



Demographic dividend and human capital development in the manufacturing sector in anticipation of Golden Indonesia 2045

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ABSTRACT

The Vision of Golden Indonesia 2045 aims to position Indonesia as a developed country with a per capita income of USD 30300, significantly reduced poverty rates, high competitiveness, and enhanced human capital. Indonesia has immense potential, particularly with its demographic dividend of 128 million workers. Therefore, human capital planning and development is required to achieve high quality performance and productivity. This article highlights the vital role of the manufacturing sector in driving economic transformation. The manufacturing industry should be prioritized for boosting human capital, by taking advantage of the demographic dividend. Suppose that the manufacturing sector will employ 25% of the workforce. In that case, by 2045, this sector will employ 51.8 million workers—an increase of 30.8 million from 20.01 million in 2024. To enhance human capital within the manufacturing sector, several strategic steps can be taken: (i) implementing education and training programs that align closely with industry needs, (ii) developing infrastructure and the overall manufacturing ecosystem, (iii) improving the quality of human resources in key manufacturing areas, particularly in palm oil, organic basic chemicals from agricultural products, machinery, and automotive spare parts, and (iv) advancing agro-industry to stimulate economic transformation and create job opportunities in the agricultural sector.

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INTRODUCTION

Indonesia's economic development is expected to progress steadily to meet its goals. Over the next twenty years, the government has outlined a vision called Golden Indonesia 2045. This vision is detailed in Law No. 59 of 2024, which pertains to the National Long-Term Development Plan (RPJPN) for 2025-2045. The plan emphasizes the Unitary State of the Republic of Indonesia as united, sovereign, advanced, and sustainable (Sekneg, 2024).

The Vision of Golden Indonesia 2045 outlines five main targets: (i) achieving per capita income comparable to that of developed countries (USD 30300), (ii) reducing poverty to 0% and decreasing inequality with a Gini index between 0.290 and 0.320, (iii) enhancing Indonesia's leadership and influence on the international stage (aiming to rank within the top 15 in the Global Power Index), (iv) improving human resource competitiveness (targeting a Human Capital Index of 0.73), and (v) decreasing greenhouse gas (GHG) emission intensity toward net-zero emissions.

To realize this vision, Indonesia must cultivate an inclusive economy, and actively engage in domestic and international integration. This requires the spread of economic development across various regions and the emergence of new growth centers. The network of primary, secondary, and tertiary production bases in each region must develop and be interconnected to create added economic value. Efficient connectivity between growth centers will help keep logistics and transaction costs low and enhance access to regional and global markets.

Achieving the Vision of Golden Indonesia 2045 is anchored in optimism, as several favorable factors. First is economic stability. Over the past decade, Indonesia has demonstrated economic growth rates of 5% to 6%. Following the pandemic, the economy rebounded quickly to previous levels. The second is economic resilience. The Indonesian economy has shown relative strength against various global challenges, including the pandemic, the Ukraine-Russia conflict, the China-America trade war, and other issues. Third is infrastructure development. Improved land, sea, and air transportation will enhance connectivity and facilitate the growth of new centers while providing access to global markets. Fourth is the commitment to economic downstream policies. The policy aims to strengthen the manufacturing sector which generates added value for primary sectors, expands the tertiary sectors, and positively impacts community welfare.

Achieving the Vision of Golden Indonesia 2045 also presents challenges. The main concern is the readiness of a skilled workforce capable of navigating the uncertainties. This article explores the socio-economic conditions anticipated in 2045. This condition relates to the demographic dividend and the challenges of enhancing human capital specifically aimed at the manufacturing sector to build a strong economy and improve global competitiveness.

DEMOGRAPHIC DIVIDEND

In the next twenty years, there will be demographic changes that have a significant impact on socio-economic life. This dynamic is known as the demographic dividend. The demographic dividend occurs when a country or region has a larger proportion of productive working-age population compared to children and the elderly who are economically dependent.

The demographic dividend provides opportunities for economic growth resulting from the productivity of the productive age population (Hayes & Setyonaluri, 2015). They enter the workforce, with high skills and competencies, and fill the national production capacity optimally. This occurs due to the decline in fertility and mortality rates, the success of health and family planning programs, education, and other development programs (Bloom et al., 2003). Countries that have succeeded in taking advantage of the demographic dividend include Japan, South Korea, Taiwan, and China; so they enjoy rapid economic growth.

