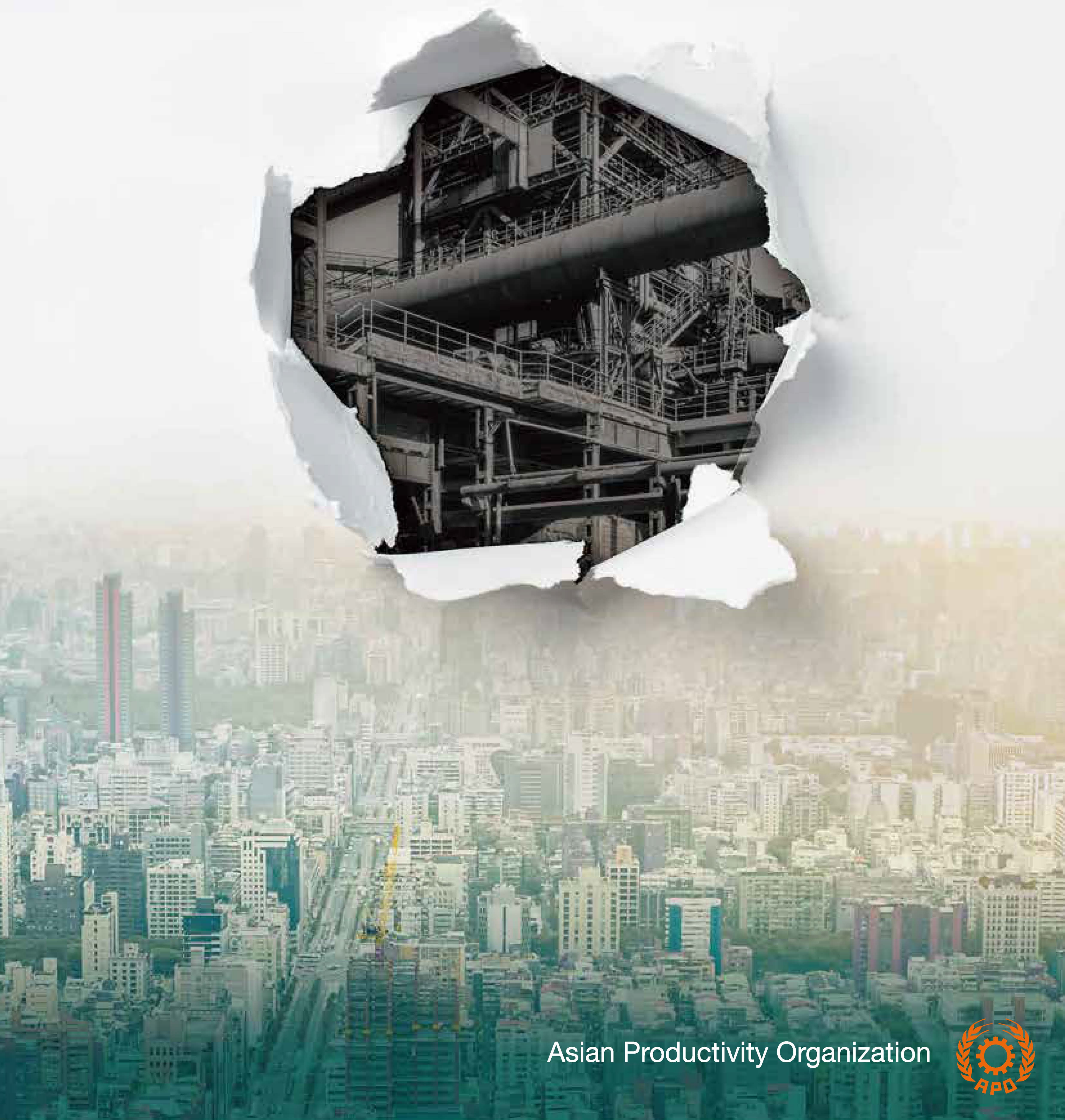
Global Perspectives on Premature Deindustrialization

Insights from APO Member Economies



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APO Members

Bangladesh, Cambodia, Republic of China, Fiji, Hong Kong, India, Indonesia, Islamic Republic of Iran, Japan, Republic of Korea, Lao PDR, Malaysia, Mongolia, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, Turkiye, and Vietnam.

GLOBAL PERSPECTIVES ON PREMATURE DEINDUSTRIALIZATION: INSIGHTS FROM APO MEMBER ECONOMIES

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Global Perspectives on Premature Deindustrialization:
Insights from APO Member Economies

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FOREWORD

In an era of rapid globalization and technological progress, the dynamics of industrialization and deindustrialization have moved to the center of global economic discourse. The complexities of shifting global supply chains, trade tensions, and technological disruptions underscore the need to understand the implications of deindustrialization and develop effective policy responses.

As economies transition from agrarian to industrial and eventually to service-oriented structures, the timing and pace of this evolution vary considerably across regions and nations. Premature deindustrialization, characterized by a decline in the relative importance of manufacturing sectors before reaching anticipated levels of development, presents a multifaceted challenge. This global trend calls for in-depth analysis of its drivers, consequences, and long-term economic performance.

The impact of premature deindustrialization extends beyond the manufacturing sector to affect entire economies by influencing employment, income distribution, innovation, and competitiveness. As traditional manufacturing declines, countries must foster new sources of growth to sustain productivity, particularly in the context of rising income inequality and environmental concerns.

This research report on *Global Perspectives on Premature Deindustrialization: Insights from APO Member Economies* examines deindustrialization in nine diverse economies, providing insights into its causes, implications, and potential remedies. By examining underlying forces such as financial crises, trade dynamics, technological disruptions, and government policies, it highlights contrasting perspectives and potential impacts on economic stability and competitiveness. It also contributes to policy discussions, emphasizing the need for comprehensive strategies that address both supply and demand. By synthesizing lessons learned from successful industrial transformations and offering forward-looking policy recommendations, the report provides a roadmap for policymakers to navigate the challenges and opportunities of industrial development.

The APO extends gratitude to all the experts who contributed to this report, led by Chief Expert Dr. Jiann-Chyuan Wang, Vice President of Chung-Hua Institution for Economic Research, ROC, and national experts from Bangladesh, Cambodia, India, Malaysia, Pakistan, the Philippines, Sri Lanka, Thailand, and Turkiye. We hope that this publication will contribute to comprehension of the forces driving industrial change and productivity dynamics, serving as a valuable resource for steering the intricate dynamics of industrial change to develop more resilient, inclusive, sustainable economies.

Dr. Indra Pradana Singawinata
Secretary-General
Asian Productivity Organization
Tokyo

PRELIMINARY INTRODUCTION

Introduction

Recently, deindustrialization has emerged as a global phenomenon, prompting considerable concern in both advanced and developing economies. Traditionally, industries and manufacturing sectors have been viewed as highly productive, generating substantial employment opportunities. Moreover, manufacturing processes are often standardized and conducive to exportation, which is particularly advantageous for developing nations leveraging their demographic dividends to foster labor-intensive manufacturing. Consequently, premature deindustrialization is widely regarded as detrimental to a country's long-term development trajectory, impeding growth potential and structured transformation (Kaldor, [1]; Dasgupta & Singh [2], 2006; Feng & Wang [3], 2021; Rodrik [4].).

Upon reaching a certain stage of development, advanced countries experience an increase in income, stimulating demand for leisure, entertainment, transportation, and other service sectors. Simultaneously, the division of labor becomes more specialized, resulting in the outsourcing of activities such as advertising, marketing, and design from the manufacturing sector. Consequently, there is a notable shift towards a higher proportion of the service industry (Lee & Wang, 2003). Moreover, enhancements in manufacturing productivity free up a portion of the labor force, facilitating the transition of workers into the service sector and driving up employment within this domain. (Wang & Mai [5]).

The diminishing share of manufacturing in developing countries can be attributed to several factors. First, escalating environmental protection, labor, and land costs, along with trade restrictions and exchange rate fluctuations, may prompt industries to relocate overseas (Wang & Mai, 2001).

Second, trade barriers and conflicts may result in the migration of manufacturing sectors from developing nations, impacting the value addition of manufacturing and the creation of job opportunities.

Third, limited participation in the international division of labor, inadequate external investments, and the absence of trade promotion agencies collectively undermine the competitiveness of the manufacturing sector, leading to declines in exports, employment, and output.

Fourth, stringent environmental and labor regulations within the manufacturing sector have compelled many jobs to transition into the informal economy. While this shift may initially appear to reduce the manufacturing output value and employment ratio, the overall impact on manufacturing output and employment remains relatively unchanged.

The question of whether developing countries should engage in premature deindustrialization and its potential long-term impacts on national development warrants serious consideration. Research by Ozmen suggests that early industrialized East Asian economies have successfully maintained a certain proportion of manufacturing industries through strategic industrial policies. However, some South Asian, Latin American, and African nations may encounter the dilemma of deindustrialization. Consequently, the industrial policies implemented by East Asian economies hold implications for other nations (Ozcelik & Ozmen [6]).

Deindustrialization, as defined by Dasgupta and Singh (2006), entails a decline in the employment ratio within the manufacturing industry, often resulting in a lower per capita income compared to advanced countries at similar stages of industrialization.

Furthermore, as analyzed by Feng and Wang (2021), deindustrialization signifies a substantial reduction in a country's industrial economic activities. According to prevailing economic theory, a nation's economic modernization is typically driven by its industrial sector, facilitating sustained growth in per capita income. Hence, premature deindustrialization poses a significant threat to a country's prospects for sustainable economic development.

As for what negative impact premature deindustrialization will pose to developing countries?

First, low income and low consumer demand have led to a decline in economic growth: Manufacturing industries typically offer higher wages due to automation and technological advancements, whereas the service sector often features lower productivity and wages. Consequently, an increase in the proportion of employment within the service industry, characterized by lower wages, may lead to reduced incomes and consumer demand, thereby contributing to a long-term decline in economic growth.

Second, the service industry in developing countries often lacks the quality and competitiveness of its counterparts in advanced economies. Factors such as inadequate investment in research and development, low levels of automation, suboptimal business models, small markets, or insufficient purchasing power of the populace contribute to lower productivity and income levels (Wang & Mai, 2001). As a result, the overall quality and efficiency of the service sector may be compromised, further exacerbating economic challenges.

Third, the decline in the manufacturing sector can disrupt the associated supply chains, negatively impacting related industries. Manufacturing supply chains tend to be extensive, and a reduction in the share of manufacturing can disrupt these intricate networks, leading to adverse effects on the development of supply chains and associated industries.

Fourth, while the informal sector may absorb a significant portion of the displaced manufacturing labor force, it poses challenges to the sustainability of the industry in the long run. Despite not directly affecting the official proportion of the manufacturing industry or employment figures, the informal sector operates with limited regulation and oversight. Concerns about potential government crackdowns or the inability to afford environmental protection and labor safety measures often confine informal enterprises to small-scale operations without long-term planning or development prospects. This lack of formalization and sustainable development hampers the long-term viability of the manufacturing sector.

Many APO member economies find themselves at diverse stages of development, yet an increasing number are confronting the phenomenon of premature deindustrialization. This trend, characterized by a rapid decline in the share of manufacturing and a corresponding rise in the share of services, occurs at earlier stages of economic development compared to industrialized nations, impacting both employment and value-added shares (APO, 2022). The implications of premature deindustrialization are adverse for future growth prospects, as it undermines labor productivity, competitiveness, and overall economic resilience.

Furthermore, several middle-income APO member states are experiencing diminishing outward foreign direct investment (FDI) and a low proportion of high-tech industries in their export portfolios. This inability to elevate their industrial complexity within global value chains poses a significant risk to their competitiveness in the global marketplace, leading to stagnation in production network development.

To keep these economies ahead of premature deindustrialization trends, relevant industrial and economic policies are necessary. This research will investigate the status of deindustrialization among APO members and its impacts on long-term productivity performance, thus generating policy implications.

As a consequence, the purpose of this project is to conduct research on *Premature Deindustrialization and Productivity Performance* in APO member economies. The content of the project includes:

1. Studying the risk of premature deindustrialization among APO members' economies.

2. Estimating the impact of deindustrialization on long-term productivity performance.

3. Generating implications for industry and productivity policies.

In this book, we use the economic development experiences of nine countries (Bangladesh, Cambodia, India, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand, Turkiye) to analyze the possible deindustrialization problem, as well as the negative impacts of the process of deindustrialization on economic development. Moreover, we also summarize governmental policies in response to the deindustrialization. Finally, we summarize our findings and policies, and propose our strategies for Asian economies to cope with deindustrialization in the future, so that governments and enterprises can absorb lessons and cope with it.

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BANGLADESH

Executive Summary

Bangladesh's economic trajectory has been characterized by robust growth and transformative changes, particularly in its textile and garment manufacturing sectors. However, concerns over premature deindustrialization have emerged, prompting an examination of its implications for productivity performance. This paper dissects the premature deindustrialization and productivity in Bangladesh, offering insights for policymakers and stakeholders. The economic overview reveals Bangladesh's consistent growth, though impacted by the COVID-19 pandemic. Forecasts indicate sustained growth, with GDP reaching USD460.20 billion in 2022, bolstered by increasing contributions from various sectors. Analyzing the deindustrialization phenomenon, the paper defines premature deindustrialization and explores key parameters influencing it. Factors such as declining manufacturing share in GDP, employment shifts, productivity, technological progress, infrastructure, education, globalization, and government policies are crucial considerations. Contrary to concerns, Bangladesh's data suggests a nuanced picture. While manufacturing's GDP share has increased steadily, employment share has fluctuated but indicating a shift towards higher productivity. Average productivity growth in the manufacturing sector rose to 6.18% during 2015–21, suggesting industrialization. Evaluating economic indicators further supports the notion that premature deindustrialization may not be occurring in Bangladesh. Despite fluctuations in employment share, rising manufacturing contributions to GDP and productivity growth underscore industrialization progress.

1. Introduction

In the wake of Bangladesh's remarkable economic journey, marked by sustained growth and transformative changes, the phenomenon of premature deindustrialization has begun to cast a shadow on its development narrative. Historically celebrated for its vibrant textile and garment manufacturing sectors, Bangladesh has experienced a notable shift in its industrial landscape, prompting a critical examination of the implications for the nation's productivity performance.

Premature deindustrialization in the context of Bangladesh encapsulates a unique set of challenges and opportunities. As a nation that has rapidly ascended the global value chains in the textile and garment industry, concerns arise regarding the sustainability of this trajectory and the potential consequences for overall economic productivity. The premature slowing down or plateauing of industrial growth in Bangladesh challenges conventional notions of industrialization as a linear path towards prosperity, prompting a reevaluation of the country's development strategies.

By scrutinizing the specific factors influencing the deceleration of industrialization within the Bangladeshi context, we aim to unravel the nuances that differentiate this phenomenon in a country with a unique economic profile. Moreover, the study seeks to delineate the impact of premature deindustrialization on key productivity indicators, such as labor efficiency, technological advancement, and overall economic output.

Against the backdrop of Bangladesh's ambitious development goals, understanding the dynamics of premature deindustrialization becomes imperative for policymakers, economists, and industry stakeholders. As the nation grapples with the challenges posed by this shift, there is a pressing need to identify strategies that can sustain and enhance productivity in a post-deindustrialization landscape.

This inquiry not only contributes to the academic discourse on economic development but also holds practical implications for shaping the future trajectory of Bangladesh's industrial and economic policies. By illuminating the unique facets of the risk of premature deindustrialization in Bangladesh, this study aims to provide actionable insights that can inform evidence-based policy decisions, ensuring that the nation continues on its path to inclusive and sustainable development.

2. Economic Overview Analysis

In recent years, the Bangladesh economy has been growing at a consistently high pace over a decade, crossing the 7% milestone in FY 2015–16 and the 8% milestone in FY 2018–19. However, the COVID-19 pandemic reduced the growth rate to 3.45% in FY 2019–20. The economy grew by 6.94% in FY 2020–21. According to the provisional estimates of the Bangladesh Bureau of Statistics (BBS), the GDP growth stood at 7.25% in FY 2021–22, 0.05% higher than the target rate and 0.31% higher than the previous fiscal year. According to the provisional estimate of the BBS, per capita GDP and per capita national income stood respectively at USD2,723.00 and USD2,824.00 in FY 2021–22, compared to USD2,462.00and USD2,591.00 respectively in FY 2020–21. The consumption increased to 78.44% of GDP in FY 2021–22 from 74.66% in FY 2020–21. The gross investment stood at 31.68% of GDP in FY 2021–22, where public investment and private investment accounted for 7.62% and 24.06% of GDP respectively. Medium-term forecasts for GDP growth rates are 7.5% in FY 2022–23, 7.8% in FY 2023–24 and 8.0% in FY 2024–25. But historically the size of GDP and GDP growth rate have been increasing yearly. The following is data on this:

TABLE 1

HISTORICAL DATA OF GDP, PER CAPITA INCOME AND GDP GROWTH RATE

Bangladesh GDP - Historical Data			
Year	GDP	Per Capita	Growth
2022	USD460.20B	USD2,688	7.10%
2021	USD416.26B	USD2,458	6.94%
2020	USD373.90B	USD2,233	3.45%
2019	USD351.24B	USD2,122	7.88%
2018	USD321.38B	USD1,963	7.32%
2017	USD293.75B	USD1,816	6.59%
2016	USD265.24B	USD1,660	7.11%
2015	USD195.08B	USD1,236	6.55%
2014	USD172.89B	USD1,109	6.06%
2013	USD149.99B	USD974	6.01%
2012	USD133.36B	USD877	6.52%
2011	USD128.64B	USD856	6.46%
2010	USD115.28B	USD777	5.57%
2009	USD102.48B	USD699	5.05%
2008	USD91.63B	USD630	6.01%
2007	USD79.61B	USD552	7.06%
2006	USD71.82B	USD504	6.67%
2005	USD69.44B	USD493	6.54%
2004	USD65.11B	USD469	5.24%
2003	USD60.16B	USD441	4.74%
2002	USD54.72B	USD408	3.83%
2001	USD53.99B	USD410	5.08%
2000	USD53.37B	USD413	5.29%

Source: World Bank

TABLE 2

CONTRIBUTION TO GDP FROM DIFFERENT SECTORS

Related	Last	Previous	Unit	Reference
GDP	460.20	416.26	USD Billion	Dec 2022
GDP Constant Prices	32180.31	30392.73	BDT Billion	Dec 2023
Gross National Product	33479.74	31520.93	BDT Billion	Dec 2023
Gross Fixed Capital Formation	13874.50	12598.82	BDT Million	Dec 2023
GDP from Utilities	377.10	360.70	BDT Million	Jun 2023
GDP from Transport	2272.40	2143.40	BDT Million	Jun 2023
GDP from Services	15914.80	15036.50	BDT Million	Jun 2023
GDP from Public Administration	1007.80	1008.00	BDT Million	Jun 2023
GDP from Mining	543.00	513.50	BDT Million	Jun 2023
GDP from Manufacturing	7749.00	7094.30	BDT Million	Jun 2023
GDP from Construction	2964.80	2786.30	BDT Million	Jun 2023
GDP from Agriculture	3479.70	3391.30	BDT Million	Jun 2023

Source: World Bank

TABLE 3

KEY MACROECONOMIC INDICATORS, FY2009-2020

Fiscal Year	GDP Growth (%)	Per Capita Income (USD)	Inflation Rate	Budget Deficit as % of GDP	Total Debt to GDP (%)	Imports (Mill USD)	Exports (Mill USD)	Remittance (Mill USD)
FY2008–09	5.05	759	7.6	-3.50	39.3	22,507	15,565	9,689
FY2009–10	5.57	843	6.82	-3.20	37.4	23,738	16,205	10,987
FY2010–11	6.46	928	10.9	-3.90	38.0	33,658	22,928	11,650
FY2011–12	6.52	955	8.7	-3.60	37.4	35,516	24,302	12,843
FY2012–13	6.01	1,054	6.8	-3.90	36.6	34,084	27,027	14,461
FY2013–14	6.06	1,184	7.4	-3.60	35.0	40,732	30,187	14,228
FY2014–15	6.55	1,316	6.4	-4.10	32.3	40,704	31,209	15,317
FY2015–16	7.11	1,465	5.9	-3.90	31.5	43,122	34,257	14,931
FY2016–17	7.28	1,610	5.4	-3.40	30.8	47,005	34,656	12,770
FY2017–18	7.86	1,751	5.8	-4.70	31.9	58,865	36,668	14,982
FY2018–19	8.15	1,909	5.5	-5.50	33.1	59,915	40,535	16,420
FY2019–20	5.24	2,064	5.7	-5.23	35.7	54,785	33,674	18,205

Source: World Bank

3. Analysis of Deindustrialization Phenomenon

Premature deindustrialization refers to a situation in which a country experiences a significant decline in the relative importance of its manufacturing sector in terms of economic output and employment at a lower level of economic development compared to historical patterns observed in more industrialized nations. Typically, industrialization has been a key driver of economic development, with manufacturing playing a central role in providing employment, generating income, and fostering technological innovation.

In the context of premature deindustrialization, the decline in the manufacturing sector's share of total economic activity and employment occurs at an earlier stage of economic development than what has been historically observed in many advanced economies. In other words, a country may transition away from manufacturing-oriented economic activities before reaching the income levels at which such deindustrialization trends traditionally occurred in the industrialization processes of more developed nations.

This phenomenon can have significant economic and social implications, as manufacturing has traditionally been associated with higher productivity, technological innovation, and the creation of decent-paying jobs. Premature deindustrialization may pose challenges for sustained economic growth, employment generation, and overall development, and understanding its causes and consequences is crucial for policymakers and analysts. Factors contributing to premature deindustrialization may include shifts in global economic dynamics, technological changes, and policy decisions that impact the competitiveness of the manufacturing sector.

3.1 Key parameters associated with premature deindustrialization and productivity performance:

1) Manufacturing Share of GDP:

One key parameter is the declining share of manufacturing in the country's GDP. A premature decline in this share may indicate that the industrialization process is occurring too early relative to the country's level of development.

2) Employment in Manufacturing:

The employment levels in the manufacturing sector are crucial. A premature deindustrialization scenario often involves a decline in manufacturing employment, which can have significant social and economic consequences, particularly in terms of job opportunities and income levels.

