefore still be macro critical.

The Philippine government has recognized the transformative potential of AI and is actively working to harness its benefits for national development, although there is no comprehensive legal framework for the time being. The National AI Strategy Roadmap, first introduced in 2021 and updated in 2024, outlines a strategic vision for integrating AI across various sectors to boost competitiveness, foster R&D collaboration, and prepare the workforce for future jobs while ensuring responsible AI governance. Complementing this initiative, the Trabaho Para sa Bayan Act (Republic Act No. 11962) aims to align education with industry needs and generate employment opportunities in the face of technological change. Concurrently, several bills are under consideration to establish regulatory and developmental bodies for AI, reflecting a proactive stance towards AI development and regulation. However, challenges persist, including regulatory gaps, inadequate infrastructure, workforce reskilling needs, and limited AI adoption due to cost concerns.

Addressing these issues will be crucial for the Philippines to fully leverage AI's economic and societal benefits. The analysis in this paper can help inform strategies to mitigate negative consequences, such as job displacement, and maximize positive outcomes, such as increased productivity and the creation of new job categories. Investments in education and training programs focused on AI and digital skills will be essential to prepare the workforce for the future. Furthermore, regulatory frameworks need to be developed to ensure the ethical use of AI and to address issues related to labor market transitions. These should draw on lessons from global best practices in regulating and ensuring ethical AI use. By proactively studying AI's impact, the Philippines can better navigate the technological transformation and ensure inclusive economic growth.

## Box 1. The History of Artificial Intelligence

The origins of Artificial Intelligence (AI) can be traced back to 1943 when Warren McCullock and Walter Pittz published their work in the Bulletin of Mathematical Biophysics. They introduced the concept of networks composed of artificial neurons and how these networks could perform basic logical problems. Their work established the foundation for computer-based neural networks and deep learning. In 1950, Alan Turing wrote “Computing Machinery and Intelligence” which defined the complexities of defining intelligence. Turing’s proposal noted that a computer that was capable of conversing without being distinguished from human interaction could loosely be regarded as having cognitive abilities, this became a test known as the Turing test.

Pioneering developments in AI such as the Manchester Mark I were characterized by machines and limited capabilities and focused on fundamental applications. At the Dartmouth Summer Research Project in 1956, the Logic Theory Machine, funded by the Research and Development Corporation (RAND) was introduced. The program was designed to mimic human’s problem-solving skills, and it was considered by many to be the first AI program. The following years saw significant advancements in AI, such as the development of the Symbolic Automatic Integrator (SAINT) by James Slagle in 1961, which can solve calculus problems at a freshman level, and the creation of ELIZA, as an early natural language processing computer, by Joseph Weizenbaum in 1965.

Despite the slowdown of interest in AI during the 1970s, SHRDLU, a program which could utilize virtual robotic arms to manipulate virtual blocks, respond to commands in plain English and explain the necessity of its actions was developed in 1971. Paul Werbos, an American social scientist conceptualized a method of training artificial neural networks through backpropagation of errors. In 1975, Ted Shortliffe introduced MYCIN, a medical diagnostic system that influenced future expert systems despite its limited use due to its slow response speed. During the Gulf War, the Defense Advanced Research Projects Agency’s (DARPA) Dynamic Analysis and Replanning Tool (DART) showcased AI’s practical applications revolutionizing the logistics planning and allocation of resources in the battlefield.

The introduction of domestic AI products like Furby and AIBO opened AI for domestic consumption. Advancements in technology in 2005 enabled companies to monitor web and media activity, facilitating personalized product recommendation based on individual interests of customers. In 2017, Large Language Models (LLMs) were introduced which are trained on enormous amounts of data to provide the foundational capabilities needed to drive multiple use cases and applications. In 2018, the first Generative Pre-Trained Transformer (GPT) algorithm was introduced which used deep learning to generate a variety of output such as computer codes, poetry, and writing an essay. In 2022, Open AI debuted ChatGPT, an AI chatbot which is capable of various functions such as chat support, content creation, and translation among others. The introduction spurred the interest of the public and within two months, it reached 100 million users. In comparison, the internet and mobile phone took twenty years to reach 80 percent of countries. It has also galvanized other technology companies to innovate and introduce their own GPT versions such as Google’s Gemini, Microsoft’s Bing AI, and Meta’s Llama and has led to a dramatic increase of AI patents from 2015-2022, highlighting the swift progress made in AI development.

# II. Context

## A. The Philippine Labor Market

Figure 1 presents several basic summary statistics that help set the context for our analysis of the Philippine labor market and its exposure to artificial intelligence. The bulk of the workforce works in the services sector, with the rest broadly evenly split between agriculture and industry. There is a sizeable gap in the labor force participation between men and women with 75% of working age men either working or looking for work while the same is only true for 53% of women. Most working Filipinos' highest educational degree is the (junior) high school diploma though just over a quarter do hold a college degree. The most common employment is a salaried position (i.e., in a private company, the government, or for a private household), followed by self-employment, and being an unpaid family worker. While the analysis in this paper focuses on the current state of the labor market, it is important to acknowledge long-running trends in some of the variables depicted in Figure 1 – for example, the share of employment in agriculture has seen steady declines while the share in industry and particularly services has increased over time.

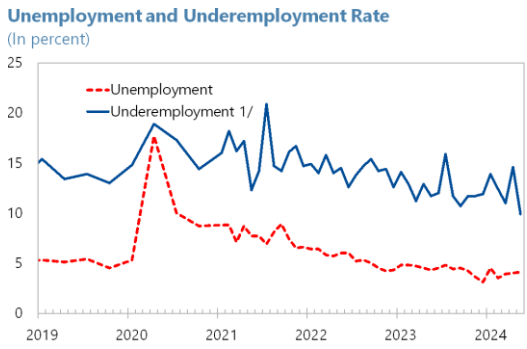
**Figure 1. The Philippine Labor Force: Key Summary Statistics**



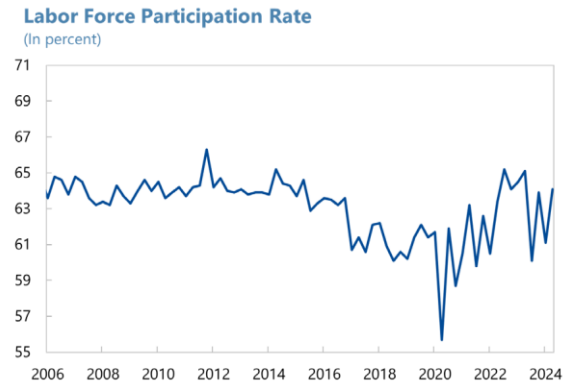

Source (for all graphs): Philippine Statistics Authority (data, April 2024 vintage), Own calculations

During COVID-19, unemployment spiked, and the labor force participation rate dropped (Figure 2). However, this shock gradually dissipated as the pandemic faded and the economy reopened. As of April 2024, the unemployment rate was 4.0%, below pre-pandemic levels, and the labor force participation rate has also recovered to pre-pandemic levels though its measurement has arguably become somewhat noisier in recent years. There is also significant underemployment, with 10-15% of employed workers looking for additional work or wanting longer hours of work.

**Figure 2. Unemployment and Labor Force Participation**



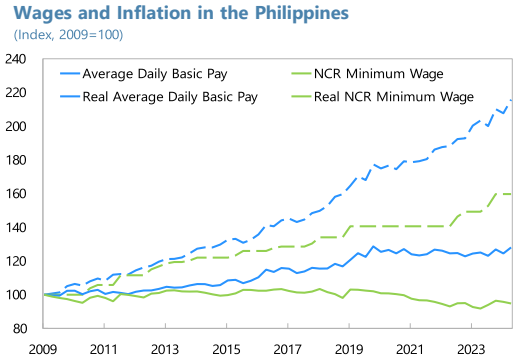

Source: Philippines Statistics Authority.
1/ Employed persons who want additional hours of work in their present job, or to have additional job, or to have a new job with longer working hours.




Source: ILO.

Figure 3 shows the evolution of wages over the past 15 years. The minimum wage for the national capital region (NCR) kept pace with inflation until COVID-19 but fell behind during the post-pandemic surge in inflation. Average daily basic pay, meanwhile, rose faster than inflation, bestowing workers with a roughly 30% real wage increase since 2009. The fact that the minimum wage did not make any gains in real terms over this time frame suggests that most of the real wage increases were concentrated in jobs with higher pay. These are likely the jobs that require specific skills or education to perform.

**Figure 3. Evolution of Pay in Real Terms**




## B. The BPO Industry

The Philippine economy is supported by its large service sector driven economy. In 2023, the services sector, as a share of total of Gross Domestic Product (GDP) accounted for 62.3 percent. In terms of employment, the April 2024 labor force survey from the Philippine Statistics Authority (PSA) noted that the services sector accounted for a large share of employment at 61.4 percent. A key driver of growth in the services sector has been the country's large Business Process Outsourcing (BPO) industry, which started in 1992. Offshore outsourcing has allowed multi-national corporations in developed economies to conduct commercial operations in a more cost-effective manner by tapping into a pool of highly skilled individuals in developing economies. This has resulted in 20-40 percent reduction in costs even factoring in additional costs such as business setup and infrastructure access (Marasigan, 2015).

