



The Philippines' Transformation Towards Industry 4.0

A GPCCI White Paper



Deutsch-Philippinische
Industrie- und Handelskammer
German-Philippine Chamber
of Commerce and Industry



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30 June 2024

Imprint

Publisher

AHK Philippinen | German-Philippine Chamber of Commerce and Industry, Inc. 8F
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About GPCCI

The German-Philippine Chamber of Commerce and Industry (GPCCI) belongs to the international network of German Chambers of Commerce Abroad (AHKs) which is represented by 150 offices in 93 countries. GPCCI is the official representation of German businesses in the Philippines; a bilateral membership organization with around 300 members; and a service provider to companies in their market entry and expansion.

Executive Summary

On 29 April 2024, the German-Philippine Chamber of Commerce and Industry, Inc (GPCCI) hosted the forum “Ushering Industry 4.0 in the Philippine Industrial Landscape,” discussing the foundations of Industry 4.0 in the Philippines, including opportunities and challenges associated with industrial automation, AI, and digitalization.

GPCCI Forum: “Ushering Industry 4.0 in the Philippine Industrial Landscape”

29 April 2024
Dusit Thani Manila



This White Paper summarizes the forum's key insights, analyzing the Philippines' status in Industry 4.0 transformation and exploring the opportunities and risks of this shift. It highlights the need for cohesive national policies and strategies in key industries and the labor sector to ensure stability during the transition.

The paper also showcases the Germany's role in advancing the Fourth Industrial Revolution in the Philippines. It emphasizes the impact of Germany's initiatives and programs along with partnerships with the Philippines in upskilling the Filipino workforce. Finally, it offers recommendations for enhancing the industry and labor sectors as part of the Philippines' Industry 4.0 journey.

Introduction

Industry 4.0, introduced at the 2011 Hannover Messe, promises significant economic, productivity, and innovation benefits.¹ However, critics highlight disparities in technology adoption across countries.² A [2021 Asian Development Bank \(ADB\) study](#) in Southeast Asia cited insufficient infrastructure and potential labor displacement as key challenges³, while a [2020 Philippine Department of Trade and Industry \(DTI\) survey](#) identified technological, skills, and digital infrastructure gaps as major obstacles.⁴ The [Spring 2024 AHK World Business Outlook Survey](#) also highlighted poor infrastructure, particularly internet connectivity, as the top concern for businesses in the Philippines.

Recognizing these challenges, DTI Undersecretary Rafaelita Aldaba emphasized the need to build the necessary infrastructure to accelerate the country's adoption of Industry 4.0.



"Addressing the gap in sufficient digital infrastructure is essential for the adoption of Industry 4.0. Hence, we need to pursue this transformation, including building the necessary infrastructure."

Dr. Rafaelita M. Aldaba

Undersecretary, Competitiveness and Innovation Group (CIG)
Department of Trade and Industry

Despite these challenges, Industry 4.0 offers significant opportunities, such as automating manufacturing, digital financial transformation, and using AI and robotics for research and communication to improve efficiency, accuracy, and productivity. The labor sector can become more technologically equipped, digitally productive, and flexible. Overall, the Philippines has the chance to develop, upskill, and align industry clusters to foster innovation through collaboration among businesses, educational institutions, and research centers.

The Philippines has yet to achieve its vision of becoming a digitalized and technologically advanced economy. A [2020 DTI study](#) reveals that about 70% of industries still operate with low levels of technology. This presents challenges and opportunities for adopting best practices, decentralizing development, and fostering public-private partnerships to facilitate a smoother transition to Industry 4.0. This white paper aims to support the Philippines' journey into Industry 4.0, focusing on enhancing the competitiveness of its industry and labor ecosystems in the digitalized world.

The Philippine Policy on Industry 4.0

PHILIPPINE INDUSTRY 4.0 TRANSFORMATION ROADMAP path to mindfacturing, reshaping the country's industrial landscape

TRANSFORM

- Establish facilities and implement transformation initiatives:

Industry Transformation Maps, Economic Value Chain, Skills Frameworks, Industry Human Resource Plan, Industry Assessment & Benchmarking Frameworks

CONNECT

- Collaborate with global and regional manufacturing communities



BUILD AND GROW

- Strengthening business and academia capabilities by developing new talent pool through collaborative industry-university applied research solutions

Philippine Industry 4.0 Transformation Roadmap

Source: DTI

Transitioning to Industry 4.0 offers significant benefits, necessitating clear direction through initiatives, programs, and policies. The Philippines is navigating this shift with strategies aimed at reshaping the industrial landscape through digitalization and technological advancement. The Philippine Industry 4.0 Transformation Roadmap includes three stages: transforming the industry by establishing facilities and initiatives, connecting with regional and global communities, and developing business and academic capabilities through industry-university research collaborations.

the Philippines has implemented complementary laws that facilitate Industry 4.0. For instance, key policies such as the Ease of Doing Business Law, which promotes efficient and transparent digital government transactions; the Innovative Startup Act, which provides incentives for technology-driven startups; the Public Service Act, which allows increased foreign investment in public services; and the Renewable Energy Act, which encourages smart energy solutions, all facilitate Industry 4.0 by streamlining bureaucracy and attracting foreign investment.