3) Productivity in Manufacturing:

Productivity performance within the manufacturing sector is a critical parameter. If productivity growth in manufacturing is not keeping pace with other sectors, it may contribute to a relative decline in the importance of manufacturing in the overall economy.

4) Technological Progress:

Premature deindustrialization is often associated with challenges in adopting and adapting to advanced technologies. The ability of a country to integrate technological advancements into its manufacturing processes can impact its productivity and competitiveness.

5) Infrastructure Development:

The availability and quality of infrastructure, such as transportation and communication networks, play a crucial role in the competitiveness of manufacturing industries. Insufficient infrastructure can hinder the growth of the manufacturing sector and contribute to premature deindustrialization.

6) Educational Attainment:

The skill level of the workforce is essential. A well-educated and skilled workforce is better equipped to contribute to a more productive and technologically advanced manufacturing sector.

7) Globalization and Trade Policies:

The impact of globalization on the manufacturing sector and trade policies pursued by the country can influence deindustrialization. Trade policies that do not support the growth of domestic industries may contribute to premature deindustrialization.

8) Innovation and Research and Development (R&D) Spending:

The level of investment in innovation and R&D is crucial for the sustained growth and competitiveness of the manufacturing sector. Countries that invest in R&D are more likely to maintain a vibrant manufacturing base.

9) Labor Market Policies:

Labor market policies, including regulations and flexibility, can impact the ability of manufacturing firms to adapt to changing economic conditions. Stringent labor regulations may hinder the growth and competitiveness of the manufacturing sector.

10) Government Policies:

The role of government policies, including industrial policies, trade policies, and investment incentives, is significant. Proactive policies that support the growth of the manufacturing sector can mitigate premature deindustrialization.

Understanding and addressing these parameters can help policymakers design strategies to promote sustainable industrialization and economic development. It is essential to strike a balance between industrialization and the development of other sectors to achieve a diversified and resilient economy.

3.2 Premature Deindustrialization Trend in Bangladesh

The industrial economy has always been integral to the high per capita income in advanced countries. In Bangladesh there may be hidden worries of premature deindustrialization, but present data does not support premature deindustrialization in Bangladesh. Share of manufacturing in GDP has been increasing over the years. The share of manufacturing in GDP was 14.04% in the year 2000 but increased to 21.76% in 2021. This indicator does not support premature deindustrialization in Bangladesh. Again, share of manufacturing in employment was 9.53% in 2000. It was in an upward trend up to 2013, when it was 16.36%. However, the employment share saw a decreasing trend after that and was 14.93% in 2021. This is a hidden worry for Bangladesh. Analyzing the productivity growth in the manufacturing sector (%), we find that average productivity growth in the manufacturing sector was 5.32% during the years 2002–05. But it saw decreasing periods like 3.88% in 2005–2010 and 4.46% in 2010–2015. After that, during the years 2015–21, productivity growth in the manufacturing sector was 6.18%. This indication does not show a premature industrialization process in Bangladesh.

3.3 Economic Indicators to Assess Premature Deindustrialization in Bangladesh

Premature deindustrialization refers to the situation where a country experiences a decline in the share of manufacturing in its total output and employment at a lower level of income compared to what more developed countries experienced during their industrialization process. Assessing premature deindustrialization requires the examination of various economic indicators. Here are some key indicators to consider in Bangladesh:

Manufacturing Share of GDP:

Track the contribution of the manufacturing sector to the country's GDP. A declining share may indicate deindustrialization. Here is the share of manufacturing in GDP in the last 23 years.

TABLE 4

CONTRIBUTION OF THE MANUFACTURING SECTOR TO GDP (%)

Year	Contribution of the manufacturing sector to GDP (%)
2000	14.04
2001	14.18
2002	14.32
2003	14.15
2004	14.44
2005	14.74
2006	15.31
2007	15.93
2008	16.12
2009	16.48
2010	16.12
2011	16.00
2012	15.91
2013	16.44
2014	16.61
2015	16.79
2016	20.35
2017	20.08
2018	20.80
2019	21.21
2020	20.60
2021	21.24
2022	21.76

Source: World Bank (World Development Indicators)

This data shows that share of manufacturing in GDP is increasing. This feature contrasts premature deindustrialization in Bangladesh. By analyzing these data, we can say premature deindustrialization is not happening in Bangladesh.

Employment in Manufacturing:

Analyze the share of total employment in the manufacturing sector. A significant decline in manufacturing employment relative to other sectors may signal premature deindustrialization.

TABLE 5

MANUFACTURING SHARE IN EMPLOYMENT (%)

Year	Manufacturing share in employment (%)
2000	9.53
2001	9.60
2002	9.84
2003	9.99
2004	10.22
2005	10.52
2006	11.03
2007	11.50
2008	11.83
2009	12.19
2010	12.38
2011	13.49
2012	14.79
2013	16.36
2014	15.77
2015	15.18
2016	14.44
2017	14.12
2018	14.48
2019	14.62
2020	14.80
2021	14.93

Source: Asian Productivity Organization

This data shows that share of manufacturing in employment was on an upward trend until the year 2013. After that, the employment share has been on a decreasing trend. But in the previous table, share of manufacturing in GDP is shown to be increasing. Although the employment share in manufacturing is decreasing, share of manufacturing in GDP increasing means productivity in the manufacturing sector has increased.

Productivity in Manufacturing:

Examine changes in labor productivity within the manufacturing sector. If productivity is increasing while employment is declining, it may suggest a shift towards more capital-intensive industries or automation.

TABLE 6

AVERAGE PRODUCTIVITY GROWTH IN MANUFACTURING SECTOR (%)

Year	Average productivity growth in manufacturing sector (%)
2000–2005	5.32
2005–2010	3.88
2010–2015	4.46
2015–2021	6.18

Source: Asian Productivity Organization

The above table shows the average productivity growth in the manufacturing sector was 5.32% during the years 2002–2005 but saw decreasing periods like 3.88% during 2005–2010 and 4.46% during 2010–2015. After that, during the years 2015–2021, productivity growth in manufacturing sector was 6.18%. This indication shows the industrialization progress in Bangladesh.

3.4 Industry in Bangladesh

The economy recorded average industrial output growth of 8.8% in the decade up to 2023. In 2023, industrial output growth was 8.2%, down from the 9.9% reading of the prior year.

TABLE 7

VALUE ADDED BY THE MANUFACTURING SECTOR AS PERCENT OF GDP

Bangladesh	Value added by the manufacturing sector as percent of GDP
Latest value	21.76
Year	2022
Measure	percent
Data availability	1960–2022
Average	12.98
Min - Max	3.98 - 21.76

Source: World Bank

The average value for Bangladesh during 1960 to 2022 was 12.98% with a minimum of 3.98% in 1972 and a maximum of 21.76% in 2022. The latest value from 2022 is 21.76%. For comparison, the world average in 2022 based on 125 countries is 13.12%.

The importance of manufacturing in the economy of Bangladesh and other countries is measured as the value added of manufacturing as a percent of GDP. Manufacturing is part of the industrial sector of the economy. The latest value from 2022 is USD100.16 billion. For comparison, the world average in 2022 based on 125 countries is USD93.19 billion.

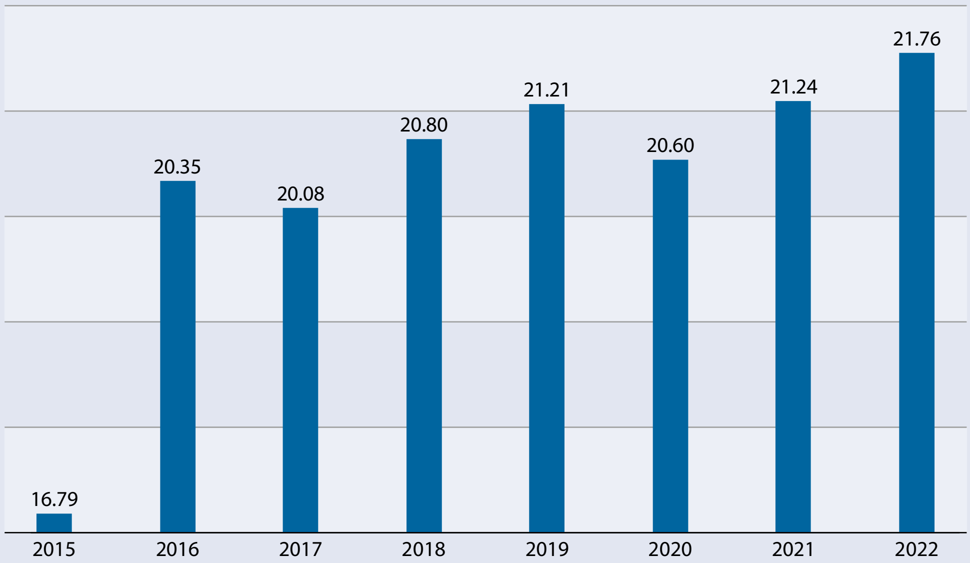
Labor productivity growth:

Labor productivity represents the total volume of output (measured in terms of GDP) produced per unit of labor (measured in terms of the number of employed persons or hours worked) during a given time reference period. The rate of participants in the labor force in the first quarter of 2023 was 61.37%. The total number of youth force in the country aged between 15–29 years is 27.38 million, of which 14.03 million are male while 13.35 million are female.

Labor productivity is important at least for four reasons. First, it drives **economic growth**.

FIGURE 1

RECENT VALUES CHART



Source: World Bank

- A highly productive economy means that we are able to:
- Produce more goods or services with the same amount of resources.
- Produce the same level of goods and services with less resources.

Second, labor productivity affects everyone.

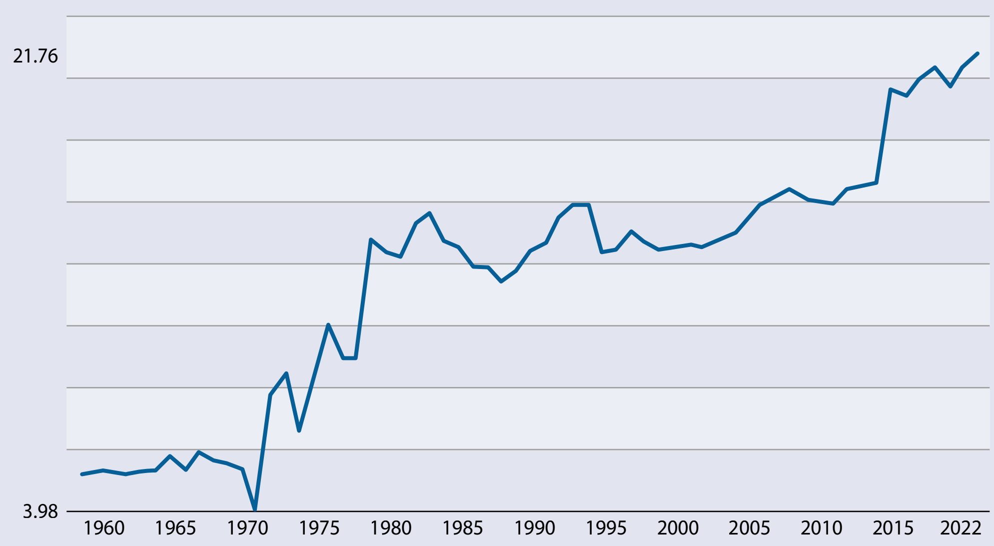
- For businesses, increased productivity brings higher profit and opportunity for more investment.
- For workers, increased productivity can translate to higher wages and better working conditions. And in the longer term, increased productivity is key to job creation.
- For the government, increased productivity results in higher tax revenues.

Third, the current state of labor productivity is important. During the past two decades, labor productivity in Vietnam grew by about 4.5% per year on average, which was the highest rate among the ASEAN countries. As a result, Vietnam narrowed down its relative gaps with more advanced ASEAN economies. But challenges remain.

- Among ASEAN countries, Vietnam's labor productivity level is still near the bottom.
- Assuming that recent productivity growth rates are maintained, Vietnam will catch up to the Philippines only by 2038, Thailand by 2069, and take far longer to catch up with many other countries.

FIGURE 2

HISTORICAL CHART



Source: World Bank

Fourth, aging population and economic integration also must be taken into consideration. Vietnam is aging rapidly. In 2045, Vietnam will face the same population aging problems as Japan does today. Vigorously boosting productivity is the only way for Vietnam to become prosperous before its population becomes old.

- Deepening economic integration, including the establishment of an ASEAN economic community, is bringing additional challenges as well as opportunities.

Bangladesh Labor Productivity dropped by 3.92% year over year in December 2022, compared with a growth of 4.44% in the previous year.

Reasons behind the deindustrialization:

Technological Advancements:

Automation and technological advancements can lead to increased productivity in manufacturing, but they may also result in job losses as machines replace human labor.

Globalization:

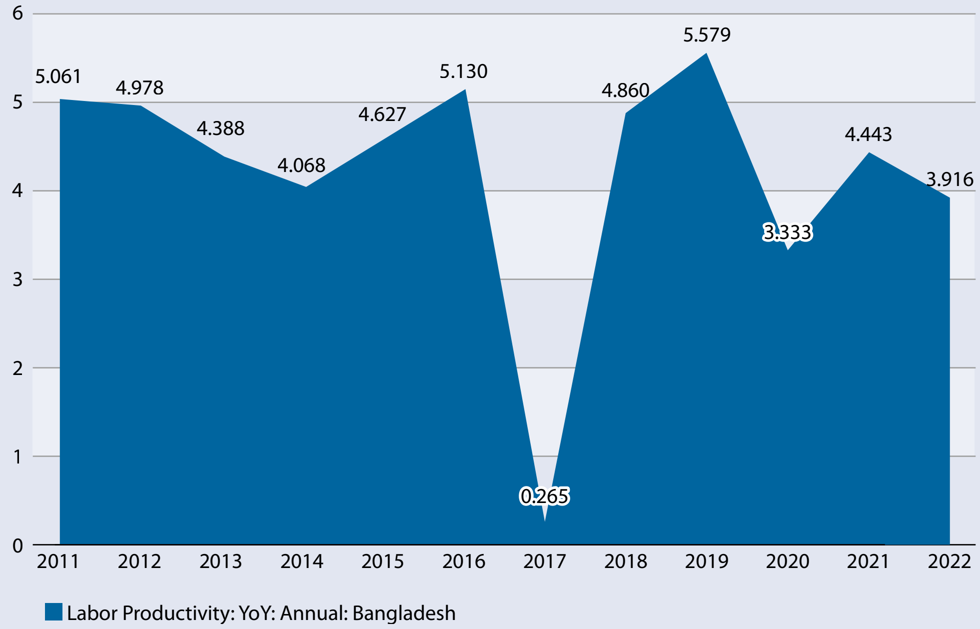
Increased global competition can lead to outsourcing of manufacturing jobs to countries with lower labor costs, affecting the industrial base of more developed nations.

Structural Changes in the Economy:

A shift towards a more service-oriented economy can lead to a decline in the manufacturing sector. This transition is often driven by factors such as increased demand for services, changes in consumer preferences, and advancements in information technology.

FIGURE 3

HISTORICAL DATA OF LABOR PRODUCTIVITY GROWTH IN 2022



Source: ceicdata.com

Trade Policies:

Trade policies that prioritize imports over domestic production can contribute to the decline of the manufacturing sector. Free trade agreements and globalization may benefit some industries but harm others.

Labor Market Factors:

High labor costs, rigid labor markets, and issues such as labor strikes can make manufacturing less competitive and contribute to its decline.

4. The Adverse Impacts of Deindustrialization

Deindustrialization typically leads to unemployment and economic difficulty. Here are some adverse impacts of Deindustrialization:

Employment Challenges:

A shrinking manufacturing sector can lead to unemployment or underemployment, particularly for workers with skills specific to that sector. This can contribute to social and economic inequalities.

Economic Vulnerability:

Overreliance on service-oriented industries without a strong manufacturing base can make an economy more vulnerable to economic downturns. Manufacturing often provides a more stable source of employment and income.

Income Inequality:

The decline of the manufacturing sector may lead to a concentration of wealth in certain industries, exacerbating income inequality between different segments of the population.

Loss of Skills and Innovation:

The decline of manufacturing may result in a loss of crucial skills and capabilities. Moreover, manufacturing often drives innovation, and a decrease in this sector may limit a country's ability to innovate and compete globally.

Trade Imbalances:

Reliance on imports for manufactured goods can lead to trade imbalances, affecting a country's economic stability. It may also result in vulnerability to external economic shocks.

Social and Political Unrest:

High unemployment, income inequality, and economic vulnerability can contribute to social and political unrest, posing challenges for the stability of a nation.

To mitigate the risks of premature deindustrialization, policymakers often focus on strategies such as investing in education and training programs, implementing favorable trade policies, promoting innovation, and adopting measures to enhance the competitiveness of the manufacturing sector.

Productivity Performance

- Premature deindustrialization impacts long-term labor productivity growth

Possible risks for developed countries: the increase in the proportion of the service industry represents professional division of labor, cross-border division of labor, changes in consumption patterns, and changes in trade structures.

Decline in Productivity Growth:

Manufacturing has traditionally been a driver of productivity growth due to its reliance on technological innovation and efficiency improvements. Premature deindustrialization can result in a decline in overall productivity growth, as other sectors that replace manufacturing may not offer the same level of productivity gains.

Skills Mismatch:
Manufacturing jobs often require specific skills, and the decline of the manufacturing sector may lead to a mismatch between the skills workers possess and those demanded by the evolving job market. This can result in higher unemployment and underemployment rates, as workers struggle to transition to new sectors.

Innovation and Research & Development (R&D) Challenges:
Manufacturing activities are closely linked to R&D efforts, driving innovation and technological progress. A decline in manufacturing may lead to reduced incentives for R&D, hindering a country's ability to stay at the forefront of technological advancements.

Trade Imbalances:
Many developed countries have historically relied on manufacturing exports to maintain trade balances. The decline in manufacturing may lead to increased reliance on service-oriented industries, potentially resulting in trade imbalances that could negatively impact the overall economic stability of a country.

Income Inequality:
Manufacturing jobs have often provided stable and relatively decent-paying employment opportunities for a broad range of skill levels. The decline in manufacturing may contribute to income inequality, as service sector jobs may not offer the same level of compensation and job security.

Loss of Strategic Industries:
Some manufacturing sectors are crucial for national security and strategic interests. Premature deindustrialization may lead to a loss of control over key industries, making a country more dependent on imports and vulnerable to disruptions in the global supply chain.

Social and Regional Disparities:
The decline of manufacturing can have uneven impacts across regions, leading to social and regional disparities. Areas heavily dependent on manufacturing may experience economic decline and social challenges, while other regions benefit from the growth of alternative sectors.

To mitigate these risks, policymakers in developed countries may need to focus on strategies that promote a balanced and diversified economy, invest in education and training programs to address skills mismatches, encourage innovation and R&D in emerging industries, and implement policies that support a smooth transition for workers affected by deindustrialization. Additionally, fostering a favorable business environment and promoting global competitiveness can help maintain a strong and resilient economy.

Possible risks for developing countries:
If the proportion of manufacturing in GDP declines too quickly, there will be the following risks: (1) decline in productivity (due to low R&D and innovation investment in the service industry); (2) decline in the proportion of employment; (3) industry linkages (4) trade deficit increase; (5) deterioration in the per capita income distribution; (6) gap between high-level and low-level talents, etc.

Premature deindustrialization can have significant implications for the long-term labor productivity growth of developing countries. While the specific challenges may vary based on the context of each country, there are some common risks associated with this phenomenon:

Limited Structural Transformation:

Manufacturing has historically played a crucial role in the structural transformation of economies, providing a pathway for moving from agrarian to industrial and service-oriented societies. Premature deindustrialization may hinder this transformation, leaving developing countries stuck in low-productivity sectors.

Low Productivity Gains:

Manufacturing activities often involve the adoption of advanced technologies and production methods, contributing to productivity gains. The premature decline of manufacturing in developing countries may result in lower overall productivity growth, limiting the ability to catch up with more advanced economies.

Employment Challenges:

Manufacturing tends to absorb a significant amount of labor, especially in the early stages of development. A rapid decline in the manufacturing sector may lead to challenges in finding alternative employment opportunities for the displaced workers, potentially resulting in higher unemployment and underemployment rates.

Skills Gap:

Manufacturing jobs often require specific technical skills, and a decline in this sector may create a skills gap if the education and training systems are not adapted to the changing economic landscape. This gap can hinder the ability of the workforce to transition to higher-productivity sectors.

Vulnerability to External Shocks:

Reliance on a narrow range of industries, especially if they are focused on raw material extraction or low-value-added activities, can make developing countries more vulnerable to external economic shocks, commodity price fluctuations, and changes in global demand.

Trade Imbalances:

If a country prematurely deindustrializes without developing alternative sectors, it may become more dependent on imports for manufactured goods. This dependence can lead to trade imbalances, currency volatility, and increased vulnerability to fluctuations in global markets.

Inequality and Social Unrest:

The decline of manufacturing jobs, which often provide stable employment with decent wages, can contribute to income inequality and social unrest. Disparities in income and opportunities may lead to social and political challenges, affecting the overall stability of a country.

Reduced Innovation and Technological Progress:

Manufacturing activities are often associated with innovation and technological advancements. Premature deindustrialization may limit a country's capacity for research and development, hindering its ability to compete globally in emerging high-tech industries.

Environmental Concerns:

Some manufacturing processes in developing countries may have lower environmental standards. A shift away from manufacturing without proper environmental regulations in place could exacerbate environmental degradation and resource depletion.

To address these risks, policymakers in developing countries may need to adopt strategies that promote economic diversification, invest in education and skills development, foster innovation, improve infrastructure, and implement policies that support the growth of competitive and sustainable industries. Additionally, efforts to enhance social safety nets and address income inequality can contribute to a more inclusive and resilient economic development path.

5. The Bangladesh government's policy measure in response to hidden risk of deindustrialization

Industrial Policy:

Bangladesh has traditionally focused on industrialization as a key driver of economic growth. The government has implemented various industrial policies to promote the development of manufacturing sectors. These policies often include incentives for new industries, investment promotion, and support for technology upgrades.

Export-Oriented Growth:

Bangladesh has a strong emphasis on export-oriented industrialization, particularly in the textile and garment sector. Policies have been geared towards attracting foreign direct investment (FDI) and encouraging the growth of industries that can compete in the global market.