The Philippines holds a significant portion of the global outsourcing market, estimated at 15 percent.[1] This is supported by the presence of 788 BPO companies, as reported by the Philippine Economic Zone Authority.[2] In 2023, the BPO sector generated US$35.5 billion in revenues, an increase of 9 percent over the previous year, or 8.1 percent of the country's total GDP. It also employs 1.7 million Filipinos, equivalent to 3.4 percent of the total labor force as of 2023 (Figures 4 and 5). Despite its small share in the country's labor market, the industry's presence in various cities throughout the archipelago generates positive spillovers to other sectors of the economy, such as the property and services sector. Additionally, BPO revenues are substantial and nearly as large as overseas remittances. The industry's ongoing expansion is fueled by robust government support, low labor costs, abundant pool of service-oriented, English speaking and young workforce, and a conducive business environment. The BPO sector in the country is composed of several business segments, in which the majority of the revenues are generated by contact centers and back-office support services (Box 2).

The IT & Business Process Association of the Philippines (IBPAP) highlights that North America remains the dominant market for the BPO industry with a 70 percent share. This is attributed to the region's extensive English-speaking population, cost-effective labor, and close cultural ties with the United States. Europe and the Asia-Pacific Region each hold 15 percent of the market share. Europe leverages the industry for its distinctive talent specialization and cost efficiency. Conversely, the Asia-Pacific Region leverages on the relative lack of onshore BPO centers for client markets, geographical proximity, and time zone overlap.

## Box 2. Types of BPO Services

**Contact Center** - Consist of in-bound and outbound voice operation services for the purpose of sales, customer service, technical support, and others.

**Back Office** - Service related to finance and accounting and human resource administration.

**Data Transcription** - Provision of transcription services for interpreting oral dictation of health professionals, dictations during legal proceedings, and other data encoding services.

**Animation** - Process of giving the illusion of movement to cinematographic drawings, models or inanimate objects through 2D, 3D, etc.

**Software Development** - Analysis and design, prototyping, programming, and testing, customization, reengineering, and conversion, installation and maintenance, education and training of systems software, middleware and application software.

**Engineering Development** - Includes engineering design for civil works, building and building components, ship building, and electronics.

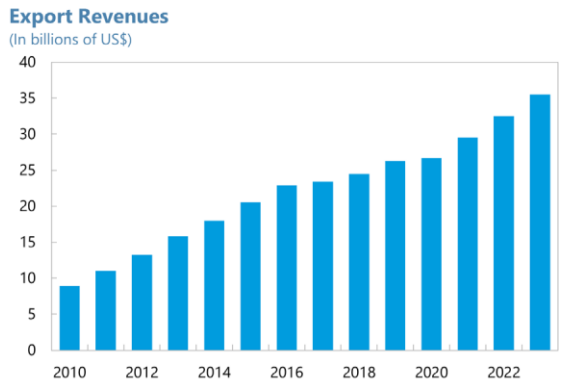
**Digital Content** - Creation of products that are available in digital form, such as music, information, and images that are available for download or distribution on electronic media.

Source: Department of Trade and Industry (DTI), Locsin (2006), The Computer Language Company Inc. (2006)

[1] https://www.magellan-solutions.com/blog/whats-the-number-analysis-of-the-latest-statistics-of-the-bpo-industry/
[2] https://www.magellan-solutions.com/studies/call-center-benchmarking-report/

**Figure 4: BPO Export Revenues**

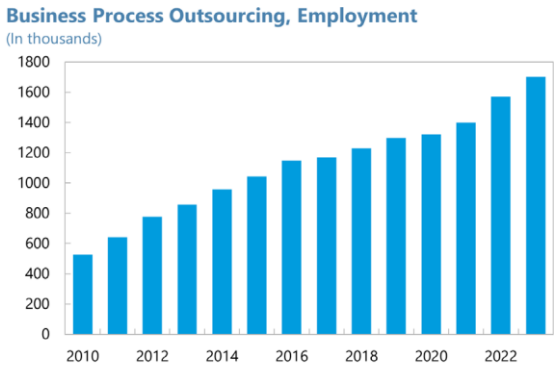
*In US$ Billion*




Sources: BSP; and IBPAP.

**Figure 5: BPO Employment**

*In '000s*




Sources: BSP; and IBPAP.

**Table 1: International Market Share of the Philippines' BPO Industry**

*In Percent*

| Industry | Percent Share |
|---|---|
| Banking, Financial Services, and Insurance (BFSI) | 25% |
| Technology, media, and telecom (TMT) | 14-18% |
| Retail | 14-18% |
| Healthcare | 11-15% |
| Manufacturing | 6% |
| Energy | 6% |
| Others | 25% |

Source: IBPAP, data as of 2023

Pre-pandemic, the BPO industry, one of Manila's economic jewels largely perceived the risk of AI as limited. The industry found solace in the fact that AI was not yet capable of demonstrating what customers needed: empathy, problem-solving skills, or engaging in English conversations. However, this perspective underwent a significant shift. The BPO Industry Employees Network, a call-center union noted that improvements in AI software have led to improved services at the expense of people's jobs. The union added that AI has turned into an adversary and is powerless to halt its progress. Outsourcing advisory firms have warned that the industry could face substantial job losses due to AI in the next five years (Avasant, 2024). On the other hand, AI is also expected to create new jobs such as data curation and algorithm training (Bloomberg, 2024).

Meanwhile, IBPAP noted that AI is both an opportunity and a challenge to the sector. It recognized the challenges that employees need to face such as improving skills in data handling, sharpening emotional intelligence and creativity through training courses and partnering with educational institutions. On the other hand, it acknowledged the potential benefits that can lead to the adoption of AI such as boosting productivity and improving customer experience, reduction of costs, and revenue growth.

Before, the threat of automation was contained to low-skilled, blue-collar jobs. However, generative AI's capabilities now pose a threat to white-collar jobs, especially for IT-BPM workers as customer services agents, tech support, and non-university educated employees. The Department of Labor and Employment (DOLE) has acknowledged that Filipinos are already losing jobs due to AI. In contrast, a survey conducted by Microsoft and LinkedIn showed that Filipino professionals are actively incorporating AI to their workflows. It indicated that 86 percent of Filipino professional workers that have been surveyed already use AI in some form, higher than the global average of 75 percent. Meanwhile, 55 percent of Filipinos who were surveyed are worried that their organizations lack plans and visions for implementing AI. Ng, et al. (2023) noted that generative AI can unlock US$79.3 billion in productive capacity, or equivalent to one-fifth of the country's 2022 GDP by 2030 especially in the country's manufacturing and Wholesale and Retail Trade sectors, largely due to its large share in the local workforce. In addition, GenAI is foreseen to complement the workforce, rather than replacing people entirely. The study noted that only one percent of the workforce would see GenAI utilized more than 20 percent of the work while 56% of workers in the Philippines will potentially use generative AI for between 5-20% of their regular work activities. Indeed, BPO companies have started to introduce AI assistant or copilots working alongside humans.

# III. Existing Literature

The academic literature has approached the study of AI through the lens of task-based models such as Acemoglu and Restrepo (2019) which were originally developed to study the impact of automation and robotics. This literature has identified three main channels through which automation may impact macroeconomic outcomes such as GDP, unemployment, and the income shares of capital and labor. Automation or AI may cause unemployment by replacing labor with machines (displacement), it may increase the productivity of existing capital or labor (productivity), and it may even generate new tasks and new jobs for producing and maintaining these machines (reinstatement)[3].

There is no consensus in the academic literature on the magnitude or relative importance of these channels. Frank et al. (2019) classifies researchers as either doomsayers or optimists but there are also prominent academics arguing that little change will come about. In terms of the most recent debate on the productivity impact of generative artificial intelligence, the two ends of the spectrum have been shaped by Acemoglu (2024) and Korinek (2024). Acemoglu (2024) argues that AI will bring only marginal TFP improvements of no more than 0.71% over ten years while Korinek (2024) predicts that the inevitable advent of artificial general intelligence will make all human work obsolete and drive the income share of labor to zero.

Empirical and experimental work has focused on more near-term and immediately quantifiable metrics. One strand looks at the overlap between occupational tasks and the capabilities of AI (Felten et al. 2021; Pizzinelli et al. 2023; Eloundou et al., 2023, Webb 2020). Gmyrek et al. (2023) even employ AI itself (GPT-4) to estimate task-level exposure scores. Brynjolfsson et al. (2023) find that generative AI increases the productivity of novice contact center workers the most while experienced workers benefit little. Others have studied labor market outcomes - Hui, Reshef, Zhou (2023) find that writing-related occupations and freelancers saw a 2.0 percent decline in the number of monthly jobs and a 5.2 percent decrease in monthly wages following the public availability of generative AI.

[3] See Berg et al. (2024) for a more detailed discussion of these channels.

In the context of emerging markets, Das and Hilgenstock (2018) studied 160 countries from 1969 to 2015 and noted that EM economies are less susceptible to routinization and thus automation as production in these economies is less capital intensive, with manual and mainly low-skilled occupations which are not easily automated. In addition, the authors noted that the large degree of informality in the economy, lack of supporting infrastructure such as but not limited to fast and stable internet connection, mobile coverage, computers, electricity, and adequacy of education and skills insulates EMs from the influence of GenAI in their labor markets. Even within emerging markets, this effect can generate differences. Carbonero et al. (2021) compare the effects of AI on the labor markets of Vietnam and Lao PDR. Vietnam has a higher risk of job displacement from AI due to labor composition differences and past industrialization. In contrast, Lao PDR has a larger share of agricultural workers. Both countries have high potential for AI adoption and task reorganization within occupations, but many job activities remain unsuitable for AI, mitigating labor displacement. In a service-centric economy like India, Copestake et al. (2023) find that jobs that harness AI can offer a substantial wage premium. However, these only benefit a niche group of workers, particularly those with AI skills, and are concentrated only in specific industries, places, and corporations. Displacement is primarily present in older 'incumbent' enterprises that do not adopt AI.