"The programs and efforts initiated by the government through DTI are a good start, especially with an existing ecosystem. However, we must also consider the challenges related to technology, knowledge, and processes. Addressing these challenges is crucial as they will significantly influence the direction we take towards Industry 4.0."

Mr. Enrico Buergo

President and Chief Executive Officer
Siemens

Programs that further support this industry transition include:

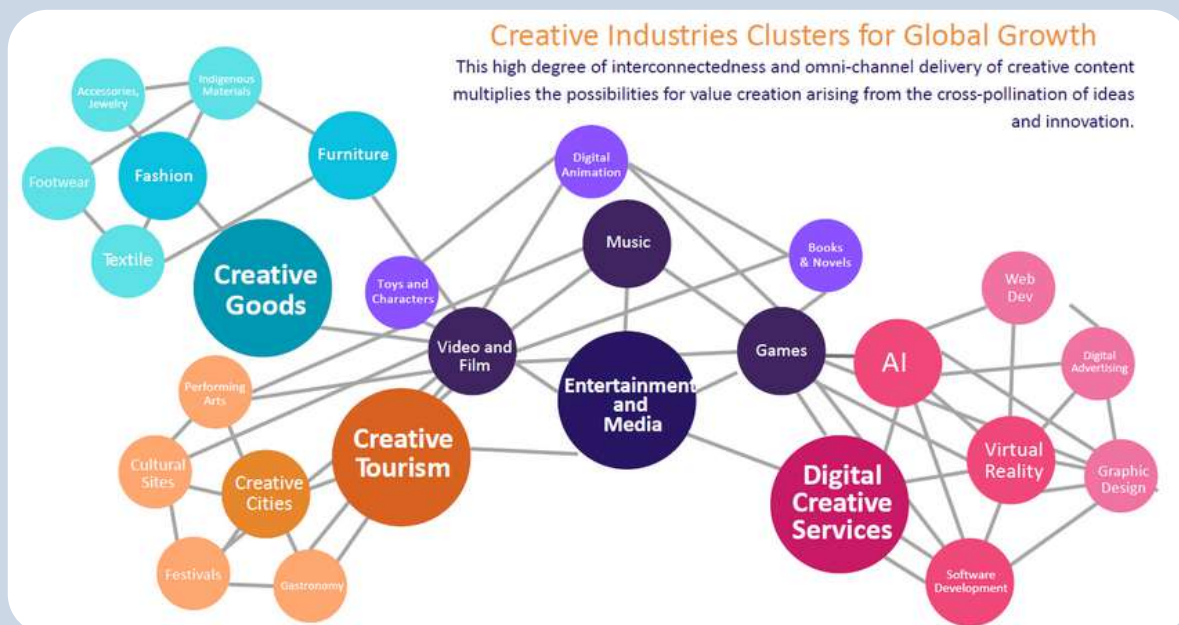
- **National Center for AI Research (CAIR).** This center focuses on advancing artificial intelligence technologies and their applications across various industries. It serves as a hub for AI research, bringing together experts from academia, industry, and government to collaborate on cutting-edge projects and innovations. CAIR aims to position the Philippines as a leader in AI technology by fostering innovation, promoting AI literacy, and creating opportunities for AI integration across sectors.
- **Industry 4.0 Pilot Factory (I4PF).** This facility aims to house advanced technologies like robotics, intelligence-of-things, drones, and virtual and augmented reality to boost the country's manufacturing sector through science, technology, and innovation. The I4PF provides a practical environment for companies to experiment with new technologies and processes, facilitating the adoption of Industry 4.0 practices and enhancing manufacturing capabilities.
- **PRISTINE Project.** Promoting Research and Innovation to Strengthen Transformation of Industries and Enterprises (PRISTINE) Project aims to improve the innovation ecosystem and establish applied R&D, skills development, and innovation infrastructure. This project focuses on creating a supportive environment for research and development, fostering collaboration between industry and academia, and enhancing the country's capacity to innovate and compete globally.