Skill Development:

To address the skills gap and enhance the competitiveness of its workforce, Bangladesh has implemented policies and programs to improve education and vocational training. This is crucial for fostering a skilled labor force that can contribute to the growth of high-value industries.

Infrastructure Development:

Investments in infrastructure, such as transportation, energy, and communication networks, play a vital role in supporting industrialization. The government of Bangladesh has been working on improving infrastructure to facilitate the growth of industries and enhance overall economic productivity.

Innovation and Technology Adoption:

Policies promoting R&D, innovation, and the adoption of advanced technologies can help industries stay competitive. Bangladesh has shown efforts to encourage technology transfer and innovation in various sectors.

Diversification Strategies:

To reduce dependence on a few key industries, there have been initiatives to diversify the industrial base. This involves supporting the growth of non-traditional sectors and encouraging entrepreneurship and innovation in emerging industries.

Trade Policies:

Trade policies that facilitate market access, reduce trade barriers, and promote a conducive global trading environment can contribute to the growth of industries. Bangladesh has engaged in international trade agreements and partnerships to enhance market access for its products.

Labor Market Reforms:

Policies aimed at creating a flexible and efficient labor market can contribute to industrial growth. This involves reforms in labor laws, ensuring a healthy work environment, and addressing labor-related challenges.

Environmental Sustainability:

As industries grow, there is an increasing focus on sustainable development. Policies promoting environmentally friendly practices and compliance with international environmental standards are essential.

It is important to note that the effectiveness of these policies depends on various factors, including the implementation capacity of the government, global economic conditions, and the ability of industries to adapt to changing circumstances. For the latest and most accurate information, refer to recent policy documents and reports from official sources in Bangladesh.

6. Conclusion and Suggestions

In conclusion, understanding and addressing the nuances of premature deindustrialization are imperative for Bangladesh's sustainable development. While challenges exist, including employment shifts and productivity concerns, the data indicates a trajectory of industrialization rather than premature deindustrialization. Policymakers must focus on enhancing productivity, technological adaptation, and infrastructure to ensure Bangladesh's continued economic growth and resilience. The government can take countermeasures for the risk of premature deindustrialization. The government may consider industrial policy, export-oriented growth, skill development, infrastructure development, innovation and technology adoption, diversification strategies, trade policies, labor market reforms, and environmental sustainability to meet the challenges of deindustrialization. The government should also take up some productivity-related policies like investment in education and skills development, R&D investments, infrastructure development, access to finance, technology transfer and adoption, innovation clusters and eco-systems, incentives for research and innovation, regulatory reforms, export promotion and diversification, social dialogue and stakeholder engagement.

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CAMBODIA

Executive Summary

This paper examines the impact of premature deindustrialization in Cambodia, a country that was economically strong before COVID-19 in 2020. Premature deindustrialization presents a peril to future growth prospects, competitiveness, and labor productivity. A desk review was utilized in this report to identify and analyze trends, gaps, and potentials for premature deindustrialization in Cambodia. The results have shown that Cambodia does not face problems related to premature deindustrialization at this time; it can circumvent challenges and construct robust economic communities if it makes use of technology and policies that foster skill development and promote innovation. Between 2000 and 2018, the labor productivity of agriculture showed signs of improvement, while manufacturing experienced fluctuation and services witnessed a decrease. Cambodia can boost its economy and become more competitive in the global arena by investing in education, infrastructure, and technology to reduce productivity disparities. Investment in education and training to reskill and upskill the core workforce is mandatory, with public-private partnerships playing a pivotal role in the country's economic development and the prevention of premature deindustrialization. To enhance this, government initiatives such as technology demonstration centers and other policies and legal frameworks would lead to business growth and be a core part of the market supply chain.

1. Introduction

Cambodia was economically strong before COVID-19 in 2020. Between 1998 and 2019, textile exports and tourism boosted Cambodia's GDP by 7.7%. Forecasts for 2023 economic growth are 5.2% [1]. This has made Cambodia one of the fastest-growing nations. Therefore, the country sought upper middle-income status by 2030. Cambodia's labor-intensive economy led to many low-tech exports in 2003, although high-tech exports rose dramatically. Technology exports are expanding, showing Cambodia's move from a labor-intensive to a tech-focused economy. This demonstrates its economic transition and technical advancement [2]. Over the last two decades, technology exports have increased. In this context, information technology has helped Cambodia export electronics and industrial components, proving their ability to develop high-tech items. Thus, Cambodian exports might reach USD20.30 billion in 2022 [3]. The World Bank [4] estimated 2.2% high-tech manufactured exports from Cambodia in 2020. Technology in Cambodia's export business has advanced due to multinational corporation alliances and global value chains.

2. Methodology

There are several steps that may be done on a desk review, such as selecting, reading, and assessing the literature for secondary data. This step's goal is to:

- Recognize the tendencies to the country's context
- Collect relevant data and information for the report
- Determine important themes, gaps, and possibilities via the analysis of accessible secondary data.

3. Economic Growth Background and (De)industrialization Trend

3.1 Cambodia Gross Domestic Product Growth Rate

In the year before the onset of COVID-19 in 2020, Cambodia had significant economic growth. After achieving lower-middle-income status in 2015, the country established the objective of obtaining upper middle-income status by the year 2030. Cambodia's economy saw significant growth, with an average annual rate of 7.7% between 1998 and 2019, mostly driven by the export of garments and the tourist sector. This growth trajectory has positioned Cambodia as one of the world's most rapidly expanding economies. The economy of Cambodia had ongoing signs of recovery during the year 2022. The resurgence of the services industry is gaining momentum, mostly propelled by accumulated consumer demand. The expected economic growth for the year 2023 is estimated to be 5.2%. Potential negative factors to consider include a significant deceleration in international demand, more constraints on global financial conditions, and a resurgence of volatility in oil prices. China's openness provides Cambodia with the potential to enhance its travel and tourism sector and attract foreign direct investment (FDI) inflows. To ensure the continuation of growth that benefits the impoverished population, promotes competitiveness, effectively manages natural resource riches, and enhances the availability and quality of public services, Cambodia must implement significant changes. Cambodia now has a significant disparity in its infrastructure, necessitating a stronger emphasis on enhancing connectivity and making investments in both rural and urban infrastructure. To achieve more economic diversity, it is essential to cultivate entrepreneurial endeavors, enhance the use of technological advancements, and develop new skill sets to effectively respond to evolving demands within the labor market. The presence of accountable and responsive governmental institutions will also be of utmost importance. Enhancing investments in human capital will be of paramount significance in attaining Cambodia's ambitious objective of attaining middle-income status by the year 2030 [4].

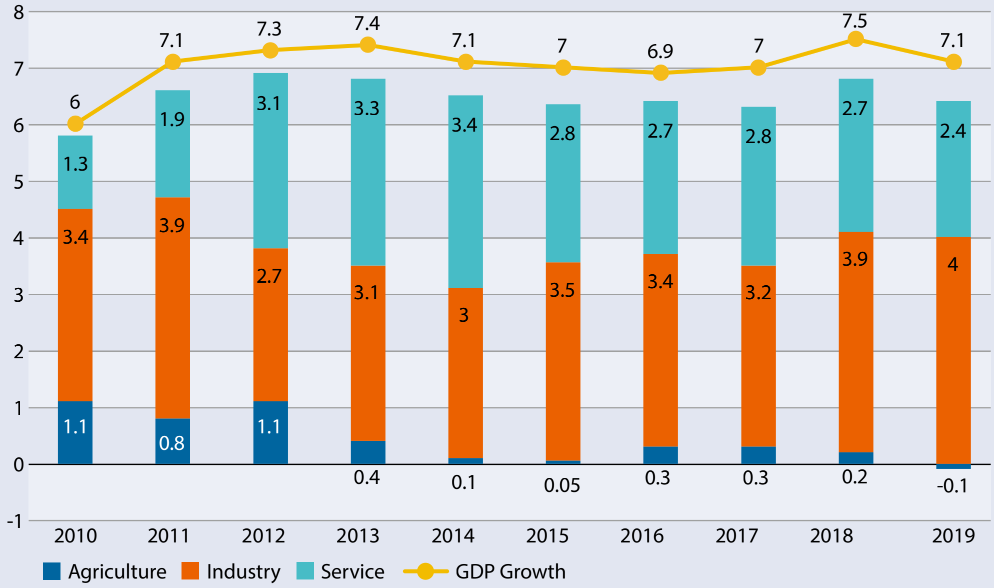
3.2 Contribution to GDP Growth by Sector

The resurgence of the services sector is gaining momentum, primarily propelled by the release of accumulated consumer demand. It is anticipated that the economic growth rate for the year 2023 would reach a level of 5.2%. Potential negative factors include a significant deceleration in international demand, more constraints on global financial conditions, and a resurgence of oil price volatility. China's openness provides Cambodia with the potential to enhance its travel and tourism sector and attract FDI inflows. In the foreseeable future, it is anticipated that the economy will gradually revert to its potential level, with a growth rate of 6%. The newly ratified free trade agreements are anticipated to enhance goods and services exports and attract significant FDI. Additionally, there is an expected increase in both private and public investment, particularly through public-private partnerships, in critical physical infrastructure such as seaports and roads. These developments occurred during the COVID-19 period and are projected to continue in the future. Furthermore, structural reforms are also anticipated to contribute to the strengthening of these factors [4].

Below, Figure 1 illustrates that Cambodia managed to sustain high GDP growth at around 7% over the past decade. Moreover, the contribution of industry to economic growth steadily increased over the period of 2012–19. This reveals that industry is the main sector which has contributed significantly to the GDP growth of Cambodia over the last decade [5].

FIGURE 1

REAL GDP GROWTH AND SECTORAL CONTRIBUTION



Source: [5]

4. Deindustrialization Trends

4.1 Trends of Agriculture / Manufacturing/ Services Shares in Value Added Term and in Employment Term

4.1.1 Value Added Trends

Over the past 20 years, there has been an evident shift in the proportion of value added by various sectors. Services had historically dominated, while agriculture has decreased, and manufacturing has slightly fluctuated but keeps its value steady at around 18% of GDP.

4.1.1.1 Agriculture

Cambodia's GDP share of agriculture is the highest among the lower-middle-income countries [6]. Whilst agriculture accounted for 32% of total value added in 2003, it decreased to 31.6% by 2013 before experiencing a dramatic drop to 22% by 2018, reflecting its lessened importance within Cambodia's economic structure over recent decades. The agriculture value added was 22.8% in 2021 and 21.9% in 2022 [7].

4.1.1.2 Manufacturing

Cambodia's economy saw manufacturing contribute 18% of GDP in 2003; by 2013, however, that share had decreased to 15% and 16% by 2018. The manufacturing value added increased to 18% in 2021 and 2022 [8]. These data points demonstrate fluctuations in its importance over time in Cambodia's economy.

4.1.1.3 Services

Over the same timeframe from 2003 to 2018, services have experienced continuous growth. In 2003, it made up 38.2% of GDP; by 2013, that had slightly increased to 38.5% and stood at 39.5% in 2018. The services sector dropped down to 34.2% of GDP in 2021 and 33.7% in 2022 due to the COVID-19 pandemic [1].

4.1.2 Employment Trends

4.1.2.1 Agriculture

In 2013, agriculture employed 50%, a decrease from 66% in 2003 of the total employment. This number decreased significantly to 39% by 2018 due to significant job loss in this sector. Agriculture employment slightly increased in 2019 and 2020, but then dropped to the previous value of 39% of the country's total employment in 2021 [9].

4.1.2.2 Manufacturing

Employment opportunities within manufacturing/industry increased from 12% in 2003, 19% in 2013 to 25% in 2018. The number decreased to 24% in 2019, but then return to its previous value of 25% in 2020 and 2021 [10]. This demonstrates an upward trend in job creation within this sector over that time.

4.1.2.3 Services

Cambodia's services sector has shown a consistent upward trend in employment since 2003, increasing from 22% in 2003 to 31% in 2013. The service employment share kept increasing to 36% by 2018, signifying significant job creation from this sector. Looking at more recent data, employment landscape in 2019 showed the services sector employing 36% of workers; this proportion held steady throughout 2020 and 2021 [11]. This data highlights Cambodia's shifting employment landscape as it shifts toward becoming increasingly diverse economically with increased emphasis on the services sector.

TABLE 1

TRENDS OF AGRICULTURE/MANUFACTURING/SERVICES SHARES IN VALUE ADDED AND IN EMPLOYMENT TERM

Year	Agriculture (% of GDP)	Manufacturing (% of GDP)	Services (% of GDP)	Agriculture (% of Employment)	Manufacturing (% of Employment)	Services (% of Employment)
2003	32	18	38.2	66	12	22
2013	31.6	15	38.5	50	19	31
2018	22	16	39.5	39	25	36
2021	22.8	18	34.2	39	25	36
2022	21.9	18	33.7	-	-	-

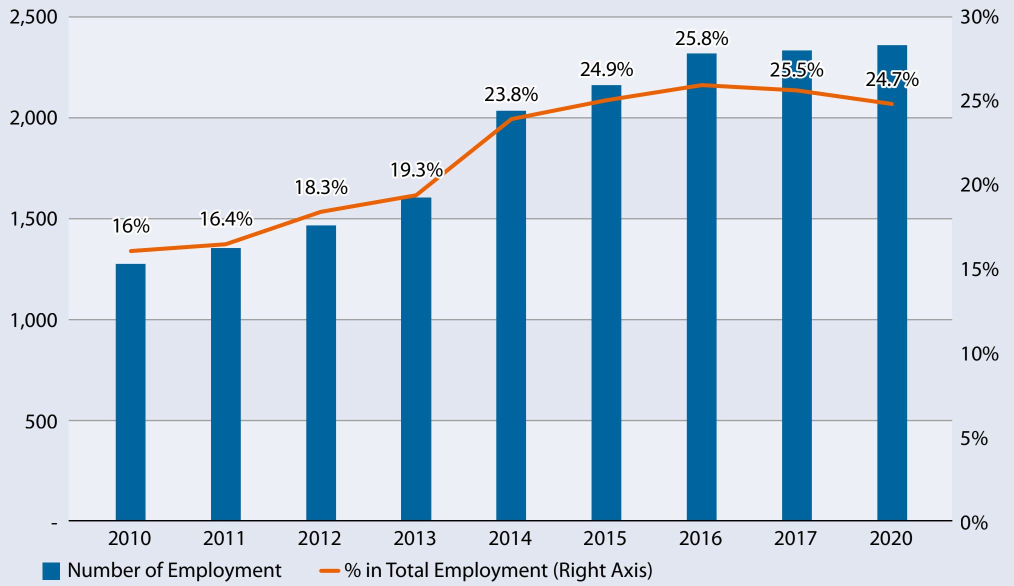
Source: [1] [7] [8] [9][10][11]

4.2 Trend in Labor Productivity by Industry

There was an increase from 347,000 jobs in 2010 to 487,000 jobs in 2020 in the non-garment manufacturing sector. Concurrently, there has been a good trend in employment within the industrial sector, with 1.3 million jobs falling short of 2.4 million jobs throughout that time frame (Figure 2). Simultaneously, with the implementation of the Cambodia Industrial Development Policy in 2015, the proportion of industrial employment in total employment also increased slightly; however, in 2020, this growth was offset by a decline in external demand, particularly for apparel, footwear, and travel goods as a result of the COVID-19 pandemic, as well as a disturbance in supply chains [5].

FIGURE 2

SHARE OF INDUSTRIAL EMPLOYMENT IN TOTAL



Source: [5]

4.3 Decomposition of Labor Productivity in Within Effect and Structural Change Effect

4.3.1 Agriculture

Labor productivity in agriculture has shown continuous decrease throughout its history. From a value of 2.0 (thousands of USD per person) in 2000, labor productivity of agricultural sector in Cambodia has increased to 3.6 (thousands of USD per person) in 2010 and 5.4 (thousands of USD per person) in 2018 [12]. Technology adoption has been an influential force behind the increase of labor productivity in agriculture [13]. Such shifts point towards structural transformation while diminishing reliance on traditional labor-intensive methods.

4.3.2 Manufacturing

Labor productivity in manufacturing has fluctuated in the period from 2000 to 2018. From a value of 9.07 (thousands of USD per person) in 2000, labor productivity of manufacturing sector in Cambodia has decreased to 8.31 (thousands of USD per person) in 2010, then increased to 12.29 (thousands of USD per person) in 2018 [12]. Technological advancement and capital investment have both played an essential role in increasing labor productivity in manufacturing. Increased adoption of modern manufacturing techniques and automation has increased efficiency during production processes, bringing advanced technology and managerial practices that facilitate structural transformation within manufacturing to increase its capacity for higher value-added activities.

4.3.3 Services

Labor productivity in the services sector has decreased from 2000 to 2018. From a value of 8.52 (thousands of USD per person) in 2000, labor productivity of the services sector in Cambodia has dropped to 8.32 (thousands of USD per person) in 2010 and 6.81 (thousands of USD per person) in 2018 [12]. The services sector encompasses an expansive array of activities, each with their own productivity dynamics. Certain subsectors of services like finance and information technology have experienced impressive labor productivity gains due to technology adoption and skilled employees, contributing further to its structural transformation [14].

TABLE 2

LABOR PRODUCTIVITY IN AGRICULTURE, MANUFACTURING AND SERVICES SECTORS

Year	Agriculture (thousands of USD per person)	Manufacturing (thousands of USD per person)	Services (thousands of USD per person)
2000	2.0	9.07	8.52
2010	3.6	8.31	8.32
2018	5.4	12.29	6.81

Source: [12]

Cambodia has experienced mixed trends in labor productivity across its industrial sectors. Agriculture has shown signs of improvement, manufacturing experienced fluctuations and services decreased. Each sector was affected by technological advancements, modernization efforts, economic policies and productivity dynamics which vary from sector to sector; understanding these trends is critical in combatting premature deindustrialization and increasing productivity and economic growth.

4.4 Changes in Composition of Exports by Level of Technology

Over the last twenty years, Cambodia's exports have undergone an obvious transformation in terms of technological sophistication. Data indicates a sharp uptick in products with advanced technological components; 2003 saw many low-tech exports due to Cambodia's dependence on labor-intensive industries. Over the intervening two decades there has been an incremental change towards more technological products exported as exports. Statista (2023) [3] reports that the exports of products in Cambodia are estimated to reach USD20.30 billion in 2022. According to the World Bank, high-technology exports (% of manufactured exports) in Cambodia was reported at 2.2831% in 2020 [4]. Partnerships between multinational corporations and integration into global value chains has had an enormous effect in driving technological innovations within Cambodia's export sector. Cambodia has made great strides forward through digitalization and information technology advances, expanding its export portfolio with higher-valued items such as electronics and machinery components, which demonstrates their increasing capability in producing goods with technological content. Overall, Cambodia's data demonstrates an upward trend in technology exports, showing its progress in transitioning away from labor-intensive industries towards technology-focused sectors [2]. This shift demonstrates its changing economic landscape as well as commitment to technological progress and advancement.

4.5 Sectoral Labor Productivity in Relative to High Income Countries

4.5.1 Agriculture

Comparing labor productivity across Cambodia's sectors to those of high-income nations can shed valuable insight into its global economic position. Cambodia stands in stark contrast to high-income countries when it comes to labor productivity, especially within its agriculture sector, where much of the population works. Cambodia's growth has been impressive in comparison with high-income nations where labor productivity tends to be much greater. Comparing to Singapore, a high-income nation of ASEAN, labor productivity of the agricultural sector in Cambodia was 3.6 (thousands of USD per person) in 2010, while Singapore gained a higher value of 17.3 (thousands of USD per person). In 2018, Cambodia's labor productivity in the agricultural sector was still lower at a value of 5.46 (thousands of USD per person) comparing to Singapore's value of 9.2 (thousands of USD per person) [12]. Singapore employs cutting-edge technologies and vertical farming methods resulting in remarkable levels of agricultural productivity despite having limited agricultural land available. Labor productivity levels for agriculture sector employees lag behind counterparts from higher-income nations due to differences in technology adoption, mechanization and overall farming practices.

4.5.2 Manufacturing

Cambodian manufacturing firms tend to experience lower labor productivity compared to high-income nations due to limited access to advanced manufacturing technologies and lower levels of automation. According to the APO [15], Cambodia lags behind in manufacturing productivity compared to economies such as the Republic of Korea (ROK) and Japan, both boasting significantly higher manufacturing productivity levels in 2018. The ROK recorded USD130,260.00 while Japan posted USD113,408.00 further emphasizing this disparate manufacturing output between these high-income nations and Cambodia [15]. Comparing to Singapore, labor productivity of manufacturing sector in Cambodia was 8.31 (thousands of USD per person) in 2010, while Singapore gained a much higher value of 169.59 (thousands of USD per person). In 2018, Cambodia's labor productivity in the manufacturing sector was still far lower at a value of 12.29 (thousands of USD per person) comparing to Singapore's value of 264.66 (thousands of USD per person [12]. However, Cambodia is presently engaged in the Technical and Vocational Education

Training (TVET) 1.5M policy measure to boost productivity and access better job opportunities. This measure aims at providing technical and vocational training at no cost to around 1.5 million young individuals from poor and vulnerable households throughout the country [16].

4.5.3 Services

Cambodia's services sector is struggling to match the productivity levels seen in high-income nations. Comparing Cambodia with two high-income nations such as Japan and the ROK, two distinct patterns emerge regarding productivity and employment trends. Cambodia experienced an outstanding 6.7% productivity surge, particularly within its services industry where employment rose from 31.2% in 2013 to 36.01% by 2018 [15]. Comparing to Singapore, labor productivity of the services sector in Cambodia was 8.32 (thousands of USD per person) in 2010, while Singapore gained a very higher value of 132.08 (thousands of USD per person). In 2018, Cambodia's labor productivity in the services sector was still far lower at a value of 6.81 (thousands of USD per person) comparing to Singapore's value of 156.91 (thousands of USD per person) [12]. This is particularly evident in knowledge intensive services like finance and IT where advanced technologies and skilled labor force play an essential part in productivity levels.

Comparing sectoral labor productivity between Cambodia and high-income countries reveals areas for potential improvement and growth. By strategically addressing factors influencing productivity levels, Cambodia can advance economic development and competitiveness on an international stage, this requires investments in technology, education, and infrastructure to close productivity gaps.