In the Philippines, Gaspar and Harris (2020) discovered that non-production workers have better job prospects due to their roles being less automatable and their higher skills. However, the authors noted that this may lead to increased trends of seasonal work, which may increase workers' exposure to economic shocks. In the short run, employment gains may not continue with advanced technologies such as AI, while its long-term effects remain uncertain. Additionally, the researchers indicated that AI adoption in the Philippines can create jobs, provided that proper training exists to offset its adverse effects. In fact, firms in the country that adopt automation are more likely to hire additional employees rather than lay them off.

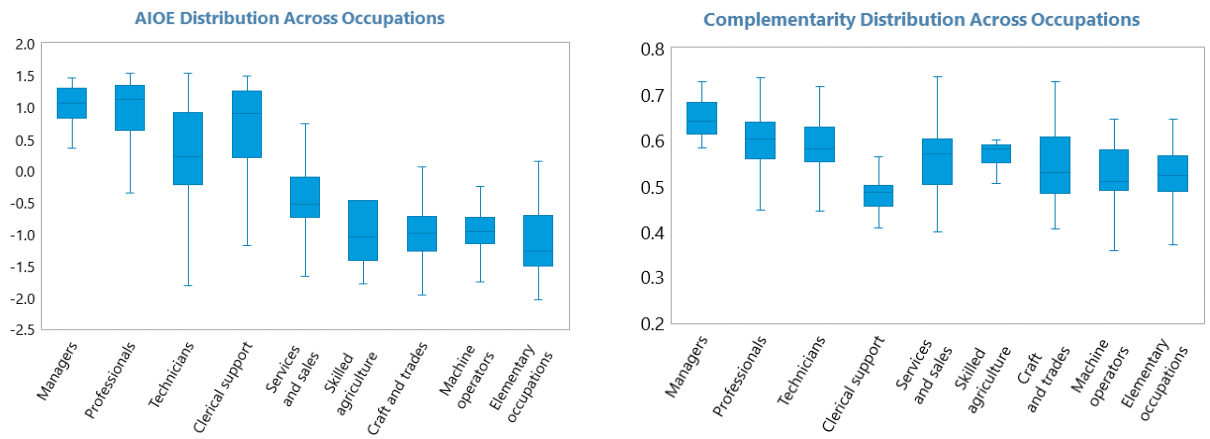
The BPO industry, which predominantly focuses on routine-centric tasks and low-skilled roles such as answering phone calls and dealing with inquiries, may be adversely affected by AI. An (ILO, 2017) study noted that modern algorithms and programs have already undermined the availability of jobs in the sector, which often requires basic literacy and English language skills. It estimates that 89 percent of the BPO workforce is at high risk of automation as consumers and clients demand better services and explore cost-saving measures. Two main technologies have been mentioned that influenced the radical shift in the BPO industry: cloud technology and robotic process automation. The former uses a network of online servers to manage, store, and analyze data on cloud platforms, while the latter utilizes software with algorithms to execute highly structured and routine operations. In fact, a recent report by the ASEAN Macroeconomic Research Office (AMRO) mentioned that the large BPO industry in the economy can face a greater risk of worker displacement, primarily those engaged in routine work, as AI gradually reshapes ICT operations. AMRO stated that the country should upgrade its BPO services to more knowledge-based services (AMRO, 2024).

Conversely, reports by the World Bank (2024a, 2024b) reported the significant adoption of generative AI tools in the Philippines, driven by its young, tech-savvy population and digital infrastructure. The study also revealed that GenAI is primarily used for productivity-related tasks. This has contributed positively to the economy, especially in sectors that require high-skilled tasks. However, challenges such as digital infrastructure and skills development need to be addressed to fully harness AI's benefits. Broadly, there is a proactive stance in the country in integrating AI technologies.

# IV. Data and Methodology

This section provides additional details on the exposure and complementarity metrics as well as the Philippine labor force survey data. Felten et al. (2021) introduce the AI Occupational Exposure (AIOE) measure to evaluate the overlap between AI capabilities and the required tasks for different occupations. To construct the AIOE, the authors first identify ten common AI applications[4], such as reading comprehension, image recognition and speech recognition, sourced from the Electronic Frontier Foundation's AI Progress Measurement project. Then, the authors obtain occupational "abilities" using data from the Occupational Information Network (O*NET), a database sponsored by the U.S. Department of Labor containing lists of required tasks to perform each occupation together with tasks' relative importance. Lastly, the authors connect the occupational abilities to AI capabilities via relevance ratings obtained from a crowd-sourced dataset.[5] The ability-level AI exposure scores are calculated by summing the relevance ratings of all AI applications for each ability within an occupation. These scores are then aggregated to the occupation level, weighted by the prevalence and importance of each ability within an occupation. This results in an occupation-level AIOE score for 774 different occupations. The score is standardized such that the median of the score is zero and the standard deviation is one. Figure 6 shows the distribution of AIOE scores across aggregated occupations.

**Figure 6. Exposure and Complementarity Across Occupations**




Pizzinelli et al. (2023) build on the AIOE by introducing a complementarity index to account for the extent to which AI complements or substitutes human labor. The complementarity index is high for occupations where AI is more likely to complement human abilities rather than substitute them. It is calculated by considering both the importance of AI applications and the context in which they are used, reflecting societal and technical constraints that may limit AI's substitutive potential in certain jobs.[6] It therefore highlights occupations that, despite high AI exposure, may not experience significant displacement due to the complementary nature of AI

[4] The ten applications are abstract strategy games, real-time video games, image recognition, visual question answering, image generation, reading comprehension, language modeling, translation, speech recognition, instrumental track recognition.

[5] The relevance ratings come from a dataset provided by Amazon which aggregates a large number of survey responses on the relevance of certain AI applications for different tasks.

[6] The six components of the score are communication, responsibility, physical conditions, criticality, routine, and skills. The O*NET database records a relevance score of these components for each occupation. The complementarity score is the weighted average of these sub-scores. See Pizzinelli et al (2023) for details.

in those roles. For example, professionals and managers tend to have high exposure but also high complementarity scores, indicating that AI is more likely to augment rather than replace their work. On the other hand, clerical workers, who generally face higher substitution risks, show high exposure but lower complementarity scores, making them more vulnerable to AI-driven disruption. The two dimensions provide sufficient nuance to obtain a clearer understanding of the potential impacts of AI on the labor market by considering both exposure and the likelihood of AI acting as a complement. For the remainder of the paper, "high"/"low" exposure/complementarity for a given occupation mean that the occupation has an above median exposure/complementarity score.

We merge the exposure and complementarity scores with labor force survey microdata from the Philippine Statistics Authority, specifically the October 2022 vintage which contains 183,602 observations for 52 variables. Critically, the LFS microdata contain information on occupations at the 4-digit ISCO-08 level (there are 436 occupations in total), allowing a very granular look at the distribution of occupations in the Philippines[7].

Several important caveats apply to our analysis. The most important one is that the analysis in this paper is static. The data we use presents a snapshot of the current labor market in the Philippines and the scores linking jobs to AI is based on the current state of AI's capabilities which are rapidly evolving. Over the medium to long term, workers will retrain and adapt, and new jobs may emerge. This process is likely to vary across countries, sectors, firms, and even at the occupational level. Over time, resources will be reallocated across sectors which could in turn generate feedback effects which would not be captured in this analysis. The results in this paper are therefore likely to be more relevant for the short to medium term. Second, the AI exposure and complementarity scores are designed to capture the capabilities of generative AI. The results in this paper therefore do not speak to the impact of potential advances in automation or robotics which may materialize in the future as AI is deployed and will likely impact different occupations than those affected by generative AI.

Another important assumption underlying this work is that the tasks in each job and their relative importance do not vary across countries. The work by Felten et al. (2021) and Pizzinelli (2023) relies on the O*NET database which contains data on occupations in the U.S. The literature on studying the impact of AI on both developed and developing countries (see also Dalla Zuanna (2024), IMF (2025)) has so far operated under the premise that tasks performed within each occupation are similar around the world. However, recent studies, e.g. Caunedo et al. (2023), suggest that some occupations in developing countries tend to be more intensive in routine and therefore automatable tasks. In similar fashion, the societal context of each occupation and as a result the extent to which it is shielded from being replaced by AI could vary across countries. Taken together, this would potentially imply a higher exposure and/or lower complementarity for some occupations. The estimates presented in this paper can therefore be interpreted as being on the conservative side. Future work tweaking exposure and complementarity scores to the country level would be a helpful contribution to the literature, data permitting.

# V. Analysis and Labor Market Implications

Table 2 shows example occupations for the three exposure/complementarity categories along with their shares in the Philippine workforce. 36% of workers are highly exposed to artificial intelligence and over a third (39%) of

[7] To translate the AIOE scores from the Standard Occupational Classification (SOC) system to the ISCO-08 classification, the SOC-ISCO-08 crosswalk published by the US Bureau of Labor Statistics is used.