The Industry 4.0 policies of the Philippines are essential for both the industry and labor sector. These policies serve as the blueprint guiding the industry sector through the Industry 4.0 transformation, ensuring coherence and stability among industries in a technologically driven environment.

How Germany Can Help?

- Germany, as the world's Industry 4.0 hotspot⁵, supports research and development institutes, industry clusters, and Small and Medium-sized Enterprises (SMEs).
- The Philippines can benchmark from Germany's National Industrial Strategy 2030⁶, focused on enhancing the policy environment, mobilizing private capital for new technologies, and preserving technological autonomy, to guide its own policy development on 4IR.
- The German-Philippine Chamber of Commerce and Industry (GPCCI) actively engages in policy advocacy to ensure Industry 4.0 policies align with international standards, through recommendations, position papers, and facilitating industry-government dialogues

Industry Overview



Creative Industries Clusters for Global Growth
Source: DTI

Industry 4.0 promises transformation of the industry sector through comprehensive digitalization of software, services, and hardware. The Philippines, Southeast Asia's fastest-growing economy with a 5.6% growth rate, has adopted the Inclusive Innovation Industrial Strategy (i3S) for sustainable and inclusive industrial development⁷. A [2022 Philippine Department of Labor and Employment \(DOLE\) report](#) indicated that digital transformation could increase the national GDP by 27% or \$101 million by 2025⁸. This presents a significant opportunity for industries amid the Fourth Industrial Revolution (4IR).

Sample Sectors Affected by Industry 4.0 Transition:



Agriculture

The Philippine government sees various opportunities to transform the agricultural sector to increase the industry's competitiveness and productivity in the global scale. Calling it "[Agriculture 4.0](#)," the government aims to embrace opportunities that employs modern technologies like hydroponics, genetic modification, blockchain, drones, powerful data analytics, and nanotechnology to increase and sustain food productivity, quality, and incomes of producers⁹.



E-Commerce

Following the impact of the pandemic in 2020, the Philippine e-commerce industry has experienced significant growth and is estimated to reach \$24 billion (Php1.36 trillion) by 2025.¹⁰ In 2023, it accounted for 70% of the overall Philippine digital economy.¹¹ The Philippine Government issued various legal and regulatory initiatives to support e-commerce growth, including Electronic Commerce Act (RA 8792) and an E-Commerce Philippines Roadmap 2022. The recently passed Internet Transactions Act of 2023 (RA 11967) created the E-Commerce Bureau which monitors e-commerce transactions, protects consumer rights and data privacy and promotes competition and innovation.



Education

Higher education and Technical and Vocational Education (TVE) adopt an area-based, demand-driven approach, expanding networks and exploring new opportunities. Moreover, TESDA has committed itself to swiftly respond to the changes brought by Industry 4.0.¹² Despite this, the key challenge remains updating the education curriculum to align with evolving labor market needs and Philippine industry performance. With a young population, Industry 4.0 offers large potential to improve industry performance through the adoption of Education 4.0.



Electronics/Manufacturing

World Bank figures show that manufacturing contributed an average 18% of the Philippines' economy on average, between 2018 and 2022.¹³ The Philippines' top tangible export product accounting for \$34 billion of the country's export value, including integrated circuits, machine parts, semiconductors, and insulated wires.¹⁴ Industry 4.0 could increase the productivity of the industry by 30%-50% through the adoption of relevant technologies and skills development in Internet of Things (IOT), AI development, and 3D modelling.¹⁵



IT-BPO

Over the last decade, Information Technology – Business Process Outsourcing (IT-BPO) services have remained the country's top industry, contributing to 27% of exports of the country and 7.5% of the country's GDP.¹⁶ Supporting this is its significant progress in the adoption of Industry 4.0, particularly in customer relations and big data analysis, which is expected to further boost its productivity by more than 25% in 2025.¹⁷



Transportation

The electric vehicles (EV) industry is a rising industry in the country with the abundant supply of critical raw materials crucial for EV development.¹⁸ This provides an opportunity for building an integrated battery manufacturing and assembly chain in the Philippines which involves the manufacturing of EV components and vehicles assembly. Supported by Republic Act (RA) 11697, or the Electric Vehicle Industry Development Act (EVIDA Law) and through tax incentives programs, the government has expressed its commitment to encourage the growth of the industry and provide a competitive and attractive area of collaboration and investment for interested stakeholders.

The Philippines is strategically positioned to capitalize on the opportunities presented by Industry 4.0. Its' potential for digital transformation to significantly boost the national GDP highlights the immense benefits of embracing Industry 4.0. By leveraging modern technologies identified in this part, the Philippines aims to enhance its industrial competitiveness and productivity.