5. Impact of Premature Deindustrialization on Productivity Performance

5.1 Assessment of Premature Deindustrialization Risk

Premature deindustrialization is marked by a decline in manufacturing's percentage of GDP, indicating its growing role in economic growth and employment. According to a study by Wickramaratne, manufacturing employment declines at significantly lower per capita income levels in developing nations than it does in advanced economies, historically taking place at around USD10,000.00 but now beginning as early as USD3,000.00 [17]. Competition from low-cost industrial centers, limited technical improvement, and infrastructural development are causing this downturn [18]. An additional key contributor to premature deindustrialization is an uneven distribution of technological advancements across various sectors. While Cambodia has made strides toward adopting modern technologies, these advancements have not reached every sector evenly, and manufacturing often lags behind. Such technological disparity hinders productivity growth and makes it harder for Cambodia to remain competitive on global markets.

Based on trends seen in data, Cambodia does not seem to be at risk of premature deindustrialization in the coming years. Manufacturing is still an essential contributor to Cambodian economic development and the data does not show the decrease of its share to GDP. Although it experienced fluctuations in the period of the last 20 years due to various factors such as shifts in global demand, the domestic economic conditions, and government policies, such as tax incentive scheme, free trade agreements with neighboring and regional partners to promote exports and attract FDI, and Cambodia has favorable tariffs on exports to main countries including the US, EU and UK [19-20]. Otherwise, manufacturing employment increased from 12% in 2003 to 25% in 2021. Additionally, the shares of the services sector to GDP have decreased gradually from 38.2% in 2003 to 33.7% in

2022, although its employment increased steadily from 22% in 2003 to 36% by 2021 [1]. However, the data of the services sector might have been affected by the COVID-19 pandemic. Hence the analysis of premature deindustrialization risk may need more recent and future data in the post-pandemic time for an accurate assessment.

5.2 Issues Posed by Premature Deindustrialization Related to Productivity and Economic Growth: An Empirical Analysis

Deindustrialization presents Cambodia with numerous challenges in terms of productivity and overall economic growth if it happens to appear prematurely, yet previous studies highlighted its complexity.

There are several causes of premature deindustrialization in developing economies including higher trade openness, lack of a considerable industrial base, lack of strategic development policies, and lack of sufficient domestic resources to finance investment [21].

A case study of China found that deindustrialization has a significantly negative effect on economic growth, which hinders the sustainability and magnifies the vulnerability of economic development in the long term. This phenomenon leads to decreasing demand and rising skill requirement for workers as a direct and visible impact [22].

5.2.1 Productivity Challenges

A major risk associated with early deindustrialization is stagnation or decline in overall productivity [18]. When industries transition away from manufacturing, which typically provides higher productivity levels, and toward the services sector instead, which may not offer comparable levels of productivity to manufacturing, overall productivity could decline. This, in turn, has implications for income levels as well as national competitiveness on global markets.

5.2.2 Labor Market Dynamics

Deindustrialization can have significant negative repercussions for labor market dynamics, leading to difficulties with job creation and income generation. If manufacturing declines prematurely, displaced workers may need to transition into alternative sectors such as services or higher-value sectors [18]. Unfortunately, this can create new joblessness rates or underemployment and have more widespread social and economic ramifications.

5.2.3 Economic Diversification

An additional risk associated with premature deindustrialization lies in an over-reliance on one or two industries, especially if services do not have as strong a capacity for absorbing labor and creating value-add. Without economic diversification measures in place, Cambodia could become vulnerable to external shocks or shifting global market needs [23].

5.3 Country Case Study on Specific Issues Relating to Premature Deindustrialization

According to the available data and the analysis above, although Cambodia does not seem to face any specific issues relating to premature deindustrialization yet, Cambodia can still be proactive to avoid the risk by learning from other nations' experiences. Japan and the ROK, for instance, are two nations which have managed to maintain healthy manufacturing sectors despite being high-income nations by investing heavily in technology adoption, innovation, and workforce skills training. These investments allowed Japan and the ROK to maintain high manufacturing productivity over time [15].

A study on premature deindustrialization in advanced, emerging and developing economies brought up the case of East Asian countries which can be considered as a good example that these countries can exclude themselves from premature deindustrialization risk. The study found that strategic and proactive industrial, trade, and financial policies have led these countries to create internationally competitive and technologically upgraded industrial bases without obeying their static comparative advantage positions and appear to have achieved much stronger linkages to the Global Value Chains which allowed them to avoid premature deindustrialization [21].

Cambodia can take inspiration from these countries examples by striking a balance between manufacturing and services and investing heavily in tech adoption education infrastructure and development strategies to avoid premature deindustrialization of economic growth while continuing economic expansion over time. By employing technology, investing in skills development programs, and encouraging innovation initiatives, Cambodia can avoid premature deindustrialization’s obstacles while building resilient and diverse economic communities.

6. Policy Recommendation

There is no silver bullet when it comes to addressing the complexities of premature deindustrialization strategy. The optimal policy will differ from case to case due to unique conditions. To avoid premature deindustrialization and enjoy the advantages of sustainable economic development in Cambodia, the governments and private sectors are increasingly seen as having a role to play in providing support. Cambodia has a comparative advantage in the production of labor-intensive goods such as garments and electronics. However, as wages increase and automation becomes more widespread, Cambodia is likely to lose some of its competitiveness in these sectors.

A study by the Ministry of Industry, Science, Technology & Innovation of Cambodia also suggested that Cambodian enterprises shall embrace technological advancement to contribute to industrializing the country. This study suggested some strategies for transformation including leveraging technology adoption and transfer, having National Technology Platforms for sharing knowledge and skills, and increasing human capital for industrial innovation. Various innovative technologies are recommended for adoption and transfer, including Mobile-first strategy, Cloud-based solutions, IoT and sensor technology, Radio-frequency identification technology, Data analytics, Cybersecurity, and Machine-to-Machine [24].

The Royal Government of Cambodia has endorsed various policies and legal frameworks in the short, medium, and long term to develop the country’s industrial sector as well as to keep industrializing the economy to achieve the vision of becoming an upper-middle-income country by 2030 and a high-income country by 2050. These policies and legal frameworks include:

- Pentagonal Strategy-Phase I

- Cambodia Industrial Development Policy 2015–2025

- National Policy on Science, Technology & Innovation 2020–2030

- Cambodia’s Science, Technology & Innovation Roadmap 2030

- Cambodia Digital Economy and Society Policy Framework 2021–2035

The following are the specific policy recommendations, which are classified into supply side, demand side, and environmental side. To support these specific policy recommendations, the government also injects the Skills Development Fund (SDF) project to promote demand-driven and sustainable skills development ecosystems or other training fund programs to respond to the contemporary needs of industry and society.

6.1 Supply Side Policy

Cambodia needs to invest in education and training to reskill and upskill the core workforce known as soft infrastructure development that meets the needs of the transformation sector as the foundational policy. The establishment and upgrading of labor market needs, as well as the generation of qualified workers and technicians, have both contributed to TVET's role in advancing socioeconomic conditions and readiness.

6.2 Demand Side Policy

The term "public-private partnerships" refers to intricate agreements made between the government and private companies to pursue goals that neither sector could achieve on its own. Public-private partnerships have the potential to play an essential role in Cambodia's economic development and the prevention of premature deindustrialization. These partnerships use the expertise and resources of the private sector to find solutions to problems that arise in the realm of skill deliveries through employment matching schemes to support the global value chain.

6.3 Environmental Side

Cambodia needs to inject new technology into new manufacturing sectors, such as the automotive electronics industry, to facilitate technology adoption through Cambodian government initiatives, such as technology demonstration centers and technology transfer programs and other policies and legal frameworks that provide businesses with access to new technologies and support their adoption. This has the potential to lower both the risk and the expense involved with implementing new technology.

To support the above, the government adopted the Law on Protection of Undisclosed Information, Sub-Decree Implementing Special Border Measures in the Trademark Law; and Sub-Decree Implementing the Copyright Law for protection and enforcement of investors intellectual property rights for both local and foreign-owned businesses. Furthermore, the government also awards tax incentives to stimulate investment in technology-intensive industries as prescribed in the Law on Investment [19].

In the meantime, the government has been hard at work on policies like the STI Parks, Technology Transfer Law, and Technology and Innovation Clusters to entice both international and local investors in the country's cutting-edge technology sector.

Conclusion

Even though Cambodia does not seem to be facing any problems related to premature deindustrialization at this time, according to the data that is currently available and the analysis that was shown above, Cambodia may still be proactive to prevent the danger by learning from the experiences of other countries. Cambodia can circumvent the challenges posed by premature deindustrialization and construct economic communities that are both robust and varied if it makes use of technology, makes investments in programs that foster the development of relevant skills, and promotes innovation. There is a growing consensus that governments and private sectors both have a duty to play in terms of providing supports, which has led the Cambodia perspective to be a smart manufacturing center and a core part of global supply chain.

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INDIA

Executive Summary

The Indian economy has made impressive strides in the last 22 years, and its GDP has been growing faster than many other countries despite a short setback due to the COVID-19 pandemic. However, the GDP has been driven largely by the Services sector, contributing 60% while the shares of Agriculture and Manufacturing are 18.8% & 14.04%, respectively, for the year 2021. There has been a steady decrease in the shares of Agriculture and Manufacturing to GDP for the past 30 years, while the share of Services has increased sharply. The shares of employment are also showing a similar trend of increase in Services and decrease in Agriculture and Manufacturing. Despite the efforts of central and state governments to mobilize foreign direct investments (FDIs) into large scale manufacturing, the average share of FDIs in manufacturing has been limited to 12% in the last 22 years. The share of manufactured goods in exports has remained constant at about 70%, of which, goods from low technology & medium low technology manufacturing industry constituted 60%. Labor Productivity (LP), including that of manufacturing, has been growing, with capital & TFP contributing to the growth. The growth rate of gross value added (GVA) from Manufacturing has been declining steadily over the last 20 years. The average rate of growth of 'industries in operation' has been less than 1% in the last 5 years. Based on these trends and empirical evidence in the past from similar situations in other countries, it can be concluded that India is experiencing 'premature deindustrialization.' The countermeasures of the government, such as production linked incentive scheme, the Make in India programme, etc., are showing positive impacts, but a much larger effort will be required to reverse this trend of premature deindustrialization.

1. Economic Overview and Analysis

The Indian economy has moved on after its encounter with the pandemic, staging a full recovery in FY2022 ahead of many nations and positioning itself to ascend the pre-pandemic growth rate in 2023. Yet in the current year (FY23), India has also faced challenges of reining in inflation caused by the European strife. The challenge of the depreciating Indian rupee, although better performing than most nations, still persists. Despite this, agencies worldwide continue to project India as the fastest growing major economy at 6.5–7.0% in FY23. These optimistic growth forecasts stem in part from the resilience of the Indian economy, seen in the rebound of private consumption seamlessly replacing the export stimuli as the leading driver of growth. The uptick in private consumption has also given a boost to production activity, resulting in an increase in capacity utilization across sectors. The rebound in consumption was engineered by the near-universal vaccination coverage by the government that brought people back to the streets to spend on contact-based services such as restaurants, hotels, shopping malls and cinemas, among other things. The world's second largest vaccination drive, involving more than 2 billion doses, also served to lift consumer sentiments that may prolong the rebound in consumption.

The economic growth in FY22 & 23 has been principally led by private consumption and capital formation. It has helped generate employment, as seen in the declining urban unemployment rate. The capital expenditure of the central government, which increased by 67% in FY23, is another reason for the growth of the economy. The recovery of micro, small, and medium enterprises (MSMEs) is proceeding fast, as seen in their contribution to the goods and service tax (GST). The food security of the country has also been endorsed by UNDP. Overall, the Indian economy is moving in the planned direction to achieve 'developed country' status by 2047 [1].

1.1 Background information on Economy and Productivity

1.1.1 GDP and GDP per capita, Growth rates, Contribution to GDP growth

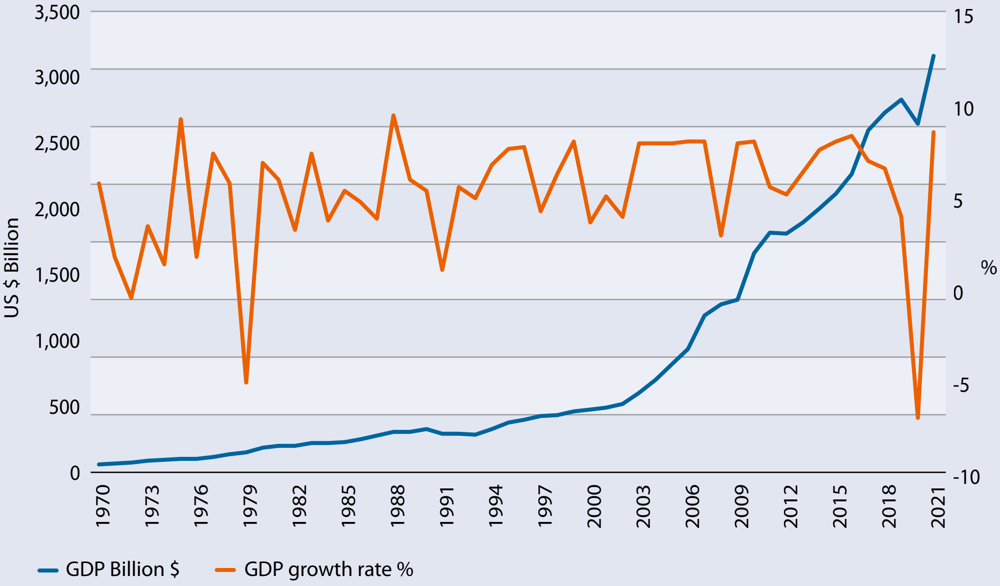
The GDP of the country has been growing consistently, at over a 6% rate for most part of the last 20 years. The GDP at current prices has reached USD4 trillion in October 2023, making it the fourth largest economy in the world. IMF has projected India's growth rate at 6.5% until 2028, at double the global rate of 3.5%. As per the India@100 document, the country's GDP is expected to reach USD26 trillion and become the third largest economy in the world by 2047, the hundredth year of India's independence.

The GDP per capita has increased from USD114.00 in 1970 to USD2249.00 in 2021. There has been a steep rise in both GDP and per capita GDP from 2000 onwards, as can be seen in Figure 2. As per GDP projections, the GDP per capita of the country is expected to reach USD15,000.00 by 2047, making India a middle-income country. The period-wise average per capita GDP is given below;

Period	Average GDP per capita (US$)
1970–90	246
1991–2000	390
2001–10	811
2011–21	1,753

FIGURE 1

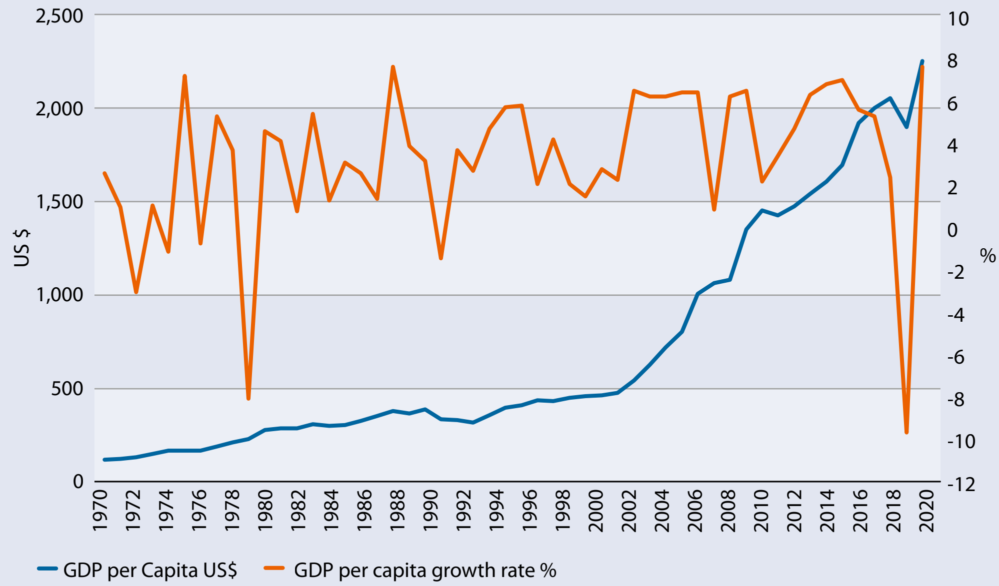
GDP & GDP GROWTH RATE



Source: APO Productivity Database 2023 v1 & National Statistics Office

FIGURE 2

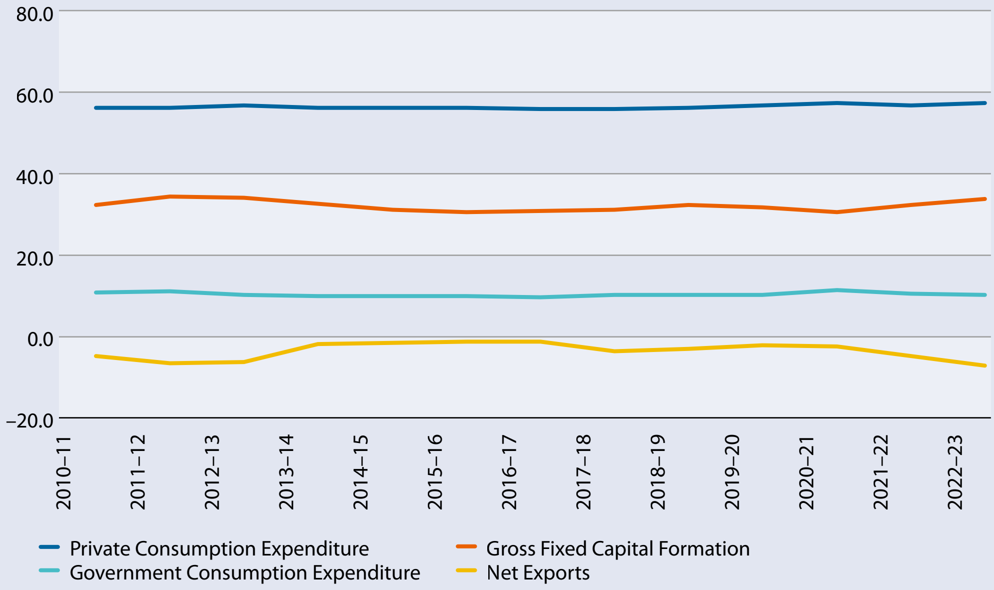
GDP PER CAPITA PERFORMANCE



Source: APO Productivity Database 2023 v1 and National Statistics Office

CHART 1

FACTORS CONTRIBUTING TO GDP (EXPENDITURE SIDE)



Source: Economic Survey 2022–23, Statistical Appendix

Contribution to GDP growth

The factors contributing to GDP, on the expenditure side, are given in Chart 3. Private consumption has been consistently accounting for 56% of GDP, while gross fixed capital formation has come down from 34% to 31% in the last decade. Government expenditure has remained around 10%, whereas net exports have remained negative right through the last few decades.

The sources of Output growth, on the production side, is given in Table 1.

TABLE 1

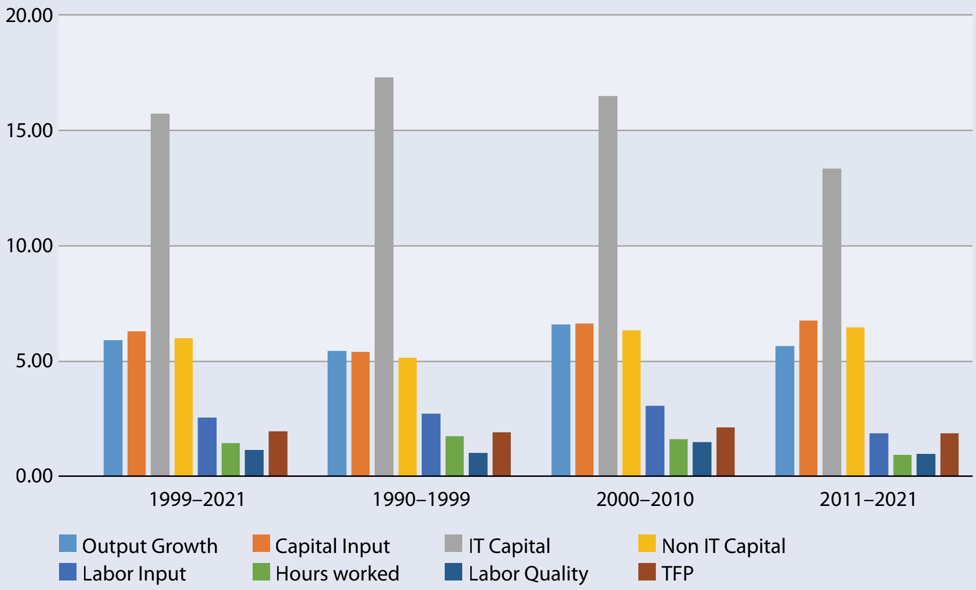
SOURCES OF GDP GROWTH PERIOD 1990–2021 & SUB-PERIODS

Contribution to Growth (%)								
Period	Output Growth	Capital Input	IT Capital	Non IT Capital	Labor Input	Hours worked	Labor Quality	TFP
1990–2021	5.92	2.35	0.18	2.16	1.61	0.93	0.70	1.96
1990–99	5.46	1.68	0.11	1.57	1.87	1.19	0.67	1.91
2000–10	6.62	2.65	0.22	2.44	1.87	1.04	0.88	2.10
2011–21	5.67	2.70	0.22	2.48	1.11	0.55	0.56	1.86
Percentage Share to Growth (%)								
1990–2021	100	39.65	3.06	36.60	27.29	15.67	11.90	33.05
1990–99	100	30.85	2.01	28.84	34.21	21.90	12.32	34.93
2000–10	100	40.09	3.26	36.84	28.21	15.69	13.28	31.69
2011–21	100	47.62	3.84	43.78	19.55	9.67	9.88	32.83
Growth (%)								
1990–2021	5.92	6.30	15.83	6.01	2.54	1.41	1.13	1.96
1990–99	5.46	5.42	17.43	5.17	2.71	1.72	0.99	1.91
2000–10	6.62	6.68	16.63	6.34	3.07	1.60	1.48	2.10
2011–21	5.67	6.79	13.42	6.51	1.84	0.91	0.93	1.86

Source: APO Productivity Database 2023 Version 1, and author's computation

CHART 2

AVERAGE GROWTH RATES OF INPUT FACTORS



The following inferences from the above table may explain the sources of GDP growth;

Growth rates (also depicted in Chart 2)

1) The average annual growth rate of output is in the range of 5.46–6.62 in the last 3 decades.