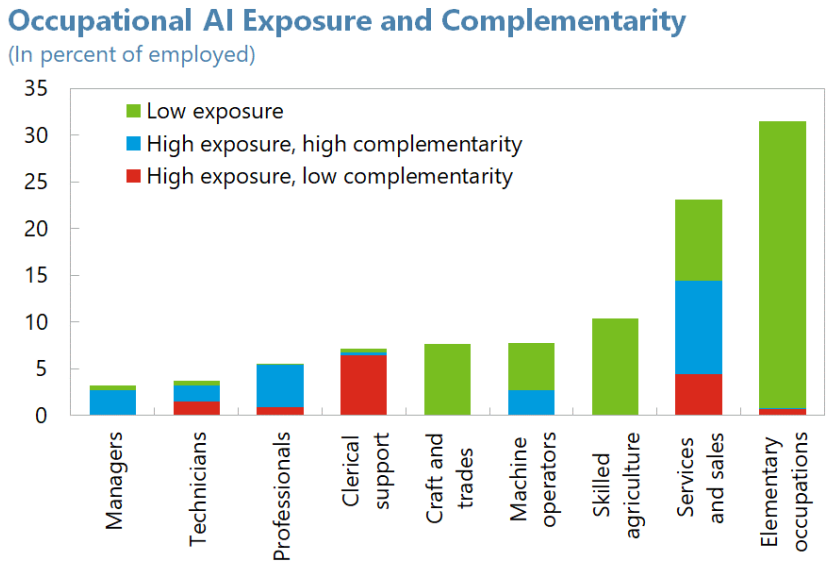
those highly exposed have low complementarity. Comparing the results for the Philippines with peer countries in the region is possible with some caveats; the appendix contains the details.

**Table 2. AI Exposure and Complementarity in the Philippines**

| Exposure | Complementarity | Example Occupation Titles | Share (PHL) |
|---|---|---|---|
| High | High | General and Operations Managers, First-Line Supervisors, Teachers and Teaching Assistants, Lawyers, Civil Engineers, Counselors | 22% |
| High | Low | Customer Service Representatives, Telemarketers, Accountants, Auditors, Secretaries, Administrative Clerks | 14% |
| Low | n/a | Farmworkers, Construction Laborers, Janitors, Maids and Cleaners, Waiters, Textile workers, Food Preparation Workers | 64% |

Figure 7 presents the distribution of exposure and complementarity across major occupational groups. It shows that occupations with low exposure are mostly agriculture workers, the trades, elementary occupations, and some services. Moving to highly exposed professions, Managers, Professionals, and some service workers are most likely to benefit from AI indicated by their high complementarity score. Those occupations most likely to be displaced by AI are clerical support workers, some professionals, and some service workers.

**Figure 7. AI Exposure by Occupation**

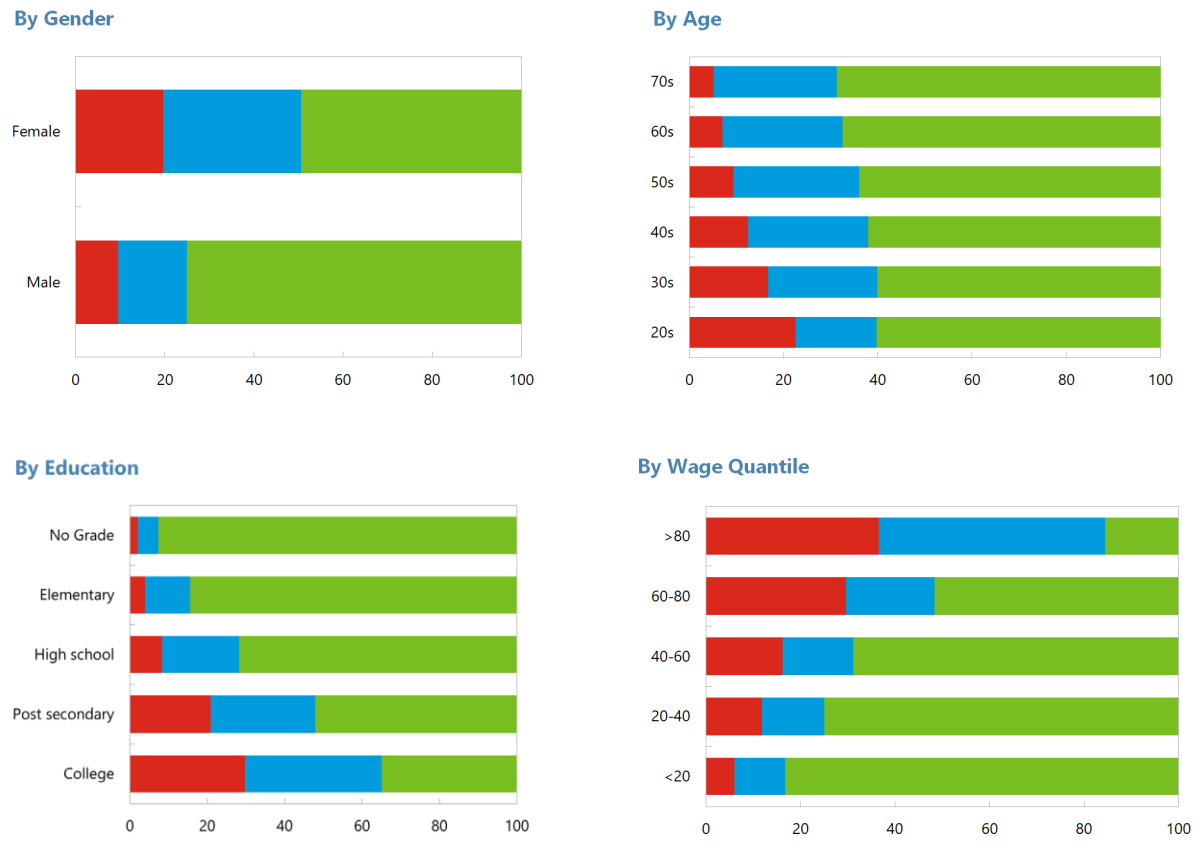



Sources: Philippine Statistics Authority; and IMF staff calculations.

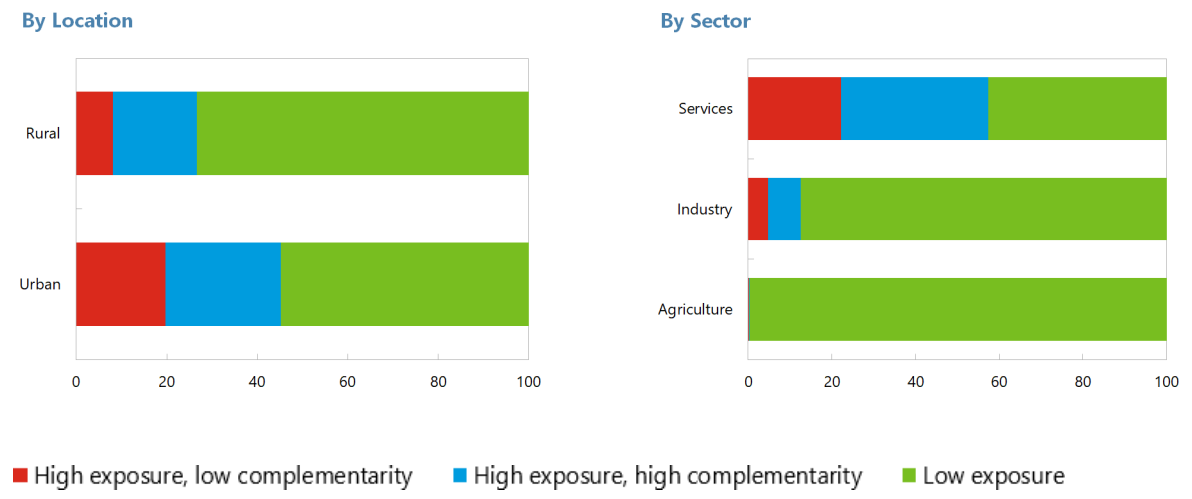
The microdata from the PSA also allows us to look at how exposure and complementarity correlate with other socio-economic and demographic variables. Figure 8 shows the gender, age, education, income, regional, and sectoral dimensions. We note a substantial difference along the gender dimension with female workers much more exposed to AI than male workers. This is due to more women being employed as clerical support, service, and sales workers whereas men have a higher share in trades, agriculture, machine operations, and

elementary occupations which are less likely to be impacted by AI at this stage (see Figure 11 in the appendix). A similar argument applies to the education variable. College-educated workers are more often employed as managers, professionals, or technicians. Here, we also note that jobs with high complementarity potential tend to be held by college-educated workers. As the world of work changes, this means that they are more likely to have the requisite skills to harness the productivity benefits from AI. Along the age dimension, overall exposure does not vary much. However, Figure 8 shows that older workers tend to hold more complementary jobs as they are more represented in managerial roles. It will be critical for young workers to have the skills that allow them to employ AI to increase their productivity for the Philippines to capitalize on the impending demographic dividend[8]. There may also be age-based differentials in skill sets when it comes to the use of digital technologies which need to be accounted for (see policy section).

**Figure 8. Exposure and Complementary by Gender , Age, Education, Wage, Location, and Sector**




[8] See selected issues paper on Potential Growth and Demographic Dividend of IMF Country Report No. 24/352




Sources: Philippine Statistics Authority; and IMF staff calculations.