A BPS study (BPS, 2012) shows that the demographic dividend begins around 2025 to 2030 (Figure 1). In 2025, the dependency ratio will reach its lowest point of 44.2%, meaning that every 100 productive workers will support around 44 unproductive people. At that time, the dependency ratio for the elderly (aged 64 and over) was 33.2, while the dependency ratio for the young (under 15) was 11. This means that the population aged over 64 is greater than those aged under 15. After 2025, the dependency ratio will increase again to 53.4%, although not as high as in the 1970s.

The figure shows that qualified and skilled national human resources are an important point in utilizing the demographic dividend. Human resources must be prepared early on, by forming them to have physical and mental health, moral values and competence and skills to drive economic growth (Han & Lee, 2020). In 2045 if they are 20 to 40 years old, currently they are 0 to 20 years old. Now is the right time for the government to prepare them unless this nation will miss the boat, as in the success of Korea or Taiwan. Educational development programs including skills training, health, and entrepreneurship development, accompanied by providing equal access will make the potential of human resources realized into advantages and competitiveness

ECONOMIC TRANSFORMATION

What happens in the next 20 years is not an easy thing to face. In addition to internal situations, external and global conditions need to be continuously observed and utilized as economic opportunities. Other countries are also working and trying to anticipate changes. They also have their own domestic problems. Therefore, the keyword and solution is to build advantages so that the economy is competitive.

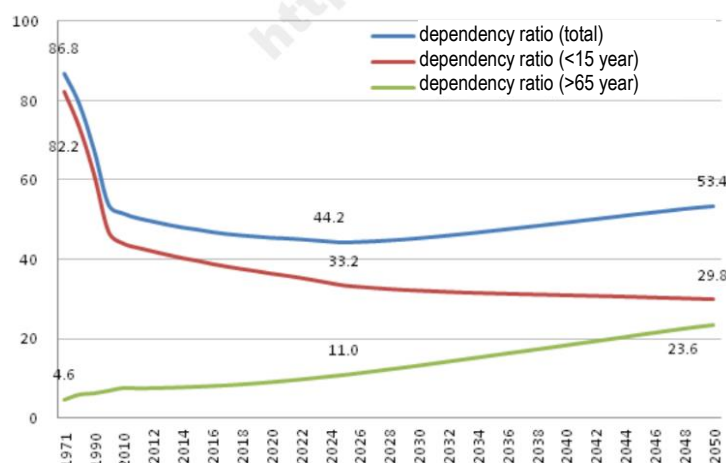


Figure 1. Dependency ratio of Indonesian population, 1971-2050 (BPS, 2012)

Table 1. Development Targets of Golden Indonesia 2045

Indicators	2025	2045
Population (million, rank)	285(4)	324(6)
Income per capita (USD)	5500	30300
Poverty rate (%)	8.0	0.8
Share of manufacturing sector to GDP (%)	20.8	28.0
Share of tourism sector to GDP (%)	4.6	8.0
Share of the creative economy sector to GDP (%)	8.0	11.0
Share of science and technology sector to GDP (%)	0.3	2.3
Share of export to GDP (%)	21.6	40.0
Logistics cost to GDP (%)	13.5	8.0
Entrepreneurship ratio (%)	3.1	8.0
Open unemployment (%)	5.0	4.0
Formal job creation (%)	35.0	80.0
Female workforce (%)	56.3	70.0
Global Innovation Index ranking	60	Top 30
Digital competitiveness ranking	43	Top 20

Source: RPJPN 2025-2045 (Sekneg, 2024)

In the future, it is predicted that there will be significant changes in terms of global demographics, geopolitics, technological developments, global trade constellations, middle class growth, natural resource competition, climate change, and the use of outer space. This description explains how the flow and socio-economic boundaries are so thin and illusory. The strength of economic resources will flow to areas that provide the highest opportunities. Competition between economic actors plays an important role in utilizing every opportunity.