2) The growth rate of capital input is almost the same as output growth, implying its greater role in overall growth.

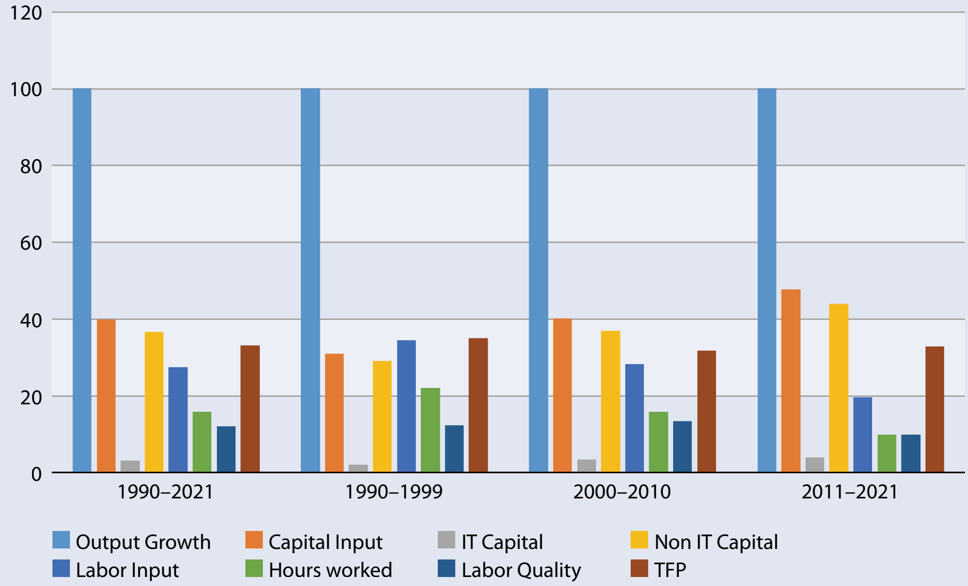
3) The IT capital growth rate has been the highest, but seems to be slowing down in the last decade.

4) Labor input growth has been coming down due to more automation in the production side. The labor quality has shown a very low growth rate, which is a concern.

5) The TFP growth rate is also low, which may be affecting the value part of the output.

CHART 3

SHARE OF INPUT FACTORS TO GROWTH



Source: APO Productivity Database 2023 Version 1, and author's computation

Share of Input Factors to Growth (also depicted in Chart 3):

1) The shares of Capital and TFP have been higher than Labor.

2) With higher growth rates of capital input, its contribution to output has also been increasing over other factors (47.62% in the last decade).

3) The contribution of labor to output growth has been declining over the last 30 years.

1.1.2 Labor Productivity

Labor Productivity has shown a consistent upward trend in the last 30 years, on both parameters viz hours worked and employment numbers, as shown below:

Labor Productivity	Index	1990	1995	2000	2005	2010	2015	2020	2021
Based on hours worked	2010=1.0	0.39	0.46	0.56	0.71	1.0	1.29	1.48	1.62
Based on number of employments	2010=1.0	0.39	0.45	0.56	0.71	1.0	1.30	1.49	1.63

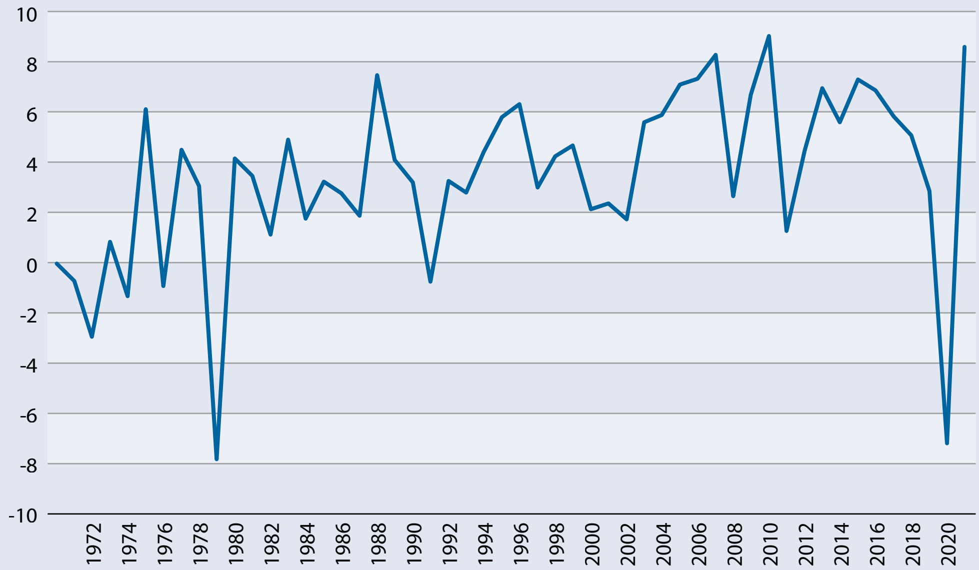
Source: APO Productivity Database 2023 v1

The trend of Labor Productivity growth from 1970 to 2021 is given in Figure 3.

An analysis of the sources of Labor Productivity growth has been given in Table 2. The overall growth rate in the last 3 decades is 4.52%, while the period 2000–10 has been the highest at 5.39%. The capital deepening and TFP have together contributed 85% to LP, whereas Labor Quality has contributed only 15% share to LP growth. The share of Labor Quality has been steadily decreasing, which is a matter of concern.

FIGURE 3

TREND OF LABOR PRODUCTIVITY GROWTH



Source: APO Productivity Database 2023 v1

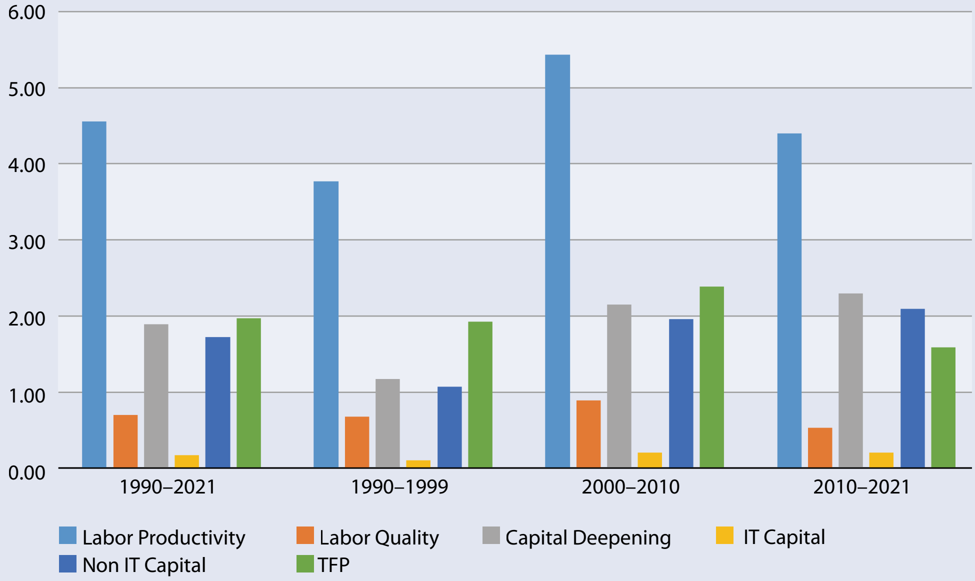
TABLE 2

SOURCES OF LABOR PRODUCTIVITY GROWTH (%)

Period	Labor Productivity	Labor Quality	Capital Deepening	IT Capital	Non IT Capital	TFP
Contribution to Growth (%)						
1990–2021	4.52	0.69	1.88	0.17	1.71	1.95
1990–99	3.74	0.67	1.16	0.10	1.06	1.91
2000–10	5.39	0.89	2.14	0.20	1.94	2.37
2010–21	4.37	0.52	2.27	0.20	2.07	1.57
Percentage share to Growth						
1990–2021	100	15.4	41.5	3.7	37.8	43.1
1990–99	100	18.0	31.0	2.7	28.3	51.0
2000–10	100	16.5	39.6	3.7	35.9	43.9
2010–21	100	12.0	52.1	4.6	47.5	35.9

CHART 4

SOURCES OF LP GROWTH



Source: APO Productivity Database 2022

1.1.3 Inflation and Foreign Exchange Reserves

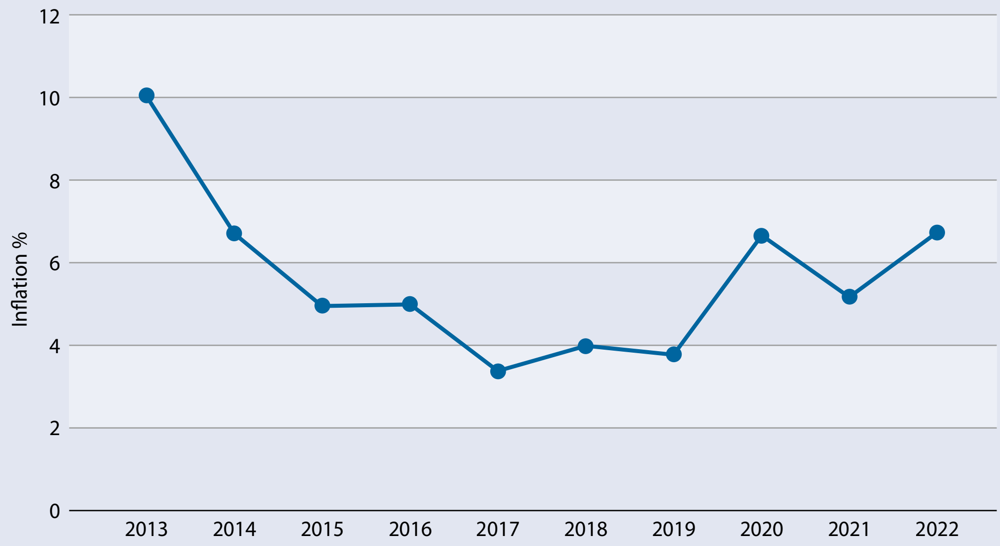
The average annual inflation rate has been 5.6% in the last 10 years. This control on inflation has been one of the main reasons for the high public spending in recent years. Figure 4 illustrates the inflation trend.

The foreign exchange reserves have been steadily increasing in the last few years. As can be seen in Figure 5, the reserves have increased from USD304 billion in 2013 to USD607 billion in 2023.

The overall inference of the economic overview and analysis is that the Indian economy is on the upswing, with impressive GDP growth, per capita GDP growth, Labor Productivity, low inflation rates, and increasing foreign exchange reserves.

FIGURE 4

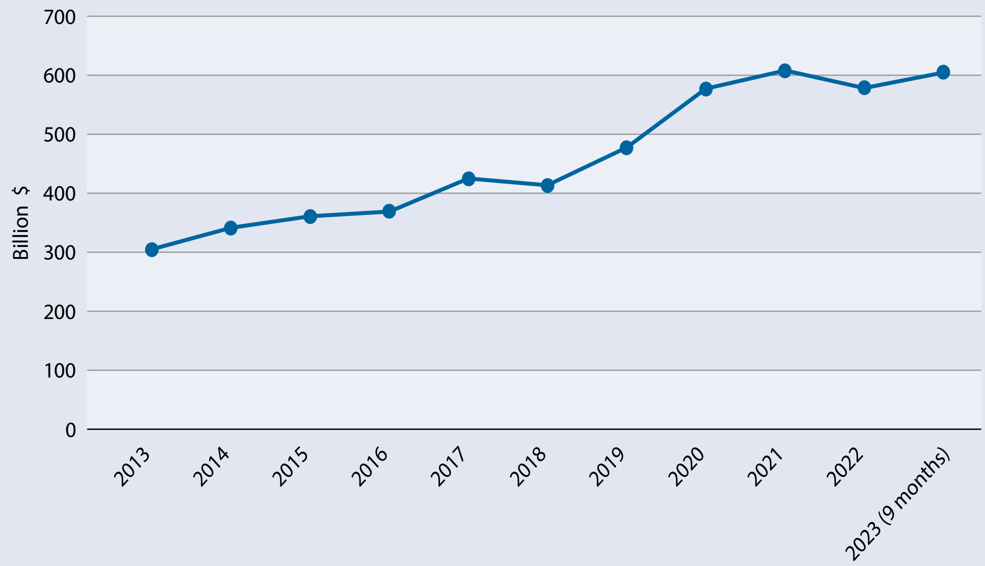
INFLATION TREND



Source: MoSPI, GoI

FIGURE 5

FOREIGN EXCHANGE RESERVES



Source: MoSPI, GoI

1.2 (De)Industrialization Trends- Analysis and Inference

Deindustrialization is the reduction of manufacturing within an economy. Explanations for deindustrialization focus upon the evolution and maturity of economies, trade specialization, competitive failure and disinvestment. While initially experienced in places in the early industrializing countries in Europe and North America in the Global North, it has become an international phenomenon following the globalization of production and the problem of premature deindustrialization has emerged in emerging and developing economies in Asia, Africa, and Central and Latin America in the Global South. Despite ongoing deindustrialization across countries, manufacturing still matters due to its generative role as the flywheel of economic growth, the potential of new digital technologies for a "fourth industrial revolution," and the increasing contribution of services in manufactured products [2].

This section examines the possibility of similar premature de-industrialization emerging in India based on various data and trend analysis.

1.2.1 Trends of agriculture/manufacturing/services shares in GDP and employment.

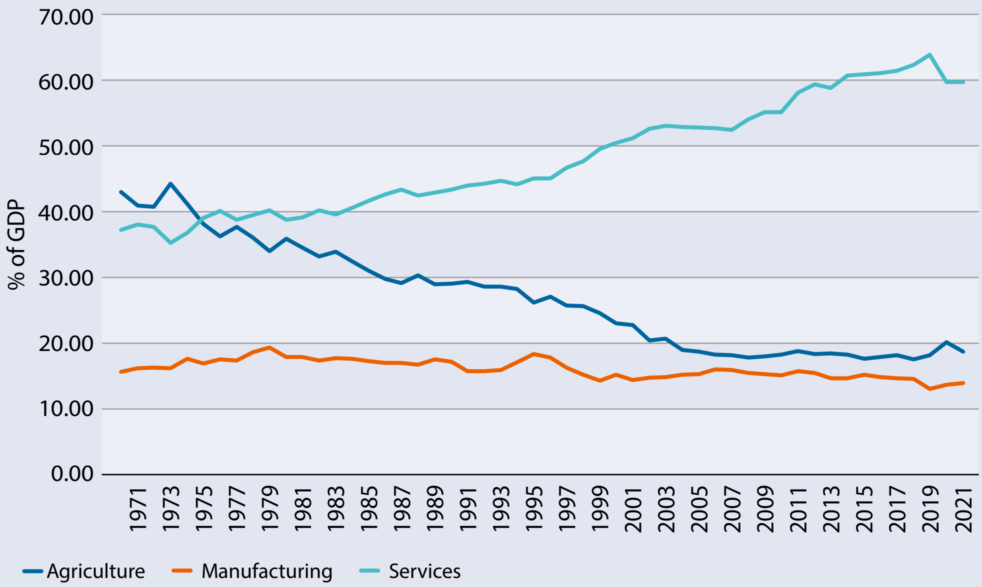
The trend of shares of three main sectors in the total GDP over the past 50 years is given in Figure 6.

The trend of employment pattern in the three main sectors is given in Figure 7. In the case of GDP, the share of Agriculture has come down steadily from 43.29% in 1970 to 18.81 in 2021, whereas Services' share has climbed up from 37.51% in 1970 to 61.14% in 2021. The share of Manufacturing has come down from 15.75% to 14.04% during the past 5 decades.

In the case of employment also, the share of Agriculture has steadily decreased from 69.52% in 1970 to 44.56% in 2021 and the share of Services has increased from 17.04% in 1970 to 29.59% in

FIGURE 6

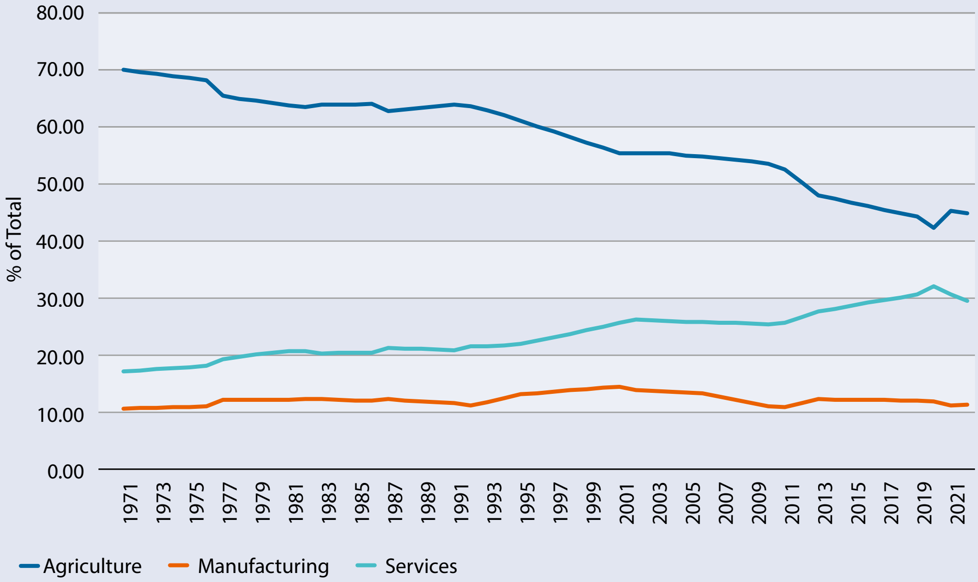
SECTORAL SHARE OF GDP



Source: APO Productivity Database 2023 v1

FIGURE 7

SHARE OF EMPLOYMENT IN TOTAL



Source: APO Productivity Database 2023 v1

2021. The share of employment in Manufacturing has increased marginally from 10.54% to 11.21% in 2021. The period and sub-period trend is given in Table 3.

TABLE 3

SECTORAL SHARES IN GDP AND EMPLOYMENT DURING THE PERIOD 1970–2021 AND SUB PERIODS

	Sectoral Share of GDP			Share of Employment		
Period	**Agriculture**	**Manufacturing**	**Services**	**Agriculture**	**Manufacturing**	**Services**
1970–2021	27.12	16.19	48.34	57.70	12.16	23.43
1970–80	39.18	17.33	27.94	66.60	11.37	18.61
1981–90	31.43	17.43	40.13	63.19	11.99	20.64
1991–2000	26.87	16.26	46.47	59.23	13.15	22.97
2001–10	19.32	15.32	53.56	54.13	12.56	25.65
2011–21	18.48	14.67	60.96	45.66	11.85	29.18

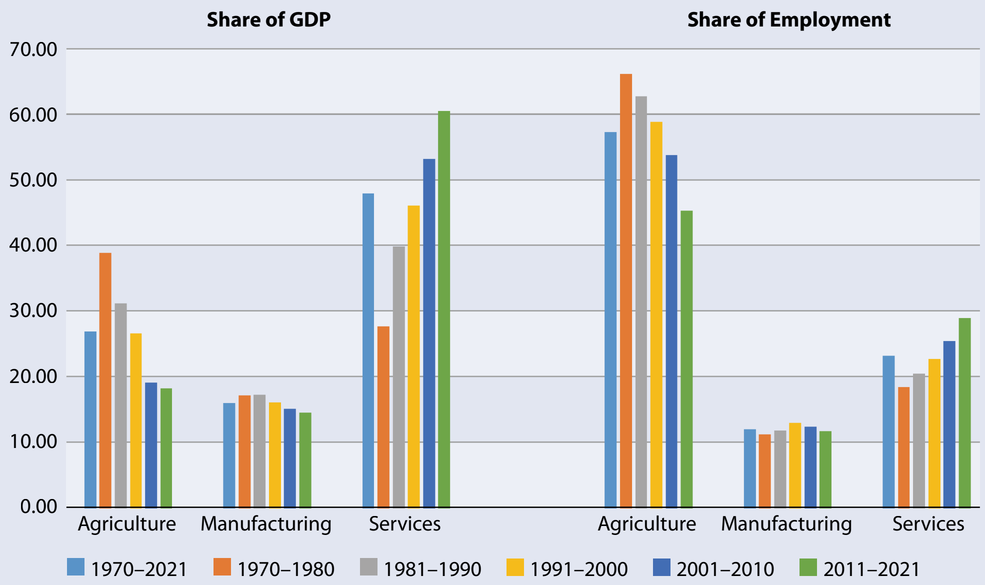
Source: APO Productivity Database 2023 v1.

The average GDP shares of Agriculture, Manufacturing, and Services for the period 1970–2021 was 27.12%, 16.2% and 48.3% respectively. The Agriculture share has come down from 39.18% in 1970–80 to 18.48% in 2011–21. The share of Manufacturing has come down from 17.33% in 1970–80 to 14.67% in 2011–21, whereas the share of Services has increased significantly from 27.94% in 1970–80 to 60.96% in 2011–21.

The share in employment in the case of Agriculture follows a similar trend, declining from 66.6% in 1970–80 to 45.66% in 2011–21. The employment in Manufacturing has remained almost constant at 12%, whereas the share of Services has gone up from 18.61% in 1970–89 to 29.18% in 2011–21, as shown in Chart 5.