The results in Figure 8 also show that AI could have profound implications for wage[9] inequality. College-educated workers in well-paid occupations which lend themselves to integration with AI could see their productivity, and thus likely also their wages, improve dramatically. At the same time, many college-educated workers are also in occupations which could be eliminated by AI, potentially shifting income dynamics in favor of blue-collar workers. It is in this respect that recent technological advances differ from those seen in the past which have typically replaced low-skilled and low-income laborers. It is worth noting, however, that there is considerable disagreement in the literature on the longer-term direction and magnitude of AI's impact on wages. Some (e.g. Korinek (2024)) argue that the advent of artificial general intelligence will eventually cause competitive market wages to plummet whereas others (e.g. Acemoglu (2018)) argue that higher productivity and the creation of new labor-intensive jobs are forces that could support the labor share of income over the long run. The purpose of this paper is not to take a stance on the debate but instead to flesh out the characteristics and distribution of potentially impacted workers in the Philippine labor force.

In terms of sectors of the economy, Figure 8 reveals that AI is a phenomenon which will mostly affect the services sector. This is of course not a particularly surprising result - however, it is important to note that there is high heterogeneity within the services sector (see Figure 12 in the appendix). The subsector with the highest proportion of occupations classified as high exposure/low complementarity is the BPO sector.[10] 73 percent of workers employed in this sector are "Contact Center Information Clerks"[11] which score highly on AI exposure but low on complementarity. Meanwhile, the subsector with the highest proportion of occupations classified as high exposure/high complementarity is the education sector.[12] The bulk of occupations in this sector are

[9] The labor force survey captures individual's basic pay per day in their primary occupation. The cutoffs for the quintiles of this distribution are 300/400/500/700. In other words, 20 percent of workers earn less than 300 PHP/day, the next 20 percent earn between 300 and 400 PHP/day, and so on.

[10] ISIC Rev. 4 Code 82, "Office administrative, office support and other business support activities, including activities of call centers".

[11] ISCO-08 code 4222

[12] ISIC Rev. 4 Code 85, "Education"

"Secondary Education Teachers" and "Primary School Teachers"[13] which score highly both on exposure and complementarity to AI. Overall, this illustrates the high heterogeneity even within the services sector.

When comparing exposure and complementarity across different types of employment (see Figure 13 in the appendix), government workers stand out as the most exposed, with a substantial portion of that rated as low complementarity. This is driven by the high number of general, accounting, and bookkeeping clerks working for the government. The high share of high complementarity jobs in this category is driven by teachers. While self- employed workers exhibit an average proportion of low complementarity jobs, the impact of job displacement could be higher given potentially unstable work arrangements and limited social protection for this type of worker.

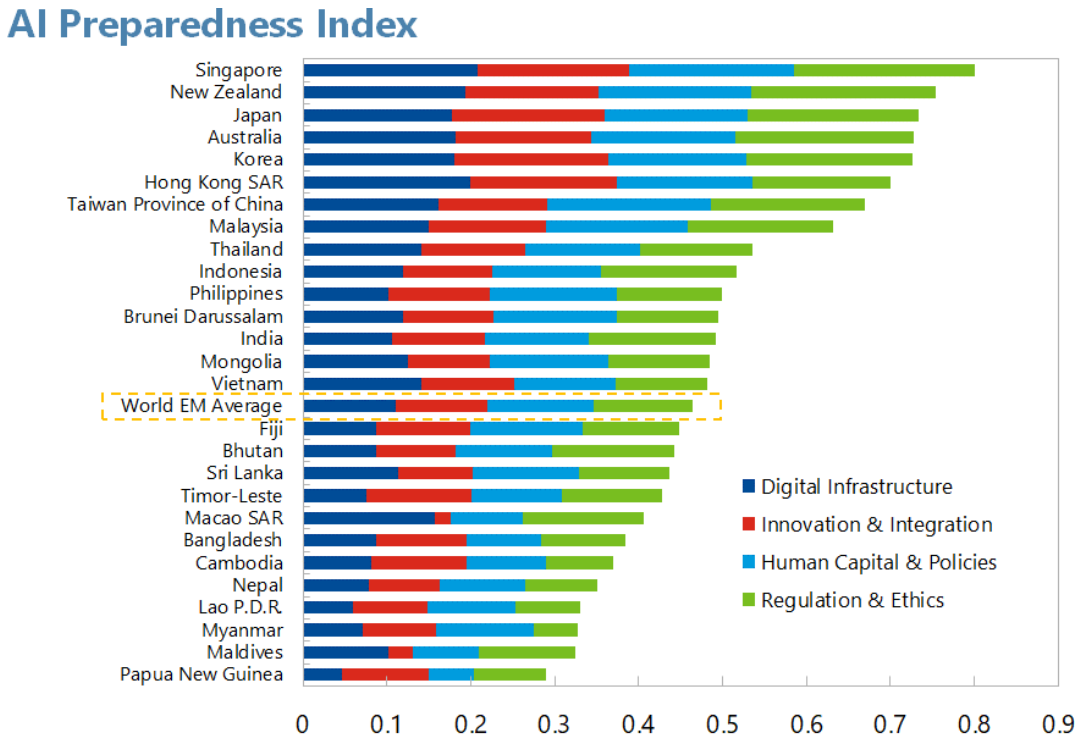
# VI. AI Preparedness

While the exposure and complementarity of occupations to AI may be one of the most important factors, there are several other aspects which will have a profound impact on the adoption of AI in the Philippines.

The AI preparedness index (AIPI) developed by Cazzaniga et al. (2024) is based on four key dimensions which are likely relevant for smooth AI adoption: digital infrastructure, human capital and policies, innovation and integration, and regulation and ethics. For each dimension, the authors collect a rich set of indicators compiled by different institutions, including, but not limited to, sustained human capital investment, inclusive STEM expertise, labor and capital mobility within and across countries, R&D ecosystem, and the adaptability of legal frameworks to digital business models. All indicators are normalized to a 0-1 scale and then averaged. The AIPI is the simple average of the four dimensions.

[13] ISCO-08 codes 2330 and 2341

Figure 9. AI Preparedness Across Asia




Source: Cazzaniga and others (2024), Gen-AI: Artificial Intelligence and the Future of Work

Comparing the scores for the Philippines against other Asian economies shown in Figure 9, the Philippines emerges as broadly in line with the scores of its emerging market peers (red dashed boxes). Looking at the underlying components, the Philippines scores well on human capital (light blue bars) but less so on digital infrastructure (dark blue bars) when compared to both its ASEAN peers but also emerging markets more broadly. The quality and reach of digital infrastructure may have implications on how much (or how little) the country can benefit from AI, even in occupations with high exposure/high complementarity with AI.

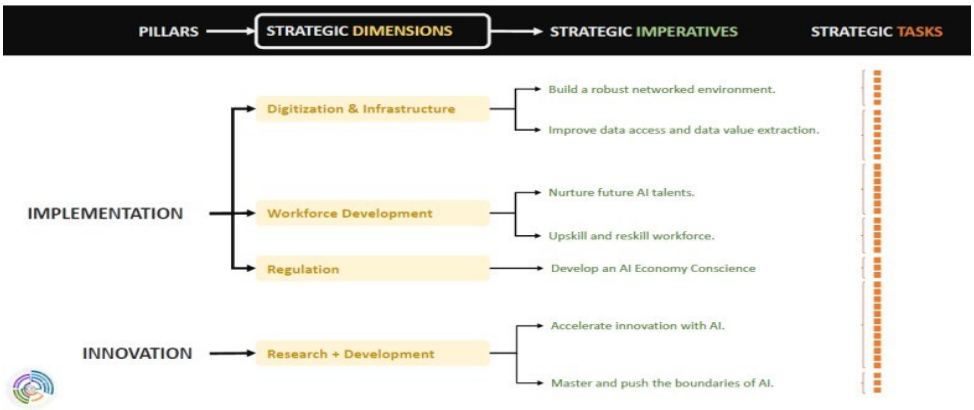
Several caveats apply to the AIPI. First, the AIPI does not capture all dimensions that could affect the adoption of AI. For instance, the importance of the BPO sector in the Philippines is not considered. Second, there is high uncertainty about what the institutional requirements for an economy-wide integration of AI will ultimately be. As a result, the AIPI should be seen as an indicative exercise to highlight potential areas for improvement along the four dimensions. For the Philippines, the AIPI points to room for further enhancements along all dimensions and particularly in digital infrastructure. This would likely also help greatly with harnessing the opportunities presented by the Philippine's human capital considering the country's impending demographic dividend. Further work identifying specific preparedness gaps in the Philippines, going beyond the labor-market focused analysis in this paper, would be beneficial.

# VII. Regulatory Framework

Understanding the implications of AI and establishing a clear regulatory framework is vital to harness its full potential and economic benefits. Currently, there is no legislative framework to guide investments, foster research and development, and prepare the workforce for AI development and application in the Philippines. However, the country has recognized the need for such a framework and has taken initial steps towards this goal. In 2021, the Philippine government formulated the National AI Strategy Roadmap, which was subsequently updated in July 2024. The main goal of the National AI Strategy Roadmap 2.0 is to guide the government and the private sector in the use of AI and related technologies and how they can be utilized for national development.