Several economic indicators have been projected from 2025 to 2045 (Table 1), including population growth from 285 to 324 million people, per capita income growth from 5,500 to 30,300 dollars, poverty decline from 8 to 0.8%, manufacturing GDP share from 21 to 28%, entrepreneurship ratio growth from 3.1 to 8.0%, global innovation index ranking from 60 to top 30, digital competitiveness index ranking from 43 to top 20, export share in GDP from 21.6 to 40%. These indicators show Indonesia's increasingly strong competitiveness, supported by innovation, strengthening the manufacturing industry through economic downstream or jumping to high technology, and the development of the service economy. The projection is very realistic because it uses a baseline (2022) with sustainable development performance.

To achieve the vision of Indonesia Emas 2045, development actors must work together effectively, each fulfilling their respective roles: the government, the business sector, and the community. Central, provincial, and district/city governments need to collaborate efficiently and transparently, ensuring that every stage of development works with accountability. All parties need to demonstrate their capacity to manage the large-scale transformations brought about by advancements in information technology.

It is not an easy task to identify which priority sectors will accelerate economic growth and provide inclusive benefits. The manufacturing sector is a crucial pillar and plays a vital role in driving economic transformation (Black et al., 2016). By developing the

manufacturing sector, we can add value to the primary sector and encourage a more inclusive economic transformation that also stimulates the growth of the tertiary sector (Su & Yao, 2017). This sector significantly contributes to economic growth, job creation, competitiveness, and the development of global trade (Hena et al., 2019).

Enhancing the manufacturing sector will positively impact the economy. As illustrated in Table 1, efforts to strengthen this sector could raise its share from 20% to 28%. This increase will not only improve Indonesia's standing in global innovation and competitiveness indices but also boost the creative economy and stimulate entrepreneurship. The urgency to strengthen the manufacturing sector is further heightened by indications of deindustrialization in Indonesia (Yasa & Monika, 2021), evidenced by a decline in the manufacturing industry's share of GDP, which fell from 22% to 19% during the 2010-2024 period (BPS, 2024a).

Developing the manufacturing sector is highly relevant, as it creates a robust economic foundation. This sector is crucial for supporting the primary sector and facilitating various activities in the service sector. The manufacturing industry also serves as a platform for technological mastery and transfer, absorbs a significant amount of skilled labor, promotes high productivity, and supports high-tech development. Such a framework will also enhance the economy's resilience to changes or crises (Bianco et al., 2023; Oliver et al., 2018).

Moreover, the manufacturing sector is poised to foster human capital. In the future, this sector will be directed toward transformation the adoption of automation, AI, IoT, and big data. These technologies relies on human capital equipped with digital, analytical, and adaptability skills to manage technological changes. Individuals should possess adequate educational qualifications and increasing income levels. This growth in human capital generally leads to improved welfare and social participation while also reducing economic inequality (Castelló & Doménech, 2002; Hanushek, 2013; Hanushek & Woessmann, 2008).

HUMAN CAPITAL AND MANUFACTURING SECTOR

In achieving the vision of Golden Indonesia 2024, it is essential to effectively utilize the demographic

dividend as a catalyst for economic growth. This demographic dividend presents a unique opportunity for Indonesia to develop high-quality human capital capable of advancing and competing on a global level.

To harness this potential, the government must take strategic steps to develop human capital. Efforts in human resource development should be aligned with investments in technology and policies for the manufacturing industry. The manufacturing sector should be positioned as the primary driver of the national economy, transforming Indonesia into a competitive global manufacturing hub. This goal requires serious attention to leverage the abundant human resources associated with the demographic dividend to support the manufacturing industry.

In 2045, there will be approximately 128 million young workers (ages 15-45) and 79.26 million mature workers (ages 45-64) (Sekneg, 2024). In 2024, the manufacturing sector is expected to employ 13.83% of the total workforce, which amounts to 20.01 million people out of a total of 144.64 million workers (BPS, 2024b). If we assume that by 2045, the percentage of workers in the manufacturing sector will rise to 20%, this would accommodate at least 41.45 million workers—a significant increase from the 20.01 million recorded in 2024.