CHART 5

SHARE OF GDP & EMPLOYMENT IN VARIOUS PERIODS



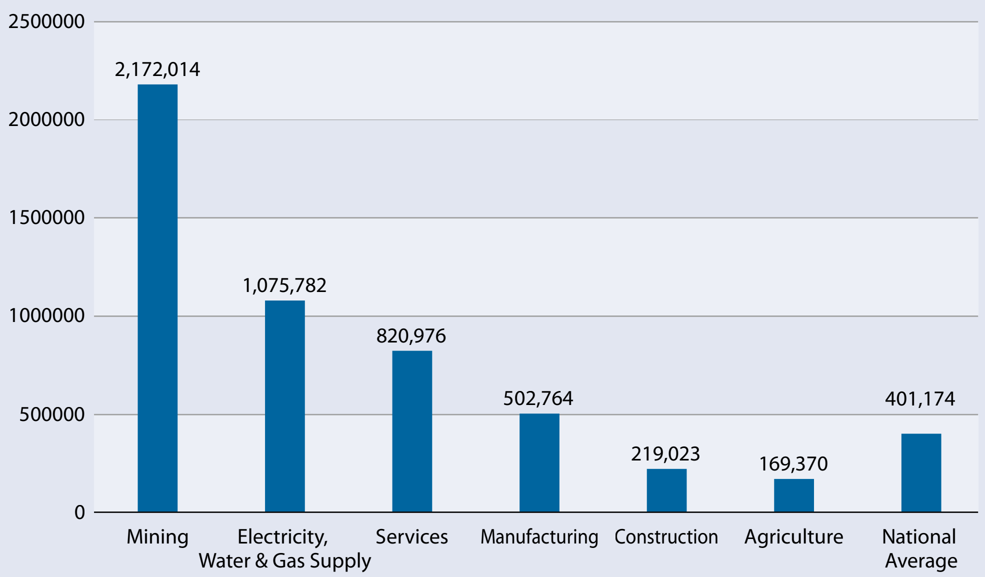
Source: APO Productivity Database 2023 v1

1.2.2 Trend in Labor Productivity by industry (Sector)

The Labor Productivity (GDP per employed person) by industry as of 2021 (at current prices) in descending order is given in Chart 6 below:

CHART 6

LABOR PRODUCTIVITY BY SECTOR

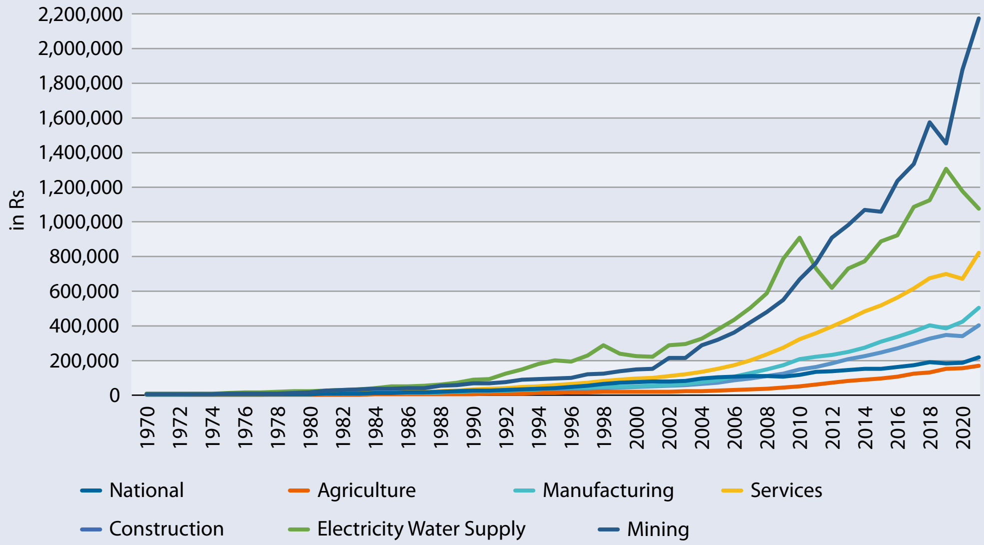


Labor Productivity in Mining remains the highest compared to others. The Services productivity is 1.6 times higher than Manufacturing. The Agriculture and Construction productivity are at the bottom.

The trend of Labor Productivity growth over the past 50 years is given in Figure 8.

FIGURE 8

LABOR PRODUCTIVITY BY INDUSTRY



Source: APO Productivity Database 2023 v1

As can be seen from Figure 8, Labor Productivity has increased at a high rate from 1990 onwards, when India started its economic reforms and liberalization, which resulted in rapid growth in all sectors of the economy. Period-wise Labor Productivity growth is given in Table 4.

TABLE 4

LABOR PRODUCTIVITY BY INDUSTRY (IN RS) FOR PERIOD 1970–2021 AND SUB-PERIODS

Period	1970–2021	1970–80	1981–90	1991–2000	2001–10	2011–21
National Average	82,853	3,080	9,146	31,569	86,197	273,216
Agriculture	33,485	1,793	4,465	14,183	30,277	112,021
Manufacturing	103,109	4,696	13,344	38,016	109,769	336,249
Services	172,090	6,324	18,677	63,591	181,724	567,201
Construction	67,310	5,314	14,551	47,830	98,534	166,591
Electricity water supply	340,717	13,272	50,039	192,085	472,535	947,700
Mining	377,589	10,731	41,555	105,140	366,419	1,310,308

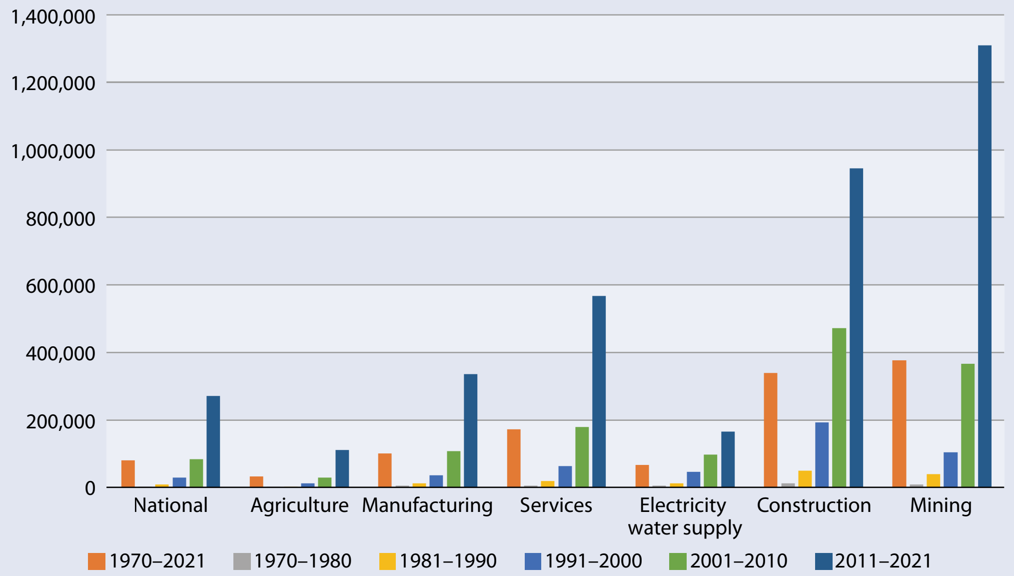
Source: Computed from APO Productivity Database 2023 v1

There is a wide range in Labor Productivity between various sectors. When Agriculture, being the lowest, is taken as the base, Manufacturing is three times higher and Services is five times higher than Agriculture for the period 2011–21.

Chart 7 below gives the growth trend sector-wise.

CHART 7

GROWTH TREND OF SECTORAL LABOR PRODUCTIVITY



1.2.3 Decomposition of Labor Productivity

Labor Productivity and growth by industry/sectors, as well as its sources of growth and decomposition, are all based on the value-added concept following OECD methodology. The exercise has been carried out for the 27 individual industries and later grouped under seven heads for the period 1980–2017 by the authors of the "India Productivity Report, 2022" [3].

Based on this methodology, the computed growth rate in various sectors is given in Table 5.

TABLE 5

GROWTH RATE OF LABOR PRODUCTIVITY FOR VARIOUS SECTORS 1981–2017 & SUB-PERIODS

Sector	1981–2017	1981–93	1994–2002	2003–07	2008–17
Agriculture	3.08	1.72	1.54	4.84	5.35
Mining	4.27	2.38	4.69	5.19	5.89
Manufacturing	5.15	4.01	5.76	7.09	6.92
Electricity & water supply	4.15	5.54	4.45	3.83	2.24
Construction	-0.19	-3.08	1.24	3.47	0.45
Market Services	4.39	2.28	4.98	6.35	5.63
Non-market services	3.58	3.77	2.28	2.35	5.1
Total Economy	4.47	3.03	3.66	6.08	6.24

Source: India Productivity Report, 2022, Centre for Development Economics

CHART 8

SECTORAL LABOR PRODUCTIVITY GROWTH

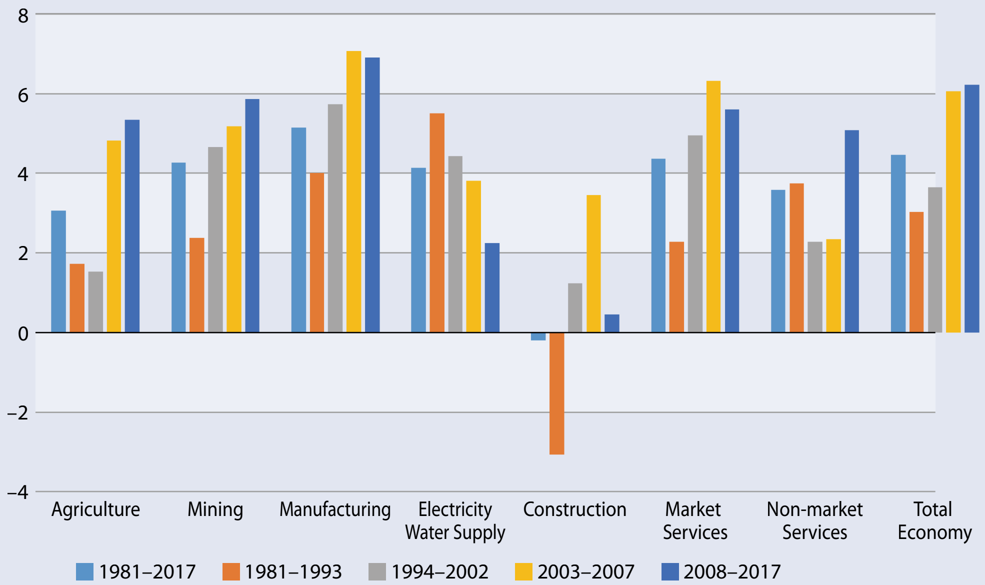


Chart 8 gives the growth in Labor Productivity in various sectors. All sectors have shown an impressive growth from 1994 onwards as a result of economic reforms and liberalization policies. Barring Agriculture and Construction, all sectors have achieved an average Labor Productivity growth rate in the range of 5–7%.

The contribution of 'within industry' effect and static reallocation (structural change) to total Labor Productivity is given in Table 6.

TABLE 6

CONTRIBUTION TO LABOR PRODUCTIVITY BY 'WITHIN INDUSTRY' AND STRUCTURAL CHANGE (%)

Year	Labor Productivity	From 'within industry'	From structural change
1981–2017	4.60	3.44	1.16
1981–93	3.0	2.11	0.99
1994–2002	3.74	3.06	0.68
2003–07	6.29	4.86	1.43
2008–17	6.47	4.79	1.68

Source: India Productivity Report, 2022, Centre for Development Economics

The percentage contribution of 'within industry' sources, namely, Labor Quality, Capital Deepening and TFP for Labor Productivity growth in the main sectors, is given in Table 7.

TABLE 7

SOURCES OF 'WITHIN INDUSTRY' EFFECT FOR LABOR PRODUCTIVITY GROWTH (IN%)

Sector	Labor Quality	Capital Deepening	TFP
Agriculture	18	45	37
Manufacturing	6	49.7	44.3
Services	3.8	65	31.2
Govt Services	5	70	25

Source: India Productivity Report, 2022, Centre for Development Economics

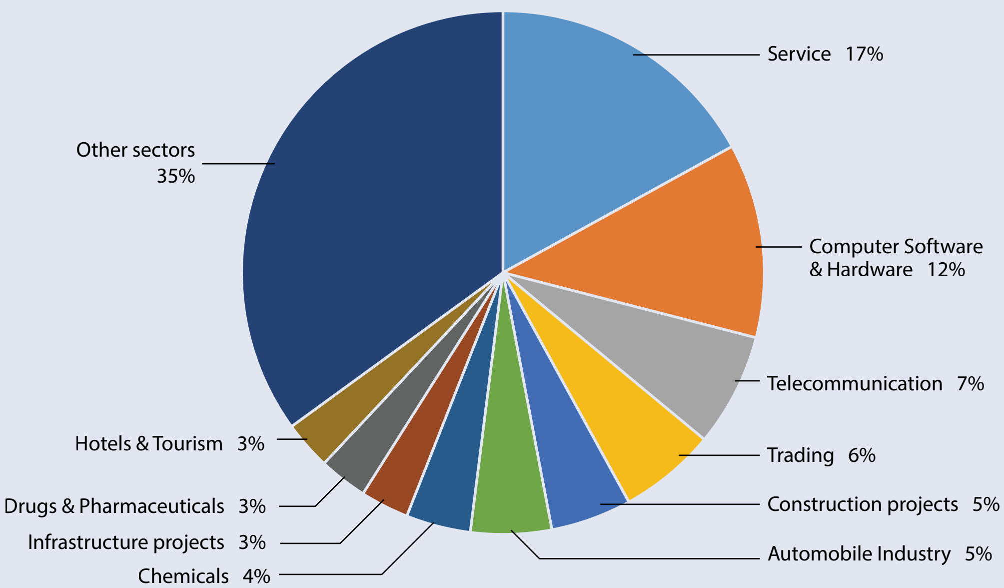
Note: Minor differences in figures for labor productivity between Table 5 & Table 6 are attributed to the method of calculation for respective factors.

The contribution from job quality is very low for Manufacturing. However, the Capital Deepening and TFP have contributed equally to Manufacturing productivity growth.

The contribution from structural change has been limited to about 25%. A major factor in structural change has been the inflow of foreign direct investments, which both the central and state governments have aggressively pursued through various campaigns with the objective of obtaining foreign capital for setting up large scale industries, which would boost the respective economies while creating jobs at the same time. Although there has been a good response by way of total FDI inflow, the actual inflow into the Manufacturing sector has been limited to about 12% comprising of Automobile sector (5%), Chemicals (4%) and Pharmaceutical sector (3%) as given in Chart 9 below:

CHART 9

FDI SHARE IN SECTORS FROM 2000–20



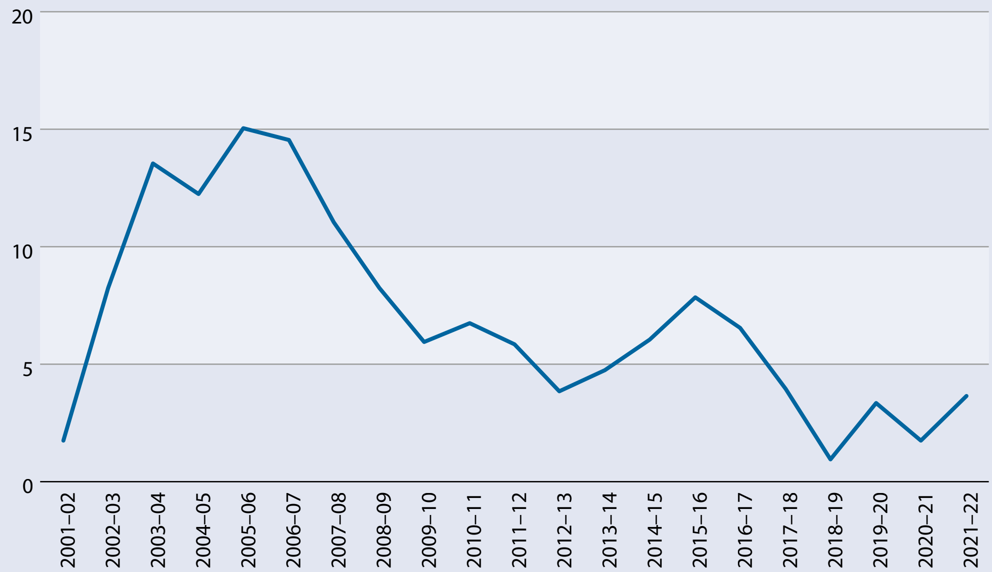
Source: Based on data from various FDI fact sheets of DPIIT

1.2.4 Growth rate of Manufacturing GVA

India's Manufacturing sector has grown, on average, at the rate of about 7% per annum. The average growth rate of manufacturing was about 6.7% per annum during 1981–82 to 2007–08 and about 7.2% during 2008–09 to 2018–19. The average growth rate in real GVA of manufacturing was 8.0 percent during 2003–04 to 2018–19 and 7.5 percent during 2012–13 to 2018–19. It was -2.9 in 2019–20, involving a negative growth turn around. An analysis of GVA growth rate based on data from the Annual Survey of Industries of the organised manufacturing sector was carried out to analyze the trend with a 3-year moving average as the reference data [4]. The trend of GVA growth rate is given in Figure 9 below. The GVA growth rate has risen steadily from 2001–02 to 2005–05 and steadily declined from 2006–05 onwards until 2012–13. It had an upward trend for three years from 2013–14 till 2015–16 and again declined until 2019–20. It is apparent that the process of premature deindustrialisation is happening in India too, and the two main reasons are import liberalization and appreciation in exchange rate (Kumar 2015). There have been some instances of outsourcing of manufacturing activity by Indian firms to other countries because of exchange rate appreciation.

FIGURE 9

TREND OF REAL GVA IN MANUFACTURING



Source: Exports & Indian Manufacturing, Biswanath Goldar, ISID 2022 and author's computation

1.2.5 Changes in composition of exports by level of technology

Table 8 gives the export-import status over the past 12 years. Imports have been consistently more than exports, and the trade balance has always remained negative. In absolute terms, the export of goods has remained constant at around USD300 billion until 2020–21, but registered a sudden increase to USD422 billion in 2021–22 and USD451 billion in 2022–23. The Services export has grown substantially from USD142 billion in 2011–12 to USD322 billion in 2021–22. The major contributor to services export is the IT sector, which accounted for USD227 billion in 2022–23, and per projections by the industry association, it is expected to reach USD500 billion before 2030. The import of goods has increased from USD489 billion in 2011–12 to USD687 billion in 2022–23. However, India's reliance on imports has also been increasing consistently from 2011–12.

TABLE 8

EXPORT IMPORT STATUS (IN USD BILLION)

Year	Exports			Imports			Trade Balance
	Total	Goods	Services	Total	Goods	Services	
2011-12	448.29	305.96	142.33	567.55	489.32	78.23	–119.26
2012-13	446.08	300.4	145.68	571.5	490.74	80.76	–125.42
2013-14	466.22	314.41	151.81	528.95	450.2	78.75	-62.73
2014-15	468.45	310.34	158.11	529.61	448.03	81.58	–61.16
2015-16	416.6	262.29	154.31	465.64	381.01	84.63	–49.04
2016-17	440.05	275.85	164.2	480.21	384.36	95.85	–40.16
2017-18	498.62	303.53	195.09	583.11	465.58	117.53	–84.49
2018-19	538.08	330.08	208	640.14	514.08	126.06	–102.06
2019-20	526.55	313.36	213.19	602.98	474.71	128.27	–76.43
2020-21	497.9	291.81	206.09	511.96	394.44	117.52	–14.06
2021-22	676.53	422	254.53	760.06	613.05	147.01	–83.53
2022-23	773.79	451.07	322.72	867.6	715.97	177.94	–93.81

Source: Annual Report, Ministry of Commerce, GoI

Goods exports comprise agricultural items, processed food, minerals, basic metals etc., apart from manufactured items. The manufactured items constitute about 70% of the total goods exports. An analysis of the exports of manufactured items on the basis of level of technology deployed for manufacturing was carried out, and their proportion to the total is given in Table 9.

TABLE 9

COMPOSITION OF EXPORTS BY LEVEL OF TECHNOLOGY (IN%)

Year	Agricultural items	Low Technology	Medium Low Technology	Medium High Technology	High Technology
2018–19	10.9	29.0	29.7	17.1	13.3
2019–20	10.0	29.3	29.2	18.1	13.4
2020–21	13.6	27.0	26.6	18.1	14.7
2021–22	12.7	24.1	34.3	17.1	11.8
2022–23	9.5	23.6	36.6	18.4	11.9

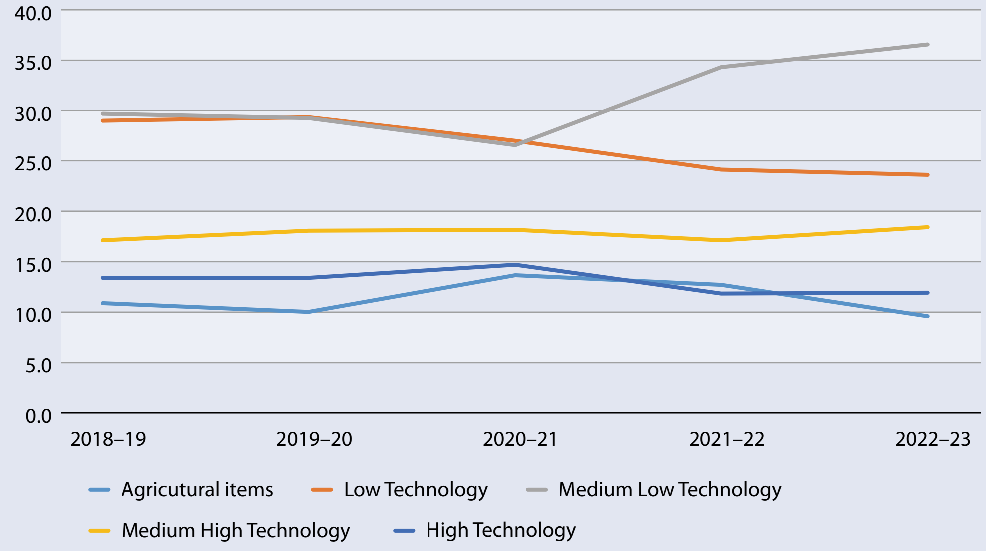
Source: Export Import Data Bank, Ministry of Commerce

Technology classification as per OECD classification

The trend of changes in the composition of exports is given in Figure 10.