The latest roadmap has the following main objectives: 1) Increased local industries' regional and global competitiveness; 2) Promote collaboration between the government, private sector, and the academia in research and development; 3) Identify key investment areas in research and development; 4) Prepare the workforce for future jobs; 5) Attract major industries to create jobs; 6) Ensure responsible rollout and governance of AI technologies.

**Figure 10: National AI Strategy Pillars, Dimensions, Imperatives**




Source: DTI, National AI Strategy Roadmap (2021)
Note: DTI is still finalizing the National AI Strategy Roadmap 2.0. Chart above was sourced from the 2021 AI Roadmap.

In addition to the National AI Strategy Roadmap, the government has passed Republic Act (RA) No. 11962, also known as the Trabaho Para sa Bayan Act. Recognizing the changing employment landscape due to emerging technologies, the law aims to establish a ten-year National Employment Master Plan (TPB) with four strategic priorities: stimulating national and local economic growth to address labor market challenges; improving the employability and competitiveness of Filipino workers by aligning education and training programs with industry requirements; reducing regulatory burdens on micro, small, and medium enterprises, including increasing access to capital, security, and protection; and encouraging upskilling and reskilling workers by leveraging opportunities provided by AI tools. It is anticipated that the TPB will generate three million jobs by 2028.

Furthermore, as part of the government's overall strategy on AI, there are pending legislations in Congress which aims to promote the development, deployment, and regulation of AI[14]. These propose to establish various official bodies (Philippine Council of Artificial Intelligence, AI Development Authority, National Center for Artificial Intelligence Research), and regulatory frameworks for the use of AI in the workplace and ethical AI development. It is important to note that these AI specific legislations are still in their infancy, will evolve along the legislative process, and may be overlapping in scope.

References to AI can also be found in other, broader, government strategies. The Philippine Development Plan, which serves as the government's overall guide in development planning, expresses the commitment of the government to adopting AI, including the following strategies: Anticipate skills needs in priority sectors (Chapter 4, Outcome 2),increase access of MSMEs to capital, digital technologies, and startups (Chapter 7, Outcome 2), support globally competitive industries and an agile workforce (Chapter 8, Outcome 4), enhance monitoring and understanding of emerging technologies, markets, and business models (Chapter 10, Cross-Cutting Strategies), and promote RegTech development (Chapter 11, Cross-Cutting Strategies).

**Identification of gaps in current policies and challenges in implementation.**

History has shown that technological development is guided by the decisions made by regulators. The rapid advancement of AI has led to policy gaps and hurdles that limits its adoption, limiting the Philippines' ability to fully harness the potential benefits of AI.

**Gaps in Regulation and Governance**: Understanding AI's implications is crucial in managing risks and opportunities. The National AI Strategy Roadmap and its updated version are promising steps, but lack of legislation limits its effectiveness. A forthcoming harmonized legislation from the proposed bills will manage AI risks like algorithmic transparency, cybersecurity, privacy, errors, biases, and labor protection.[15] Regulation will also promote best practices and cooperation between the government and private sector. However, with the rapid advancement of AI, regulations surrounding the country's data privacy and intellectual property laws must evolve to keep pace. For example, the United Kingdom and European Union have guidelines for ethical AI use, and the UN adopted a resolution for safe AI in March 2024.[16]

**Gaps in Physical and Digital Infrastructure**: AI requires robust physical and digital infrastructure. For instance, an AI chatbot handling 195 million queries needs data centers consuming power equivalent to 23,000 U.S. households. It is forecasted that data centers' electricity consumption is expected to increase, straining electricity grids for countries like the US and Ireland. Similarly, expanding the adoption of AI in the Philippines will have important implications for power demand and infrastructure needs[17], which come on top of the existing gaps in access to and quality of power supply—about two million households still lack electricity, and power interruptions remain common (PIDS, 2023). A fast and reliable internet connection is also crucial for AI, yet the Philippines has slow speeds and high costs. In the 2023 Worldwide Broadband Speed League, the Philippines ranked 86th out of 220 countries with an average download speed of 43.36mbps, lower than the

[14] As of January 2025, these include house bills 7396, 9448, 7913, 7983

[15] https://lti.institute/2022/09/how-regulation-can-catch-up-with-ai/

[16] https://news.un.org/en/story/2024/03/1147831

[17] https://www.bworldonline.com/economy/2024/02/25/577716/energy-dept-seeking-to-gauge-major-data-centers-re-needs/#:~:text=The%20Philippines%20is%20positioning%20itself,approximately%20300%20MW%20by%202025.

Asian average of 45.72mbps.[18] Meanwhile, the World Data Lab estimates that nearly 19 million Filipinos or 16.6 percent of the population cannot afford a minimum package of internet.[19] The quality and reach of digital infrastructure will matter not just on the household side, but also on the firm side, particularly for MSMEs, which may face challenges in terms of capacity, cost, access.

**Upskilling and Reskilling**: The Future of Jobs report states that 23 percent of the workforce will change within five years, with 60 percent needing training by 2027 which are centered on creative and analytical thinking, AI, and big data (WEF, 2023)[20]. Despite high internet penetration, 90 percent of Filipinos lack basic ICT skills. The Philippines also lags in international education assessments in mathematics, reading, science, and creative thinking. Workers also lack soft skills like adaptability, problem-solving, and collaboration (PIDS, 2023). Despite the high demand for trainings, obstacles to skills enhancement include inadequate internet access, lack of time, high training costs, and limited opportunities (Economist, 2023).[21] However, the government has multiple training initiatives that are underway, that are backed by the industry to boost reskilling. In addition, the government is also updating the education curriculum and reskilling educators to meet to industry needs.[22] IBPAP noted that the Philippine tech industry is expected to generate 1.1 million new jobs by 2028, necessitating a steady supply of skilled workers.

**Use Cases and the Cost of Adoption**: The Philippine AI Roadmap has noted that one of the gaps in adopting AI is that some companies in the Philippines do not yet fully comprehend its capabilities and limitations to utilize and enhance their productivity and efficiency. Moreover, hesitancy remains in adopting AI and emerging technologies due to high costs and lack of clear and tangible returns. Firms in the country noted that key roadblocks in modernizing their technology is the high fixed capital costs followed by high licensing costs associated with technology adoption (ILO, 2017). In addition, a survey made by Cisco, noted that firms in the Philippines have expressed that only 17 percent are ready to deploy and use AI in their business processes, 44 percent are said to be moderately ready, 35 percent indicated they have minimal readiness while 4 percent answered they are not prepared to use AI. The clear understanding of AI may also entice the private and public sector to support research and development. Currently, the Philippines is spending less than 0.2 percent of GDP, equivalent to US$0.8bn, lower than the global benchmark of 1 percent of GDP or US$3.75bn. This places the Philippines second last compared to other Southeast Asian countries (DTI, 2021).

# VIII. Policies to Foster AI Adoption and Harness its Benefits

The analysis in this paper shows that a substantial proportion of the Philippine labor force will be impacted by AI. 14 percent of jobs are classified to be at risk of displacement by AI and another 22 percent are likely to see the nature of their work change significantly as AI is rolled out. The BPO sector is the most exposed sector of the economy and therefore deserves particular attention. While BPO sector employees only make up about 3 percent of the total workforce, the size of its revenues (7.4 percent of GDP, similar in magnitude to all

[18] https://www.pids.gov.ph/details/news/in-the-news/think-tank-says-ph-connectivity-still-lags-behind-in-asia#:~:text=Despite%20this%20improvement%2C%20however%2C%20the,Asian%20average%20of%2045.72%20Mbps.

[19] https://www.bworldonline.com/infographics/2022/04/18/442463/philippines-most-internet-poor-in-southeast-asia/

[20] https://www.weforum.org/publications/the-future-of-jobs-report-2023/digest/

[21] https://impact.economist.com/perspectives/talent-education/bridging-skills-gap-fuelling-careers-and-economy-philippines#_ftn21

[22] https://www.philstar.com/headlines/2024/06/26/2365677/ai-education-pressing-issues-employers-ecop

remittances) generates large potential spillovers from changes in the BPO sector to other parts of the economy. This section lays out several key areas that policymakers can focus on to harness the opportunities and mitigate the risks presented by the rollout of AI.

The first key area for policymakers is investment in digital infrastructure. The quality and reach of the digital infrastructure in the Philippines are uneven, with significant disparities between urban and rural areas. Improving internet connectivity, expanding electricity grids, and ensuring reliable access to power will be critical. The government should also support the development of a robust digital economy and entrepreneurial ecosystem, which can foster innovation and create an environment conducive to AI deployment. Providing fiscal incentives for private sector investment in AI, such as research and development grants, can stimulate technological advancements and facilitate the integration of AI across various sectors.

Second, enhancing human capital through education and training programs is essential. The Philippines has a relatively young and dynamic workforce with English language skills, but there are gaps in digital literacy and advanced technical skills[23]. The education system needs to be updated to include AI and related subjects, and there should be a focus on upskilling the current workforce. Studies have shown that introducing basic concepts in early education can build foundational understanding and critical thinking in young students[24]. On the tertiary level, studies argue that AI education should focus on specialized knowledge and applications which can prepare students for advance roles in their chosen fields. Meanwhile, technical vocation and training (TVET) play a crucial role in AI adoption by developing sector-specific skills, adapting curricula to meet industry needs, and providing lifelong learning opportunities to ensure continued employability and inclusivity to a broader segment of society. Beyond formal education, policymakers will need to promote lifelong learning and upskilling initiatives to prepare the workforce for AI-related changes. This includes offering specialized training programs to help workers adapt to new technologies. Additionally, fostering collaboration between academia, industry, and government can help bridge the skills gap, ensure that training programs are up-to-date vis-à-vis the latest developments in this fast-changing field, and equip the workforce with the necessary skills to thrive in an AI-driven economy.