How Germany Can Help?

- Germany has consistently been one of the [Philippines' top trade and investment partners](#), known for its advanced technological and industrial innovations, especially in sustainable technologies.¹⁹
- During President Ferdinand Marcos Jr.'s [working visit to Berlin](#) in March 2024, German companies pledged \$4 billion in investments across various sectors, and a [Letter of Intent](#) was signed to establish an Innovation Think Tank hub in the Philippines.²⁰
- New industry technologies such as “Digital Twins” offered by German companies like Siemens and Bosch show technological simulations that allow industries to anticipate future scenarios and stay current with manufacturing advancements.²¹
- The German Center for Artificial Intelligence, a leader in AI research since 1988, continuously updates its AI strategy, focusing on research, expertise, applications, regulations, and societal impact.²²
- Given Germany's well-established AI research and development, there is significant untapped potential for collaboration between the Philippines and Germany to strengthen the AI industry in the Philippines.

Top 10 Emerging Jobs in 4IR

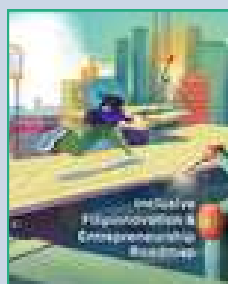
- | | |
|--|--|
| 1 AI and Machine Learning Specialists | 11 Blockchain Developers |
| 2 Sustainability Specialists | 12 E-commerce Specialists |
| 3 Business Intelligence Analysts | 13 Digital Marketing and Strategy Specialists |
| 4 Information Security Analysts | 14 Data Engineers |
| 5 FinTech Engineers | 15 Commercial and Industrial Designers |
| 6 Data Analysts and Scientists | 16 Business Development Professionals |
| 7 Robotics Engineers | 17 Devops Engineers |
| 8 Big Data Specialists | 18 Database Architects |
| 9 Agricultural Equipment Operators | 19 Process Automation Specialists |
| 10 Digital Transformation Specialists | 20 Software and Applications Developers |

Source: WEF Future of Jobs 2023

The Philippine labor market has shown growth in the post-pandemic recovery phase, with 48 million active workers contributing across various sectors including human resources, engineering, technology, and IT fueling industry growth.²³ However, a [2023 report by the Commission on Human Rights](#) flags a concerning trend: recent graduates are struggling to find employment, further illustrating a skills gap that demands urgent attention.²⁴ In the same survey, the top priorities for skills training over the next five years in the Philippines are AI and big data at 59%, and analytical thinking at 46%. As AI reshapes workforce demands, employers are emphasizing "soft" skills like self-efficacy, teamwork, and ethics, crucial for adapting to change and resisting automation.

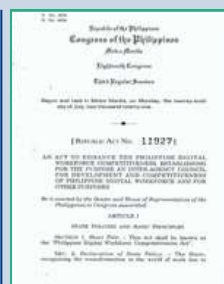
Understanding the status of the labor market is essential to support the industry sector's needs. Contrary to some perceptions, Industry 4.0 has the potential to increase net employment of industries as displacement effects are offset by employment linked to productivity gains.²⁵ According to a [2023 survey by the World Economic Forum](#), AI and Machine Learning Specialists lead the list of fastest-growing jobs, followed by Sustainability Specialists and Business Intelligence Analysts.²⁶ Conversely, many clerical or secretarial positions, such as Bank Tellers and Related Clerks, Postal Service Clerks, and Cashiers and Ticket Clerks, are expected to decline rapidly.

2017
Inclusive Innovation Industrial Strategy Framework (i3S)



2018
Inclusive Filipinnovention and Entrepreneurship Roadmap (IFER)

2021
Philippine Skills Framework (PSF)



2022
RA 11927: Philippine Digital Workforce Competitiveness Act

2023
Philippine Labor and Employment Plan 2023-2028



The goal is to align the labor sector through upskilling and reskilling of the workforce on emerging skills aligning with market demands. Education reforms must align with market needs, ensuring that school curricula develop the competencies required by the market and enhance the competitiveness of our sectors to meet global standards and demands. Ultimately, the Philippines aims to build a globally competitive and inclusive Filipino workforce.



"When discussing digital transformation, we often focus on utilizing the best technologies. However, I believe we can all agree that digital transformation extends beyond hardware; it also encompasses change management. This involves not only processes but also people. We've learned that there's a critical need to upskill and reskill."

Mr. Tristan Arwen Loveres

Vocational Training Committee Chairperson

German-Philippine Chamber of Commerce and Industry, Inc.

How Germany Can Help?