FIGURE 10

CHANGES IN COMPOSITION OF EXPORTS BY LEVEL OF TECHNOLOGY



Source: Table 9.

The proportion of agricultural exports shows a slight decline, although India is the largest exporter in many agricultural items. The goods manufactured from low technology is showing a downward trend, while the medium low technology items are showing an upward trend. Medium high and high technology items are remaining constant at the same proportion.

1.2.6 Sectoral labor productivity in relation to high income countries

The absolute figures of Labor Productivity (in 2017 PPP price) for comparison of India with high income countries such as Japan, the Republic of Korea and Malaysia for the period 1970–2021 and sub periods 1970–1980, 1981–1990, 1991–2000, 2001–2010 & 2011–2021 is given in Table 10.

TABLE 10

LABOR PRODUCTIVITY IN US$ BASED ON 2017 PPP PRICE

Period	India	Japan	ROK	Malaysia
Agriculture				
1971–2021	3,675	21,262	14,342	30,586
1971–80	2,380	13,125	3,715	17,158
1981–90	2,488	17,837	6,922	22,235
1991–2000	3,182	22,138	13,068	28,909
2001–10	3,880	26,103	19,465	38,140
2011–21	6,219	27,109	28,543	46,490
Construction				
1971–2021	8,931	62,043	48,316	20,960
1971–80	8,562	61,288	33,415	16,566
1981–90	7,652	67,199	46,400	19,780
1991–2000	9,521	66,656	52,174	23,302
2001–10	9,945	54,558	54,175	18,604
2011–21	9,005	60,532	55,417	26,546
Manufacturing				
1971–2021	7,913	69,638	56,761	40,631
1971–80	3,238	34,101	8,749	15,200
1981–90	3,950	49,712	17,130	22,658
1991–2000	5,090	67,296	40,448	35,013
2001–10	8,726	91,347	90,636	56,950
2011–21	18,020	105,735	126,841	73,337
Mining				
1971–2021	31,321	126,133	130,621	1,161,637
1971–80	14,393	107,670	59,094	491,588
1981–90	18,310	133,086	39,769	1,026,303
1991–2000	24,401	134,205	162,362	1,673,323
2001–10	32,344	148,023	219,828	1,898,850
2011–21	65,438	107,681	172,050	718,123
Services				
1971–2021	18,710	77,184	42,789	30,893
1971–80	6,732	57,018	22,370	14,678
1981–90	9,109	72,155	30,087	19,921
1991–2000	13,686	84,127	42,744	32,121
2001–10	22,293	87,264	54,123	39,387
2011–21	40,724	85,005	64,623	48,359

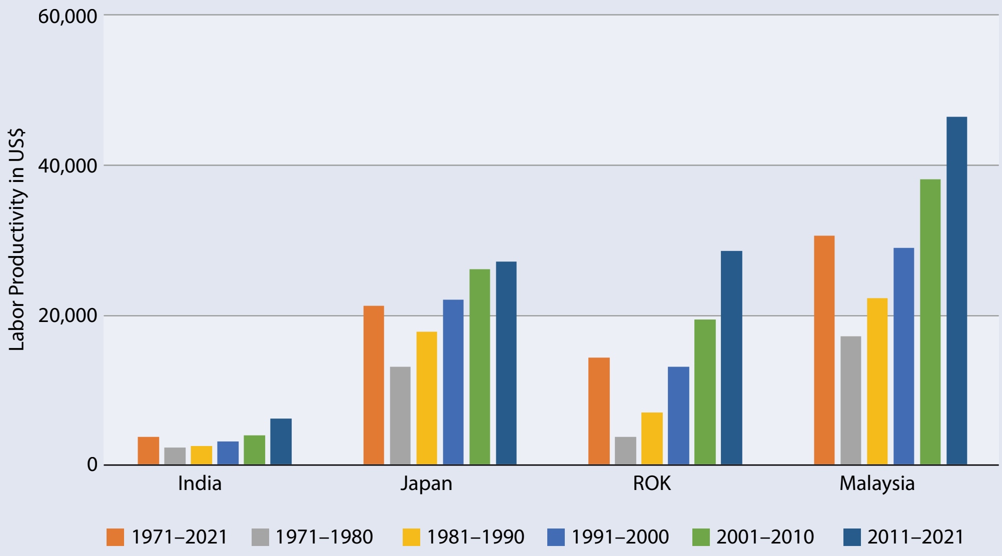
Source: APO Productivity Database 2023 v1 & Malaysia Country paper on Premature Deindustrialization.

Labor Productivity in India started to increase from 1990 onwards, coinciding with economic reforms and liberalization. A comparison in terms of index with Indian LP as 1 is made with other countries for the three periods starting from 1991 for each sector given below:

A graphical comparison is given in Chart 10.

CHART 10

LABOR PRODUCTIVITY COMPARISON—AGRICULTURE

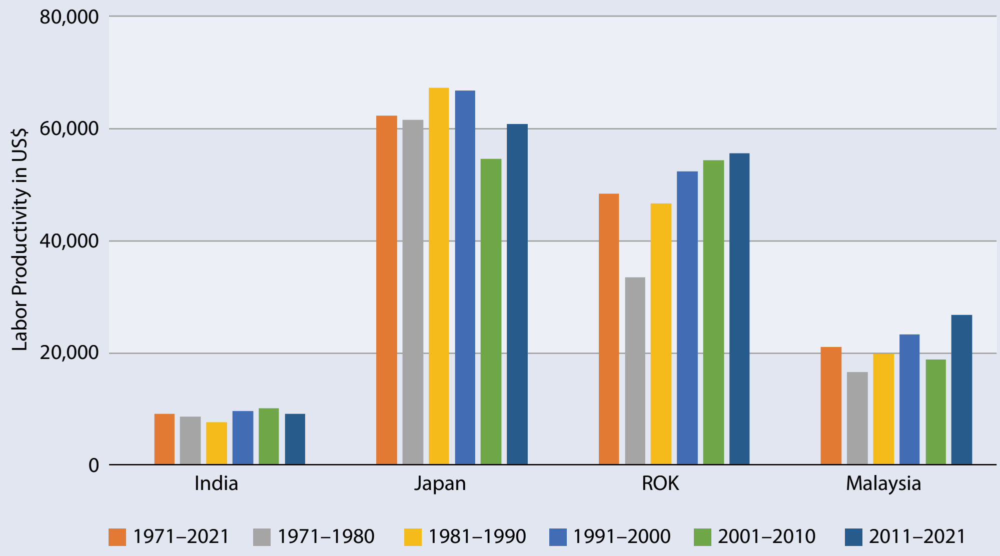


Period	India	Japan	ROK	Malaysia
1991–2000	1.0	6.9	4.1	9.1
2001–10	1.0	6.7	5.0	9.8
2011–21	1.0	4.3	4.6	7.4

In Agriculture, the productivity in Japan was 6.9 times in 1991–2000, which has come down to 4.3 times in the last decade.

CHART 11

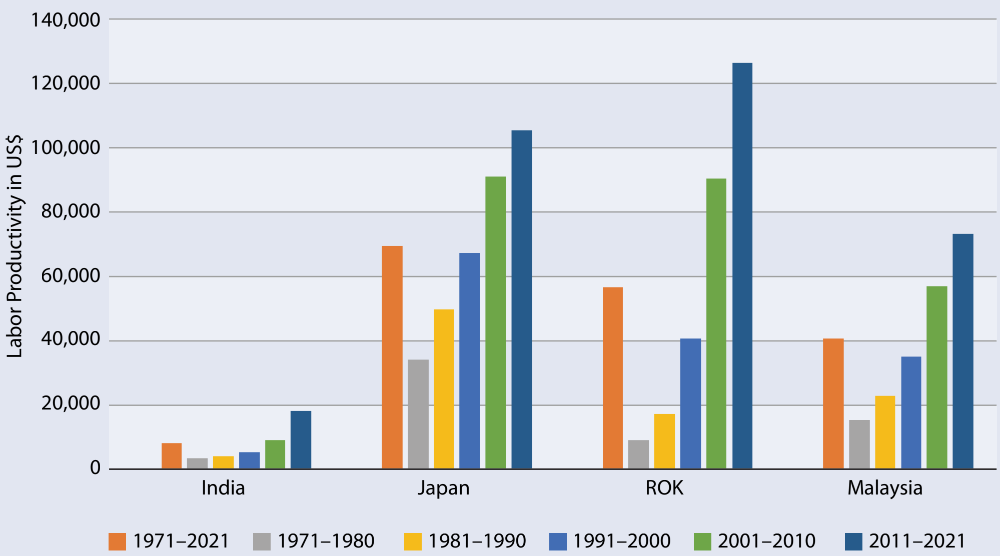
LABOR PRODUCTIVITY COMPARISON–CONSTRUCTION



The Labor Productivity in Construction remains low consistently.

CHART 12

LABOR PRODUCTIVITY COMPARISON–MANUFACTURING

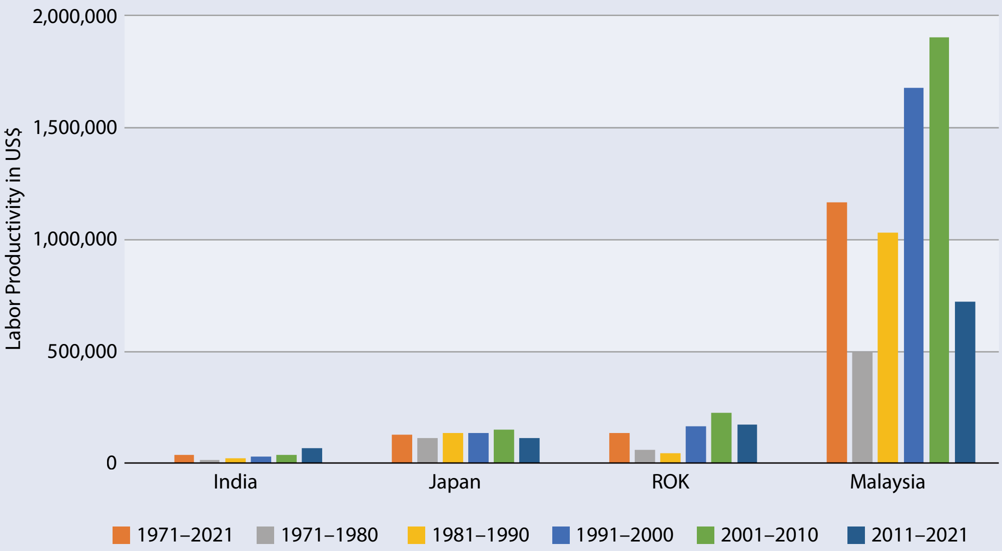


Manufacturing	India	Japan	ROK	Malaysia
1991–2000	1.0	13.2	8.0	6.9
2001–10	1.0	10.5	10.4	6.5
2011–21	1.0	5.9	7.0	4.1

In Manufacturing, the Labor Productivity in India has shown a very positive improvement. In 1991–2000, the Japanese productivity was 13.2 times more than India, which has come down to 5.9 times in 2011–2021, signaling a rapid increase in manufacturing productivity in India.

CHART 13

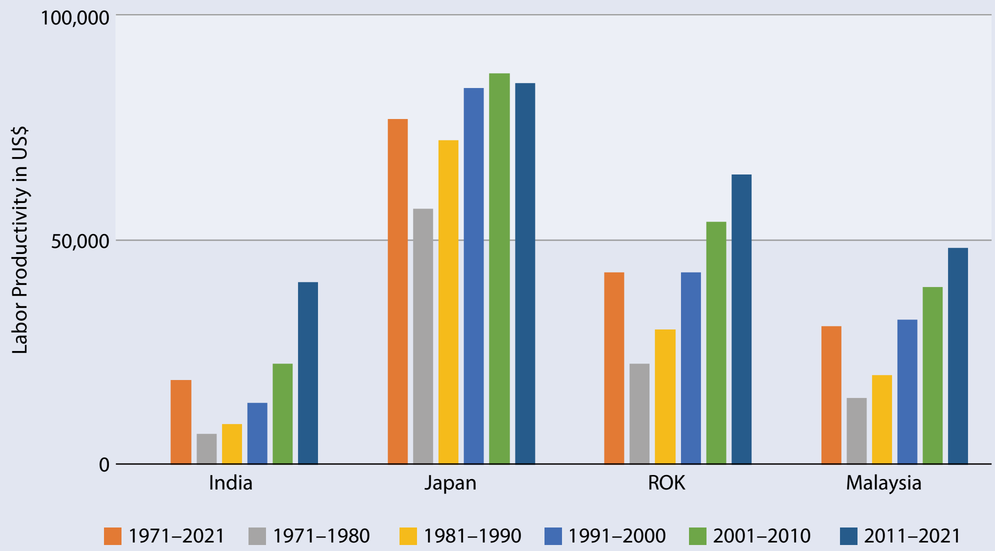
LABOR PRODUCTIVITY COMPARISON–MINING



Mining	India	Japan	ROK	Malaysia
1991–2000	1.0	5.5	6.7	58.6
2001–10	1.0	4.6	6.8	58.7
2011–21	1.0	1.7	2.6	10.9

CHART 14

LABOR PRODUCTIVITY COMPARISON–SERVICES



Services	India	Japan	ROK	Malaysia
1991–2000	1.0	6.2	3.1	2.3
2001–10	1.0	3.9	2.4	1.7
2011–21	1.0	2.2	1.6	1.2

In Services, the productivity level in India is much better compared to other sectors. It has shown consistent increase and is now almost nearing the levels of ROK and Malaysia.

1.2.7 Growth rate of Registered factories

The Annual Survey of Industries conducted by the Ministry of Statistics and Programme Implementation, Government of India, covers all registered units employing 10 or more people through a sampling method. The results of this survey are used to assess many important characteristics of industrial units. The growth rate of some such characteristics of these registered units is given below in Table 11.

TABLE 11

GROWTH RATE OF CHARACTERISTICS OF REGISTERED UNITS

Sl.No.	Characteristics	Percentage growth over previous year				
		2015–16	2016–17	2017–18	2018–19	2019–20
1	Factories in Operation	0.84	1.74	0.62	0.8	0.75
2	Fixed Capital	13.5	13.55	2.99	5.48	5.06
3	Invested Capital	9.65	11.5	3.83	7.09	4.11
4	Workers	3.54	4.73	4.81	4.7	2.03
5	Total persons engaged	3.01	4.28	4.72	4.26	2.11
6	Input	-2.27	5.52	12	17.24	-3.18
7	Output	-0.31	5.87	11.1	14.99	-3.4
8	GVA	9.32	7.44	7.23	4.84	-3.4

Source: Annual Survey of Industries 2019-20, MOSPI, GOI

There is a decline in the growth rates of 'factories in operation', workers, invested capital etc., indicating a slowdown of industrialization. The average growth rate of factories has been less than 1% in the past 5 years.

2. Possibility of Deindustrialization

Deindustrialization is defined as the normal result of sustained economic growth in fully employed and already highly developed economies. It occurs because productivity growth in the manufacturing sector is so rapid that despite increasing output, employment in this sector is reduced either absolutely or as a share of total employment. However, this does not lead to unemployment, because new jobs are created in the service sector on a scale sufficient to absorb any worker displaced from manufacturing. Paradoxically this kind of deindustrialization is a symptom of economic success (Rowthorn and Wells,1987) [5]. The following section assesses whether such a situation is developing in India.

2.1 Assessment of Risks of Deindustrialization

Based on empirical evidence, the following aspects could be listed as possible factors leading to a risk of deindustrialization:

1) Overall Labor Productivity has been increasing in the last 30 years, driven largely by Capital and TFP.

2) Annual output growth rate at the 5.46–6.62% range has been fueling the GDP in the last 30 years after economic reforms and liberalization in 1990. The output growth has been driven largely by Capital input & TFP, and to a lesser extent by labor input.

3) Average annual share of Manufacturing in GDP has come down to 14.67% in the period 2011-2021 (14.04% in 2021) from 17.33% in the period 1970–80. The Services share of GDP has increased to 60.96% during the period 2011–2021 from 27.94% in 1970–80.

4) Average annual share of employment in Manufacturing has remained almost the same at 11.85% in 2011–2021 from 11.37% in 1970–80. The Services share in employment has increased to 29.18% in 2011–2021 from 18.61% in 1970–80.

5) The annual growth rate of Labor Productivity in Manufacturing has increased consistently from 4.01% in 1981–93 to 6.92% in 2008–2017. The growth rate of productivity in Manufacturing has been consistently higher than Services, which after some time leads to reduction of manpower and a shift of surplus manpower from the Manufacturing to Services sector. The difference in Labor Productivity, when benchmarked with Japan, is steadily narrowing down in the last 30 years. The Labor Productivity of Japan in Manufacturing, in absolute terms, was 13.2 times more than India in 1991–2000, but only 5.9 times in 2011–2021.

6) The share of Manufacturing in GDP has decreased, while the share of employment has remained constant despite increase in manufacturing productivity. This is an interesting aspect of a seemingly premature deindustrialization phase. However, maintaining a higher percentage of share in GDP is important because division of labor in Manufacturing is more sophisticated and can create more high-paying jobs.

7) The annual growth rate of Service Labor Productivity has also increased from 2.26% in 1981–93 to 5.63% in 2008–2017. Japan's Service productivity, in absolute terms, was 6.2 times more than India in 1991–2000, but it has come down to 2.2 times in 2011–2021.

8) In exports, goods manufactured with low technology has come down to 23.6% from 29.0% in the last 5 years from 2018–2022. Goods manufactured through medium low technology has increased to 36.61% from 29.7% in the last 5 years. The medium high technology category has remained stable at 18%, while the high technology category has come to 11.9% from 13.3% in the last 5 years. As the proportion of goods manufactured through higher levels of technology increases, the number of industrial units and employment in lower level technology manufacturing will start to shrink, leading to deindustrialization.

9) There has been a decline in the growth rates of factories in operation, workers employed, and invested capital among the registered manufacturing units (organized sector).

10) There has been a steady decline in the growth rate of GVA of manufacturing over the last two decades.

11) FDI inflows into manufacturing during the period 2000–2020 has been relatively low, at 12% of the total inflows.

From the foregoing developments in the Indian economy, it seems possible that India is moving towards a state of early deindustrialization, although it has not reached a developed economy status. It can therefore be concluded that India is in the initial stages of premature deindustrialization.

2.2 Analysis of reasons for Deindustrialization

1) The National Manufacturing Policy (2011) envisaged increasing the share of Manufacturing in GDP from 16% (in 2011) to 25% by 2022 and also increasing the share of employment by creating 100 million jobs with the objective of making India a manufacturing hub for the world. The inability to implement this policy in practice, due to developments like demonetization, GST rollout, the COVID-19 pandemic, etc., has resulted in a stagnancy of industrialization.

2) The decline in demand in domestic market as a consequence of the above is affecting the manufacturing sector.

3) The movement of workers away from Manufacturing to Agriculture and Services, as brought out in Periodic Labor Force Surveys, is another signal of distress.

4) Logistics remains a big problem for Manufacturing in India. Logistics cost in India is the highest compared to other countries, affecting its global competitiveness. It's about 12–16% of GDP, against a global average of 8%. It is also a constraint to developing supply chains among MSMEs.

5) Import of goods from other countries like China and Southeast Asian nations is hampering domestic manufacturers, who are abandoning their manufacturing activities and switching over to importing and trading of goods.

6) Land acquisition for industrial purposes has become a long, drawn-out process after the Government introduced the revised 'The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013." This has constrained big industrial houses from establishing large manufacturing facilities and they are dependent on

state governments for land allocation.

7) Labor related issues such as minimum wages, skill development, social security, occupational health, healthcare & welfare, unionization, etc., are hindering the starting of new manufacturing enterprises.

8) Low productivity and value addition in MSMEs, which contribute over 30% to manufacturing value added, affects the growth of this sector and is a major hurdle to rapid industrialization.

2.3 Impact of Deindustrialization on the Economy

As per Marxian tools of analysis, two forms of impact of deindustrialization can occur in an economy as given below;

Form 1: Relative shift from manufacturing to non-surplus value producing activities (such as services provided on nonmarket basis by state, subsistence agriculture, circulatory financial services, etc.)

Form 2: Relative shift from manufacturing to other surplus value producing activities (such as Mining & Agriculture) and service activities like restaurants, cleaning houses, hair saloons etc [6].

Both these forms are already happening in India, which is evident from the components of GDP and the increase in employment in Agriculture and Services, with Manufacturing remaining stagnant. As a consequence, the dependence on imports will increase, resulting in gradual extinction of domestic manufacturing. An analysis of the import structure reveals that the imports of manufactured goods, especially capital goods and electronic items, have been increasing consistently over the years. In 2021–22, manufactured items like electronic products, telecom & computer hardware, machinery, electrical items, nuclear reactors, plastic items, etc., accounted for 30% of the total imports of USD613 billion. This high import share of domestic demand will have a crippling effect on domestic manufacturers.

There has been an excessive expansion of the service industry in the last decade, which has also become a large employment provider. As of 2019–20, this sector employed about 173.3 million people, against about 62.4 million in the manufacturing sector. The service sector has opened up new avenues of employment, attracting the educated youth in huge numbers at the cost of the manufacturing sector. Some illustrative areas are sales & business development, software development, financial services, customer service, investments & trading, marketing & communication, human resources, consulting, project & programme management, data science & analysis, teaching & training, R&D, IT & information security, procurement & supply chain, content & editorial journalism, design & architecture, legal & regulatory, administration & facilities management, healthcare & life sciences, quality assurance, CSR & social services, merchandising & retail, e-commerce, food, beverages & hospitality, travel & tourism, environment health & safety, security services, media production, sports fitness & personal care, shipping & maritime, event management, etc. However, overdependence on a service based economy may impact various aspects, including deteriorating income distribution, limited high paying job opportunities, and minimal industrial spillover effects. In the short term, service sector productivity may be enhanced through Artificial Intelligence (AI), but the eventual outcome of increased AI driven productivity might result in reduction of employment opportunities. It is already being witnessed in the collapse of many startups, e-commerce enterprises, edutech, the real estate industry, etc. The bubble burst effect is also possible as a consequence of events that can't be predicted, such as during the COVID-19 crisis.