Third, strengthening social protection systems to support workers during transitions, such as unemployment insurance, will also be crucial in mitigating the potential negative impacts of AI on the labor market. The Philippine Social Security System already explicitly allows claiming unemployment benefits in the case of redundancy due to the “installation of labor-saving devices”[25]. Against this backdrop, instituting reskilling and upskilling programs could help workers transition to different jobs without having to rely on unemployment insurance. This needs to be combined with developing strategies for businesses to responsibly integrate AI while supporting and training workers. The potentially increased use of unemployment insurance and the cost of reskilling programs may also involve fiscal cost which would need to be budgeted for. Over the medium term, the taxation of capital income may need to be recalibrated if the income share of labor does indeed decline due to the adoption of AI (see Cazzaniga et al. (2024)) for a more in-depth discussion.

Overall, a comprehensive strategy that includes infrastructure development, human capital enhancement, and supportive fiscal policies will be essential for the Philippines to fully capitalize on the opportunities presented by AI. This paper has fleshed out the geography of the labor market which will help policymakers tailor and target

[23] Chapter 5 of OECD (2023) discusses skill needs in the age of AI in detail.

[24] See Yim and Su (2024)

[25] Source: https://www.sss.gov.ph/unemployment-benefit/

their measures to those parts of the economy that benefit from them most. This approach will help the country navigate the challenges of AI integration and position itself as a competitive player in the global digital economy. The Philippines is not the only country facing the enormous challenge of effectively making use of AI. International partnerships, peer learning, and support from organizations like the IMF will help along the way.

# References


Acemoglu, D. and Restrepo, P., 2020. Robots and jobs: Evidence from US labor markets. Journal of political economy, 128(6), pp.2188-2244.

Acemoglu, D., 2024. The Simple Macroeconomics of AI (No. w32487). National Bureau of Economic Research.

Asian Development Bank Institute. (2020). ADBI Working Paper 1081. Retrieved from https://www.adb.org/sites/default/files/publication/566281/adbi-wp1081.pdf

ASEAN+3 Macroeconomic Research Office. (2024). AREO 2024 Special Feature. Retrieved from https://amro-asia.org/wp-content/uploads/2024/04/AREO-2024-C2-Special-Feature.pdf

Berg, A., Papageorgiou, C. and Vaziri, M. (2023). Technology's Bifurcated Bite. Finance & Development Magazine, IMF. Retrieved from: https://www.imf.org/en/Publications/fandd/issues/2023/12/Technology-bifurcated-bite-Berg-Papageorgiou-Vaziri

Bernardo, A. B. I., Albert, J. R. G., Vizmanos, J. F. V., & Muñoz, M. S. (2023). Toward measuring soft skills for youth development: A scoping study. Discussion Papers (No. 2023-28). Philippine Institute for Development Studies. https://doi.org/10.62986/dp2023.28

Brynjolfsson, E., Li, D. and Raymond, L.R., 2023. Generative AI at work (No. w31161). National Bureau of Economic Research.

Carbonero, F., Davies, J., Ernst, E., Fossen, F.M., Samaan, D. and Sorgner, A., 2023. The impact of artificial intelligence on labor markets in developing countries: a new method with an illustration for Lao PDR and urban Viet Nam. Journal of Evolutionary Economics, 33(3), pp.707-736.

Caunedo, J., Keller, E. and Shin, Y., 2023. Technology and the task content of jobs across the development spectrum. *The World Bank Economic Review*, *37*(3), pp.479-493.

Cazzaniga, M., Jaumotte, M.F., Li, L., Melina, M.G., Panton, A.J., Pizzinelli, C., Rockall, E.J. and Tavares, M.M.M., 2024. Gen-ai: Artificial intelligence and the future of work. International Monetary Fund.

Copestake, A., Marczinek, M., Pople, A., & Stapleton, K. (2023, March). AI and services-led growth: Evidence from Indian job adverts. [Working Paper]. Centre for Economic Policy Research (CEPR). Retrieved from https://steg.cepr.org/sites/default/files/2023-03/WP060%20CopestakeMarczinekPopleStapleton%20AIAndServicesLedGrowth_0.pdf

Centre for Economic Policy Research. (2023). Fear of Technology-Driven Unemployment and Its Empirical Base. Retrieved from https://cepr.org/voxeu/columns/fear-technology-driven-unemployment-and-its-empirical-base

Cornell University. (2023). Artificial Intelligence and Its Short-Term Effects on Employment. Retrieved from https://arxiv.org/pdf/2303.10130

Dalla Zuanna, A., Dottori, D., Gentili, E. and Lattanzio, S., 2024. An assessment of occupational exposure to artificial intelligence in Italy (No. 878). Bank of Italy, Questioni di Economia e Finanza (Occasional Papers).

Das, M. and Hilgenstock, B., 2022. The exposure to routinization: Labor market implications for developed and developing economies. Structural change and economic dynamics, 60, pp.99-113.

Department of Trade and Industry Philippines. (2021). National AI Strategy Roadmap.

Economist Impact. (2023). Bridging Skills Gap: Fuelling Careers and Economy in the Philippines. Retrieved from https://impact.economist.com/perspectives/talent-education/bridging-skills-gap-fuelling-careers-and-economy-philippines#_ftn21

Eloundou, T., Manning, S., Mishkin, P. and Rock, D., 2023. Gpts are gpts: An early look at the labor market impact potential of large language models. arXiv preprint arXiv:2303.10130.

Emerald Insight. (2023). Economics of ChatGPT: A Labor Market View on the Occupational Impact of Artificial Intelligence. Retrieved from https://www.emerald.com/insight/content/doi/10.1108/JEBDE-10-2023-0021/full/pdf?title=economics-of-chatgpt-a-labor-market-view-on-the-occupational-impact-of-artificial-intelligence

Ewrin, R. (2017). History of artificial intelligence. In Artificial intelligence: The quest for the ultimate thinking machine (pp. 45-54). Arcturus Publishing Ltd.

Felten, E., Raj, M. and Seamans, R., 2021. Occupational, industry, and geographic exposure to artificial intelligence: A novel dataset and its potential uses. Strategic Management Journal, 42(12), pp.2195-2217.

Frank, M.R., Autor, D., Bessen, J.E., Brynjolfsson, E., Cebrian, M., Deming, D.J., Feldman, M., Groh, M., Lobo, J., Moro, E. and Wang, D., 2019. Toward understanding the impact of artificial intelligence on labor. Proceedings of the National Academy of Sciences, 116(14), pp.6531-6539.

Gaspar, R. and Harris, N., 2020. The fate of job creation in the Philippines amid the automation revolution: A firm-level analysis (No. 1081). ADBI Working Paper Series.

Gmyrek, P., J. Berg, and D. Bescond. 2023. Generative AI and Jobs: A Global Analysis of Potential Effects on Job Quantity and Quality. ILO Working Paper 96. International Labour Organization, Geneva, Switzerland.

Hebrew University of Jerusalem. (2023). Automation and Employment. Retrieved from https://en.economics.huji.ac.il/sites/default/files/economics-en/files/automation_4.pdf

Hui, X., Reshef, O. and Zhou, L., 2023. The short-term effects of generative artificial intelligence on employment: Evidence from an online labor market. Available at SSRN 4527336.

Institute of Labor Economics. (2023). IZA Discussion Paper 14944. Retrieved from https://docs.iza.org/dp14944.pdf

International Labour Organization. (2017). ILO Report. Retrieved from https://www.ilo.org/media/421871/download

International Monetary Fund. (2018). IMF Working Paper 135. Retrieved from https://www.elibrary.imf.org/view/journals/001/2018/135/article-A001-en.xml

International Monetary Fund. (2025). Transforming the Future: The impact of artificial intelligence in Korea. Selected Issues Papers.

Korinek, A. and Juelfs, M., 2022. Preparing for the (non-existent?) future of work (No. w30172). National Bureau of Economic Research.

Liu, Y., & Wang, H. (2024). Who on earth is using generative AI? Policy Research Working Paper No. 10870. Washington, DC: World Bank. Retrieved from: https://openknowledge.worldbank.org/entities/publication/5a876bd0-f85a-479b-ae32-cf0b7f33792f

MIT Initiative on the Digital Economy. (2016). AER Article. Retrieved from https://ide.mit.edu/sites/default/files/publications/aer.20160696.pdf

National Bureau of Economic Research. (2023). NBER Working Paper 30074. Retrieved from https://www.nber.org/system/files/working_papers/w30074/w30074.pdf

National Center for Biotechnology Information. (2019). PNAS Article. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6452673/pdf/pnas.201900949.pdf

Ng, M., Khoo, M., Haridas, G., & Toh, J. T. (2023, May). Generative AI in the Philippines: Challenges and Opportunities. Access Partnership. Retrieved from https://accesspartnership.com/wp-content/uploads/2023/05/Micr_GenAI_-Philippines_FINAL_230529.pdf

Organisation for Economic Co-operation and Development (OECD). 2023. "OECD Employment Outlook 2023: Artificial Intelligence and the Labour Market." Paris, France.