- Facing significant labor market challenges due to Industry 4.0 transformations, Germany has implemented the [Skilled Labor Strategy](#), including the STEM Action Plan 2.0 to enhance education and working conditions and attract foreign talent through immigration.²⁷ Germany's dual vocational training programs also have potential for expansion in the Philippine market.
- Germany and the Philippines have a long history of collaboration, highlighted by the [GPCCI's Porsche Aftersales Vocational Education \(PAVE\) program](#) adopting Germany's Dual Vocational Training System since 2008. Recent government-supported agreements, such as TESDA's MOUs with GPCCI, Siemens, and Festo, aim to enhance Industry 4.0 skills development.²⁸
- The [2nd Joint Economic Commission](#) meeting in March 2024 emphasized transforming Philippine labor and industry, with TESDA and Germany's BIBB renewing their cooperation program to upskill Filipino workers in digital skills. These efforts are essential for preparing the workforce for Industry 4.0 demands.

Recommendations

While the challenges of adopting Industry 4.0 are evident, the Philippines, as a developing country, holds significant potential for economic growth, industrial development, and workforce advancements. Establishing a vision with clear implementation mechanisms and evaluation metrics through a National Industry 4.0 Policy is essential. This policy will be instrumental in guiding stakeholders toward a digitalized and industrialized future for the Philippines. Furthermore, this White Paper offers specific recommendations for the industries and labor sector to achieve this goal.

1

Establish a National Semiconductor and Electronics Council. Create a unified entity combining public and private efforts to strategically plan investments and developments, streamlining public-private connectivity, and eliminating bureaucracy between institutions.

2

Develop competency-based training regulations aligned with international standards. Partner with industry experts, businesses, and professional organizations to develop competency frameworks aligned with international standards, outlining the knowledge, skills, and attitudes needed for each role.

3

Align Higher Education Courses with Industry 4.0 Needs. Echoing the recommendation of the Semiconductor and Electronics Industries in the Philippines Foundation, Inc. (SEIPI), the Commission on Higher Education (CHED) can incorporate emerging Industry 4.0 skills into the core curriculum which can be identified through labor market analysis, especially for the information technology, engineering, and applied sciences program.

4

Promote access to upskilling and reskilling through apprenticeship program reforms. Remove the limit on apprenticeship period, issue training certificates and promptly approve programs and accredit institutions that upskill and reskill displaced workers to transition them into Industry 4.0 jobs and ensure the protection of workers from the risks of Industry 4.0 transformation.

5

Intensify and upgrade high-quality technical and vocational education training (TVET) programs. Upgrade and launch government-funded TVET programs that align with industry standards and establish partnerships with leading companies in 4IR to help modernize training equipment and attract investment.

6

Incentivize Research and Development (R&D) initiatives to accelerate the expansion of the country's research ecosystem. The government must support R&D growth through public subsidies and offer stable incentives for companies that increase their R&D spending and capability development.

7

Strengthen Public-Private partnerships on Industry 4.0 related programs. Encourage collaboration among the government, higher educational institutions, training providers, and companies to share knowledge and resources, and implement third-party audits that ensure that programs meet international standards and effectively share expertise, investments, training programs, and transitory processes.

8

Enhance infrastructure and logistics to support "digitization" and "digitalization". Invest in building significant infrastructure, improving cell towers and fiber optic cables, especially in underserved areas to improve connectivity and facilitate the adoption of Industry 4.0 technologies.

9

Develop local tech expos and trade fairs to promote new technologies. To build interest, confidence and further encourage the adoption of digital transformation, the government can develop platforms such as trade expos, fairs, and various public campaigns in the Philippines like the Hannover Messe that can showcase future technologies and digital processes beneficial for businesses.

10

Initiate cross-industry ecosystems for accelerated skills development. Create industry clusters for development with clearly outlined objectives to facilitate networking and partnerships to develop new skills and knowledge from experiences and best practices of each industry.

Conclusion



As in other countries, Industry 4.0 will transform both the industry and workforce. For the Philippines, it presents opportunities for automation, digital transformation, and upskilling the workforce.

However, critical challenges like inadequate infrastructure and skills gaps demand immediate attention. The recommendations outlined in this White Paper, through government support for its implementation, can help achieve swift adoption of Industry 4.0.

With Germany as a leader in Industry 4.0 and strong partner of the Philippines, it offers valuable opportunities for collaboration and assistance to the Philippines through investments in key sectors, knowledge sharing via its Dual Vocational Training System, AI expertise, and partnerships for workforce development. Embracing Industry 4.0. with a decisive action allows the Philippines a chance to excel in a highly competitive global market.

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