Creating 20 million jobs in the manufacturing sector over the next twenty years is a considerable challenge. This projection is moderate; if the workforce in the manufacturing industry were to increase to 25%, the government would need to prepare for an additional 31.80 million jobs in this sector by 2045. In 2019, the manufacturing sector employed 29% of the workforce in East Asia and the Pacific, while in South Asia, the figure was 26% (World Bank, 2024).

Several strategic steps be taken to ensure sustainable development over the next twenty years. First, enhancing human resource quality through education and training. The government must prioritize education and training, especially in STEM (science, technology, engineering, and mathematics) fields, as these are foundational for knowledge in the manufacturing industry. This includes strengthening vocational and polytechnic education tailored to industry needs, fostering collaboration between industry and universities to develop technology-based curricula, and focusing on the digitalization and automation of industries. Additionally, reskilling and upskilling programs for workers affected by

automation are crucial. This initiative should be a mass movement within the education sector, aiming to produce 31.8 million skilled workers to meet the demands of the manufacturing industry.

Table 2. Population Structure of Indonesia, 2025 and 2045

Indicator	2025	2045
Age Composition (%)		
0-14 (%)	23.3	20.7
15-64 (%)	68.6	65.2
65+ (%)	8.1	14.1
Dependency Ratio (%)	45.7	53.4
Population (million)	282.45	318.96

Source: BPS (2018)

Second, developing infrastructure and manufacturing ecosystems. The government needs to enhance the development of integrated industrial areas equipped with modern facilities. New industrial zones should be established with diverse amenities and incentive policies to attract both domestic and foreign direct investment (FDI). These efforts aim to create new growth centers supported by the connectivity of raw materials, logistics, and infrastructure. Simultaneously, the development of local manufacturing and technology startups should be encouraged to facilitate the transfer of modern technology and support downstream programs. This ecosystem development will help cultivate and deploy skilled human resources across various manufacturing sectors.

Third, strengthening competitive manufacturing industries. Not all manufacturing sectors are currently competitive or export-oriented. Key sectors with significant export potential, include palm oil, organic basic chemicals derived from agricultural products, machinery, automotive spare parts (for both two-wheel and four-wheel vehicles), semiconductors, electronic components, and jewelry (BPS, 2024c). It is essential to reinforce these sectors to maintain their competitive edge, including opening investment opportunities for downstream operations through domestic and foreign investments.

Fourth, advancing agro-industry development. The agro-industry plays a critical role in both social and economic contexts, bolstering the agricultural sector while enhancing domestic value addition and employment opportunities to drive economic transformation. In 2024, the agricultural workforce is significant, comprising 40.76 million people or 27% of the total workforce (BPS, 2024b). It is vital to support

these workers to avoid low productivity traps. The agro-industry can improve their livelihoods through training in agricultural processing technology, fostering entrepreneurship, and establishing marketing networks. Skilled human resources will significantly contribute to the advancement of the agro-industry (Yasa & Monika, 2021).

CONCLUSION AND SUGGESTION

The demographic dividend presents an opportunity to realize the vision of Golden Indonesia 2045. Indonesia must effectively utilize its abundant productive human resources. By 2045, the national workforce is projected to be approximately 128 million individuals aged 15 to 45 years and 79 million individuals aged 45 to 64 years. The workforce must possess high skills and productivity, enabling them to thrive in highly competitive economic sectors.

For the economy to accelerate with a robust foundation, the manufacturing sector must serve as a crucial pillar, driving economic transformation to support primary industries and stimulate the development of the tertiary sector. Strengthening the manufacturing sector will enhance Indonesia's global competitiveness, the creative economy, and encourage entrepreneurship.

In 2045, it is estimated that 25% of the workforce, or 51.8 million people, will be employed in the manufacturing sector—an increase of 30.8 million from the 2024 figure of 20.01 million. Strategic initiatives to boost human capital in manufacturing include: (i) providing education and training that aligns with industry needs, (ii) developing infrastructure and manufacturing ecosystems to create new growth centers, (iii) fostering key manufacturing industries, particularly in palm oil, organic chemicals derived from agricultural products, machinery, and automotive spare parts, and (iv) promoting agro-industry to facilitate economic transformation and create jobs in the agricultural sector.

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