Philippine Institute for Development Studies. (2023). Electricity Supply Interruptions in the Philippines: Characteristics, Trends, Causes. Retrieved from https://www.pids.gov.ph/publication/discussion-papers/electricity-supply-interruptions-in-the-philippines-characteristics-trends-causes

Philippine Journal of Labor and Industrial Relations, Volume 33. (2015). Retrieved from https://journals.upd.edu.ph/index.php/pjlir/article/view/7256/6319

Pizzinelli, C., Panton, A.J., Tavares, M.M.M., Cazzaniga, M. and Li, L., 2023. Labor market exposure to AI: Cross-country differences and distributional implications. International Monetary Fund.

Standard Chartered – ChatGPT Impact on Labor Markets. (2023). Retrieved from https://research.sc.com/research/api/application/protected/rp/api/data/render/241545

The Philippine IT-BPM Industry Roadmap 2028. (2022). Retrieved from https://www.ibpap.org/knowledge-hub

Webb, M. 2020. "The Impact of Artificial Intelligence on the Labor Market." Stanford University Working Paper, Stanford, CA.

World Bank. 2024a. "Who on Earth Is Using Generative AI?" World Bank Publication. Retrieved from https://openknowledge.worldbank.org/entities/publication/5a876bd0-f85a-479b-ae32-cf0b7f33792f

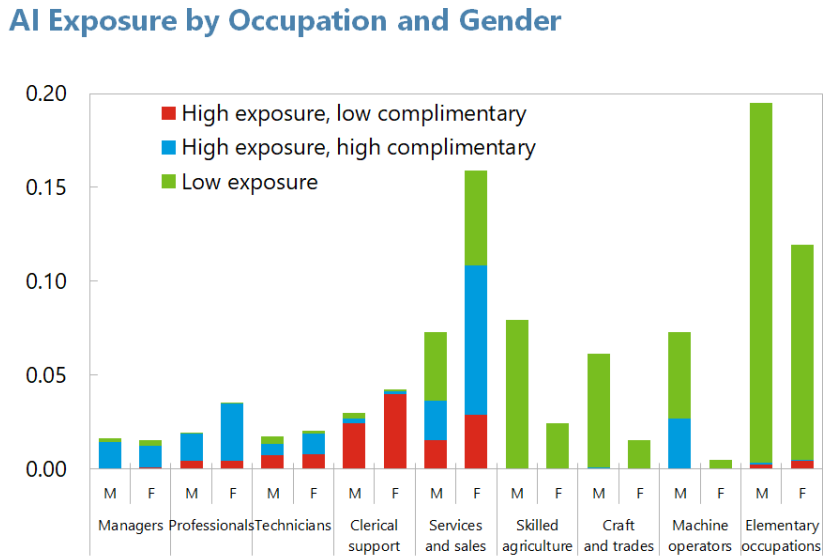
World Bank. 2024b. World Bank East Asia and the Pacific Economic Update, October 2024: Jobs and Technology. Washington, DC: World Bank

World Economic Forum. (2023). The Future of Jobs Report 2023. Retrieved from https://www.weforum.org/publications/the-future-of-jobs-report-2023/digest/

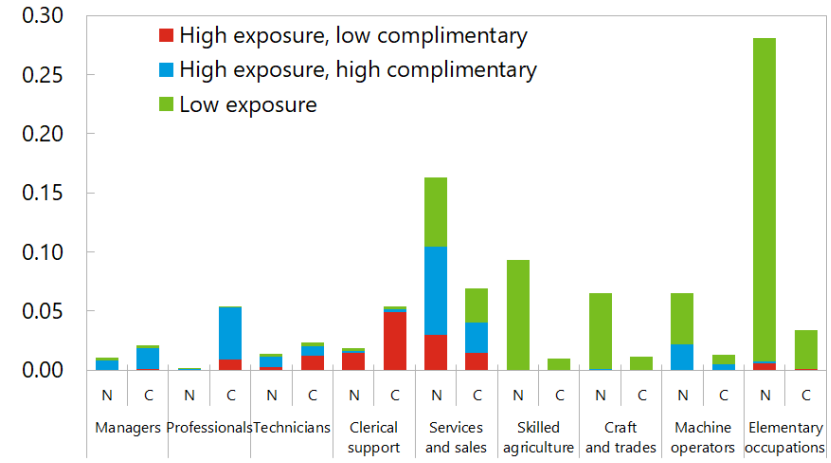
Yim, I.H.Y., Su, J. Artificial intelligence (AI) learning tools in K-12 education: A scoping review. *J. Comput. Educ.* (2024).

# Appendix

Figure 11. AI Exposure by Occupation, Gender, and Education




Sources: Philippine Statistics Authority; and IMF staff calculations.

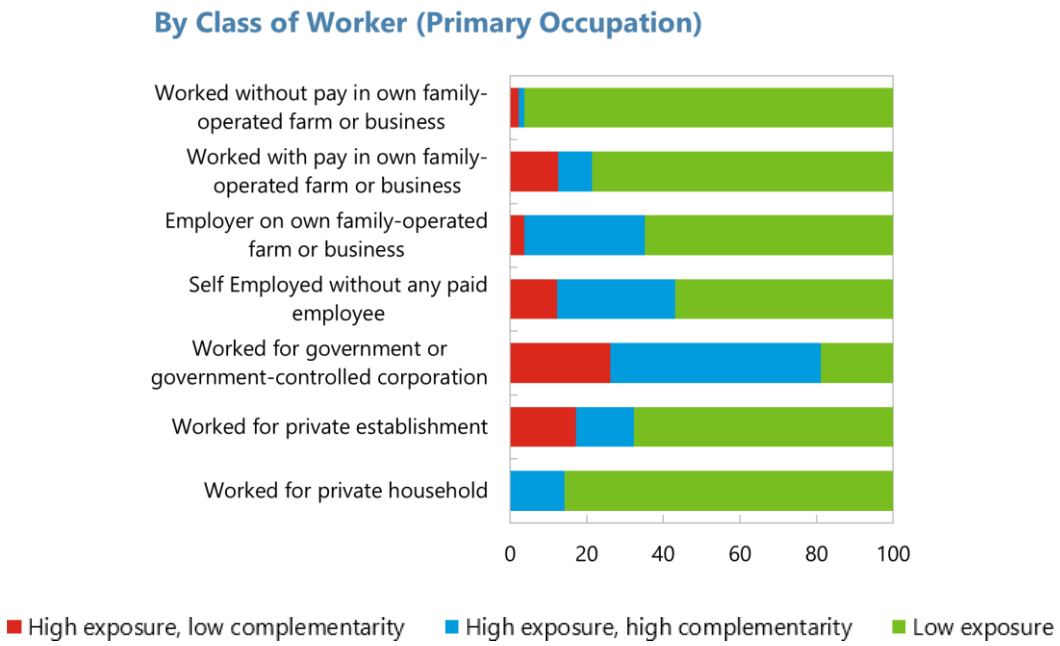



Sources: Philippine Statistics Authority; and IMF staff calculations.
Note: "N" refers to non college educated and "C" to college educated workers.

## Figure 12. Exposure and Complementary by Activity within Services



Figure 13. Exposure and Complementary by Type of Worker




## Cross-country comparison

Comparing the results for the Philippines with peer countries in the region is possible though a few caveats apply. To compute exposure and complementarity shares for other Asian economies, we use data on employment by occupation from the International Labor Organization (ILO)[26]. This dataset contains aggregated data submitted by country authorities. Occupations are captured at the 2-digit level (43 different occupations) and therefore less granular and less accurate than the data for Philippines used in this paper which captured occupations at the 4-digit level (436 different occupations). Table 2 shows that the Philippine labor force exhibits a total exposure that is higher than other Asian EMDEs but not as high as Asia's advanced economies.

Comparing the shares computed using ILO vs PSA data for the Philippines in table 2 shows that having access to granular data matters mostly for the complementarity angle. In other words, the additional granularity helps in breaking down the ISCO-08 major groups which are highly heterogeneous in terms of AI exposure such as services and sales workers (Figures 7, 12). As a result, results for the Philippines and its peers in the region along this dimension are difficult to compare.

[26] The reader may also refer to box I in the chapter 2 of the Fall 2024 IMF Regional Economic Outlook for Asia and the Pacific.

**Table 2. AI Exposure and Complementarity in Philippines and Asia**

| Exposure | Complementarity | Example Occupation Titles | Share (PHL) | Share (other Asian EMDEs) | Share (Asian AEs) |
|---|---|---|---|---|---|
| High | High | General and Operations Managers, First-Line Supervisors, Teachers and Teaching Assistants, Lawyers, Civil Engineers, Counselors | ILO: 10%<br>PSA: 22% | 9% | 24% |
| High | Low | Customer Service Representatives, Telemarketers, Accountants, Auditors, Secretaries, Administrative Clerks | ILO: 27%<br>PSA: 14% | 18% | 26% |
| Low | n/a | Farmworkers, Construction Laborers, Janitors, Maids and Cleaners, Waiters, Textile workers, Food Preparation Workers | ILO: 63%<br>PSA: 64% | 73% | 50% |

Sample includes AE = AUS, SGP, JPN; EMDE = BGD, BRN, BTN, IDN, IND, KHM, KIR, LAO, LKA, MDV, MNG, PHL, PNG, THA, TLS, TUV, VNM, WSM.