Countries with a higher share of manufacturing in GDP, such as ROK (31%), China (30%), Malaysia (22%) and Germany (21%), are already facing deindustrialization and its negative effect on their GDP. India, with only a 14% share, may soon enter the deindustrialization phase, and it will eventually affect its target of achieving a GDP of USD26 trillion by 2047.

3. Counter measures and Strategies in response to Deindustrialization

3.1 Cause: Decreasing share of Manufacturing in GDP (target of 25% by 2022 not achieved)

Countermeasure: To promote higher domestic production, the Government of India has launched the following programmes:

1) Make in India Programme

The Make in India movement holds immense significance for India's economic development. By attracting Foreign Direct Investment (FDI) and encouraging domestic companies to increase their manufacturing capabilities, the movement aims to boost industrial growth, create job opportunities, and reduce dependency on imports. This broad programme, which is aimed at self-sufficiency (atmanirbhar), has substantial accomplishments across 27 sectors, including manufacturing and services. It's has been in implementation for the last 9 years since 2014, and has succeeded in attracting FDI inflows consistently from USD45 billion in the first year to USD84 billion in 2021–22.

2) Production Linked Incentive Scheme

As a part of the 'Make in India" programme, the Government introduced this scheme across 14 key manufacturing sectors, spanning drugs & intermediates, medical devices, automobiles & auto components, telecom products, electronic items, white goods, solar panels, ACC batteries, etc. The total funds allocated for this scheme are USD26 billion, and will be implemented by various ministries for their respective manufacturing sectors. Under this scheme, any manufacturer who makes incremental investment to produce additional production will be entitled to an incentive of 4–6 % of the production cost, apart from other sector specific incentives, for a period of 5 years. In the automobile & auto components sector, where the outlay is USD3.5 billion, the incentives can go up to 18%. Until March 2023, the expected investment was USD46 billion, and actual investment realized was USD8 billion. The incremental production/sale has been USD86 billion, and employment generated was 325,000 [7].

One of the most successful cases of a production linked incentive (PLI) scheme is the production of mobile phones, which crossed over 2 billion in the last two years, driven largely by Apple Inc. Similar successes have been achieved in the electronic components sector, as well as in the automobile & auto components sector.

3.2 Cause: Declining demand in the domestic market

Counter Measure: Public Procurement (preference to make in India) order, 2017

The governments, central and state, together make procurement of goods and services (including contracts) worth billions of USD (ex: in 2018 it was USD608 billion). In the past, the tenders would be awarded to agencies who were traders procuring items from various sources, including cheap imports. To help domestic manufacturers, this order has come into being, wherein domestic manufacturers are given preference in selection. The Public Procurement Portal has enabled access to all manufacturers, especially MSMEs, to take part in public procurement.

3.3 Cause: Decline in share of employees in Manufacturing and shift to other sectors

Counter Measure: Skill India Programme

This is implemented by the Ministry of Skill Development & Entrepreneurship. The objective of this skill certification scheme is to enable Indian youth to take up industry-relevant skill training that will help them in securing a better livelihood. Since the inception of the programme, over 13.7 million youth have been trained and placed in various places, including manufacturing firms.

3.4 Cause: Logistics affecting delivery performance and supply chain consolidation

Counter Measure: PM Gati-Shakti Programme & National Logistics Policy

The PM Gati Shakti-National Master Plan for Multi-modal Connectivity will cover economic zones like textile clusters, pharmaceutical clusters, defense corridors, industrial corridors, electronics parks, agri zones, etc., to improve connectivity and make Indian businesses more competitive. This will be further complemented by the National Logistics Policy, whose vision is to drive economic growth and business competitiveness through an integrated, seamless, efficient, reliable, green, sustainable and cost effective logistics network by leveraging best-in-class technology, processes, and skilled manpower. This will reduce logistics cost and improve delivery performance.

3.5 Cause: Import of cheap goods from China leading to closure of domestic manufacturers

Counter Measure: Levy of Duty on imports

India presently has a robust import duty structure to safeguard domestic farmers and manufacturers, but proposes to bring down duty rates to that of ASEAN in the near future. In the case of manufactured goods, the safeguard duty and anti-dumping duty are meant to protect domestic manufacturers. The increase in duty on toys from 20% to 70% has actually benefitted the toy industry, which has increased its production not only to meet domestic demand but also exports [8].

3.6 Cause: Difficulty in Land acquisition for new industries

Counter Measure: National Industrial Corridor Development Programme

Under this programme, 11 industrial corridors are being developed across the country, along with development of futuristic industrial cities along the corridor, which will be world-class manufacturing destinations. They will create employment opportunities and boost economic growth. Apart from utilizing the existing industrial estates along the corridor, state governments will acquire additional lands for the development of industrial townships, logistics hubs, industrial parks, etc.

3.7 Cause: Low productivity & Value addition at MSME level

Counter Measure: MSME Competitive (Lean) Scheme

This is a scheme for enhancing the competitiveness of the MSME sector through implementation of lean tools and techniques, which are tested and proven methodology for improving productivity, quality, delivery, safety, and value creation in manufacturing units. After the successful implementation of this scheme in over 5,000 units, it has been upgraded to cover another 100,000 units in the next 5 years. It is hoped that MSMEs will achieve world class levels in productivity and quality to compete and integrate with the global value chains.

3.8 Cause: Low penetration into Global Value Chains (GVC)

Counter Measure: Collaboration with countries like the Republic of China for enhancing participation in GVC.

The Republic of China has played an important role in making China a major player in global value chains. It has a well-established manufacturing supply chain covering all industries, and its electronics & semiconductor industry is a world leader. India and the ROC have been increasing their bilateral cooperation in the industrial sector during the last decade and presently there are over 200 ROC companies operating in India, with an FDI of USD4 billion. There are ongoing bilateral discussions to enter into a free trade agreement with the ROC. It may be worthwhile to consider providing special economic zones for ROC companies with legal protections to set up manufacturing units. This will encourage these companies to increase both investment and capacity multi-fold and scale up production of electronic & semiconductor products to meet both domestic and global demands.

4. Conclusion

The analysis of share of Manufacturing in GDP shows a steady decline over the last 3 decades and stands at 14.04% as of 2021 which is less than countries like China (30%), Republic of Korea (31%) & Malaysia (22%) which are already in the stage of deindustrialization. The share of manufacturing in employment has remained almost static at about 11–12% in the last 3 decades. The share of Services in GDP & Employment has been steadily increasing over the same period and stands at 60.14% and 29.4% in 2021, respectively. It can be concluded based on similar empirical evidence that India has arrived at the stage of premature deindustrialization even before achieving developed economy status [9].

The reasons behind this premature deindustrialization are the country's inability to scale up manufacturing activities as envisaged in the National Manufacturing Policy of 2011 due to various factors such as demonetization, GST roll out, the COVID-19 pandemic, the decline in domestic demand as a consequence of the above developments, shortage of skilled manpower, poor logistics infrastructure hindering development of supply chain networks, import of cheap goods from China, low productivity levels in MSMEs, etc.

The possible impact of this deindustrialization is the shift of resources from manufacturing to both non surplus producing and surplus producing service activities in the service sector and to the agriculture sector, which will further bring down the share of Manufacturing in GDP. The service driven economy will be like a bubble: always at the risk of bursting in the short and long term. It will also impact the country's Labor Productivity, as higher productivity is possible only in Manufacturing. The dependence on imports will increase, causing more trade imbalance.

In response to these developments and keeping manufacturing in focus, the government has taken effective measures like the 'Make in India' scheme, 'Production Linked Incentive Scheme', 'Public Procurement with preference to make in India order' etc. in the short term to boost manufacturing. As long term measures, 'Inter Model Connectivity', 'National Logistics Policy', 'National Industrial Corridor Programme' etc. are being implemented towards achieving the target of 25% share of manufacturing in GDP. The 'MSME Competitive Lean Scheme' is another flagship programme of the Government to transform MSMEs to world class standards in manufacturing. India is also collaborating with countries like the ROC for increasing it's share in the global value chains, especially in electronics and semiconductors. These measures are expected to arrest premature deindustrialization in the short term and also lead to rapid industrialization in the long term.

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MALAYSIA

Executive Summary

In recent years, Malaysia has undergone a process of deindustrialization, despite its previous reputation for strong industrialization efforts. Deindustrialization is the process of manufacturing industries becoming less important in the economy, usually accompanied by a move towards services and other sectors. The findings of this study emphasize that revitalizing Malaysian industries could have a significantly positive impact on the overall economy and labor productivity, almost equalling the effects on real GDP. This underscores the need to focus efforts on high value-added activities within the manufacturing sector to reinvigorate it and address its stagnant growth in recent years. Additionally, the shift-share analysis supports the idea that structural changes in manufacturing are hindering overall productivity growth, highlighting the importance of revitalizing Malaysia's industrial sectors to boost economic development and enhance quality of life. The analysis in this report has broadly identified multiple factors that have contributed to this prevailing pattern:

1. Economic Transition: Malaysia's economy has seen substantial structural transformations, shifting from an agricultural-based economy to a manufacturing-oriented one in the 1970s and 1980s. Nevertheless, in the last several years, there has been a significant transition towards services, propelled by reasons such as globalization, technological progress, and changing consumer preferences.

2. Globalization and Trade Liberalization: Malaysia's integration into global markets, enabled by trade liberalization measures and involvement in international trade agreements, has resulted in heightened competitiveness and the delegation of industrial operations to external sources. This has had a negative effect on the competitiveness of domestic industries and has played a role in the process of deindustrialization.

3. Technological advancements: The use of automation, robots, and other sophisticated technologies in manufacturing has led to improved productivity but a decrease in the need for labor-intensive manufacturing activities. Consequently, there has been a decrease in the number of people employed in manufacturing, which has played a role in the process of deindustrialization.

4. Policy Challenges: Malaysia has had policy obstacles in terms of implementing policies, governing, and developing infrastructure, which have impeded the expansion of its manufacturing industry. The competitiveness of Malaysian industry has been negatively impacted by insufficient infrastructure, bureaucratic inefficiencies, and a shortage of skilled or trained labor.

5. Resource Dependence: Malaysia's economy has traditionally depended on the exploitation of natural resources, namely in sectors like palm oil, rubber, and oil and gas. Although these sectors have played a role in fostering economic expansion, they have also limited the progress of other industries and led to the decline of industrialization.

Malaysia persists in implementing measures to tackle deindustrialization and stimulate economic diversification, despite the obstacles it faces. Malaysia's economic transformation and sustainable growth rely heavily on endeavours to increase human capital development, boost technology and innovation skills, modernise infrastructure, and attract investment in high-value-added businesses. Ultimately, Malaysia has seen a process of deindustrialization in recent times. However, it is crucial to tackle the fundamental obstacles and enforce efficient strategies in order to rejuvenate the manufacturing industry, foster economic diversification, and secure sustained prosperity in the long run.

Several policy recommendations have been discussed, drawing from national policy documents and categorized into three main areas: supply, demand, and environmental perspectives. On the supply side, it is crucial to enhance the manufacturing workforce environment and increase productivity through technology and innovation adoption. From the demand side, transitioning to export medium- and high-tech manufacturing and establishing industry foundations through quality investment are recommended. Finally, from an environmental standpoint, focusing on emerging green industries is essential.

1. Economic Overview

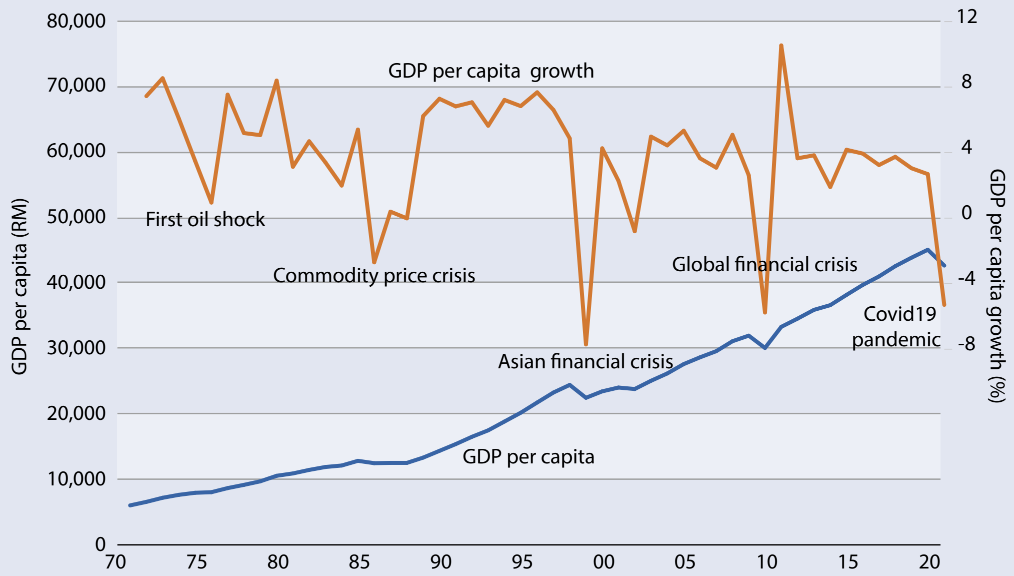
1.1 GDP Per Capita, and GDP Per Capita Growth Rate

The economic performance of the Malaysian economy has been remarkable, if not outstanding, for the past five decades, considering year-to-year economic growth. Since its independence in 1957, over the period of 50 years, Malaysia has developed and became an upper middle-income developing nation in 1992. In 1970, Malaysia's gross domestic product (GDP) per capita stood at MYR6,775 (in 2020 constant prices), and by 2020, Malaysia's GDP per capita reached MYR43,378. The GDP per capita has been on an increasing trend from 1970 to 2020, as shown in Figure 1. However, there were hiccups in several years, particularly during the first oil shock of 1975, the commodity price crisis in 1985–86, the Asian financial crisis in 1997, the global financial crisis of 2008–09, and the unprecedented COVID-19 pandemic in 2020. As shown in Figure 1, Malaysia's economic growth was quite volatile in the 1970s due to the fluctuations in commodity prices, but Malaysia also enjoyed more stable economic growth during the early 1990s, 2000s, and a decade before the COVID-19 pandemic struck. The export-oriented industrialization policy of 1970–80 [1] has succeeded in promoting Malaysia's economic growth to an average 7.4% for the 1971–73 period and 6.6% for the 1976–79 period. This was a period of high economic growth, fuelled by strong commodity prices. Despite this remarkable growth, in the 1970s, Malaysia was struck by the first oil shock in 1974–75 and the second oil shock in 1980.

In the 1980s and 1990s, industrial policies (Industrial Master Plan 1, 1986–95; Industrial Master Plan 2, 1996–2000) were dominated by the economy-led heavy industries and privatization; foreign domination of high technology and dynamic export sector, which centered on high-technology manufactured exports of electronics and electrical components (E&E), spurred economic growth to an average of 6.8% during 1988–96. During the 1980s and 1990s periods, Malaysia had to face two economic crises – the commodity price crisis in 1985–86, and the Asian financial crisis in 1997. After recovering the 1997 Asian financial crisis, Malaysia enjoyed a stable average growth rate during 2002–07. Unfortunately, Malaysia had to face another financial crisis in 2008–09. The

FIGURE 1

TREND IN GDP PER CAPITA AND GDP PER CAPITA GROWTH IN MALAYSIA, 1970–2020



Source: Computed from APO [4].

global financial crisis cost Malaysia a negative growth of 5.8% in 2009, but lower than the 1997 Asian financial crisis of negative 7.7% growth in 1997. Nevertheless, yet another crisis struck Malaysia in 2020. The COVID-19 pandemic resulted in a negative growth of 5.3% in 2020. The economic growth post-global financial crisis and pre-COVID-19 pandemic only registered an average growth rate of 3.4% for the period 2011–19. The lower economic growth rate for the periods beyond 2000 have been the results of deindustrialization experienced by Malaysia, and the rise in China's export-oriented manufacturing sector additionally created a huge competition for Malaysia. The contribution of the manufacturing sector in terms of share to total output and total employment has been declining since 2000 [2, 3].

1.2 Contribution to Per Capita GDP Growth by Factor

In growth accounting, the production function is most typically defined as the Cobb-Douglas production function specified in the familiar form,

$$Y_t = A_t K_t^{\alpha} L_t^{1-\alpha} \quad (1)$$

where Y_t is total real output to an economy, K_t is capital, and L_t is labor input, while A_t is the efficiency parameter or the technical progress or technology. As such, increase in A_t is to be associated with people inventing new technologies that allow firms to be more productive. Expressing Equation (1) through percentage changes gives us the so-called growth accounting formula

$$g_t^Y = g_t^A + \alpha g_t^K + (1-\alpha) g_t^L \qquad (2)$$

where g denotes percentage growth. Equation (2) says that the growth rate of output equals the growth rate of the technology term plus a weighted average of capital growth and labor growth, where the weight is determined by the parameter α. The parameter α is the share of capital to total output.

By defining capital consisting of ICT capital and non-ICT capital and labor input consisting hours worked and labor quality, we have an expanded growth accounting [5] as

$$g_t^Y = g_t^A + \alpha(g_t^{ICT} + g_t^{non-ICT}) + (1-\alpha)(g_t^{hw} + g_t^{lq}) \qquad (3)$$

The labor productivity growth, therefore, can be decomposed into the following:

$$g_t^Y - g_t^{hw} = g_t^A + \alpha(g_t^{ICT} + g_t^{non-ICT}) + (1-\alpha) g_t^{lq} \qquad (4)$$

Results from the decomposition of economic growth are reported in Table 1 and Chart 1. As shown in Table 1, Malaysia achieved a GDP growth of 5.9% over the five decades from 1971–2020. Growth during this period was supported by 6.3% growth in capital input and 4.6% in labor input, and a total factor productivity (TFP) growth of 0.3%. During the sub-periods of 10 years, the growth of GDP Malaysia showed quite impressive trends. Malaysia experienced an outstanding average growth of 7.8% during the period 1971–80. However, in the next several decades, the average GDP growth fell to 5.9% in 1981–90, increased to 6.9% in 1991–2000, and then fell again to 5.2% in 2001–10 and 3.8% in 2011–20. Despite the decreasing average growth performance, growth in capital input was still high, growing at an average of 7.8% during the three sub-periods 1971–80, 1981–90, and 1991–2000. On the other hand, the average growth of labor input only grew at the average of 2.0% for the same three sub-periods. Furthermore, during these three sub-periods, the growth in ICT capital was outstanding, with an average growth of 20%.

In terms of contribution to GDP growth, capital input played a major role in this performance, with an average share of more than 65% for 1971–2020. Although growth in ICT capital was higher than the growth in non-ICT capital for decades, non-ICT capital input contributed more than 50% to the share in the growth in capital input. For example, except for 2001–20, the contribution to capital growth by non-ICT capital input was 55.0% in 1971–80, 72.1% in 1981–90, 72.8% in 1991–2000, and 64.1% in 2011–20. The contribution of labor input was about 30.0% on average in the last five decades. The performance of labor input has been driven by 18.0% of hours worked and 12.0% in labor quality during the same period. Nevertheless, the contribution of TFP to GDP growth has been very low, and in fact, shows negative growth and contributions for the periods 1981–90, 1991–2000, and 2011–20 (see Chart 1).

The rather low contribution of TFP to output growth may be due to the upsurge in the growth rate of capital, which far exceeded the rate of growth of output, thereby causing a negative TFP growth during those periods. According to Choong and Tham [6], it is possible that excess capacity will emerge when the increase in capital exceeds the increase in output. The underutilization of capacity may be due to the lumpiness in investment. On the other hand, the low contribution of TFP is also supported by the work of Menon [7]. His works on estimating TFP growth in foreign and domestic firms in 53 Malaysian 5-digit ISIC manufacturing industries for the period 1988–92 suggests that the nature of the activity involved in this industry is low-skilled and labor intensive assembly operations. Menon [7] also found that almost 65% of real output growth is due to growth in intermediate inputs, while for foreign firms, almost 75% of the growth in real output is due to growth in intermediate inputs. This finding support Krugman's [8] contention that such growth is input, rather than efficiency, driven. Krugman [8] warns that input-driven growth is an inherently limited process in that it will inevitably encounter diminishing returns if it continues without productivity growth.

TABLE 1

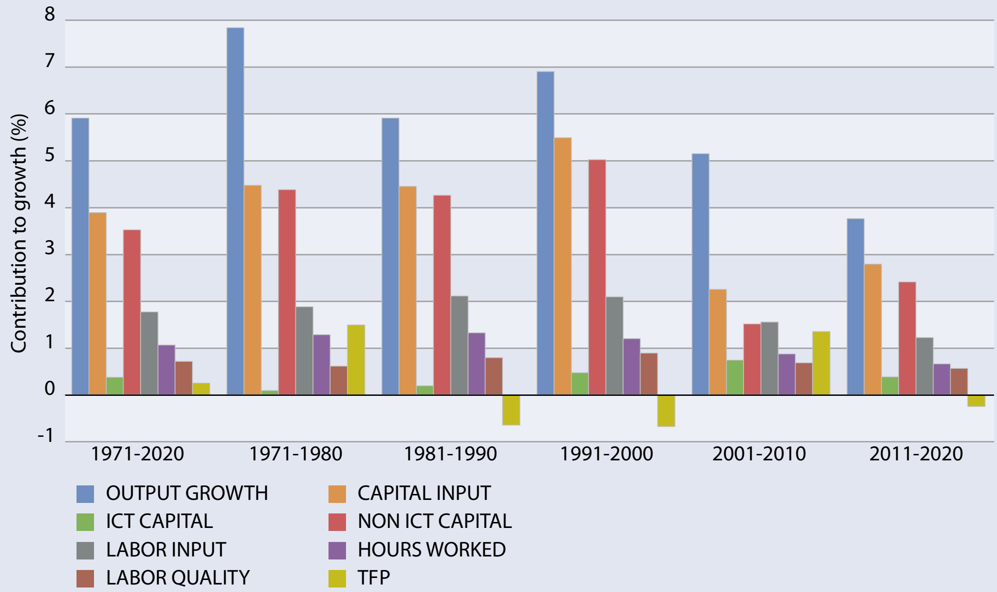
SOURCES OF GDP GROWTH, 1971–2020 AND SUB-PERIODS

Periods	Real GDP growth	Capital input	ICT capital	Non-ICT capital	Labor input	Hours worked	Labor quality	TFP
A. Growth (%)								
1971–2020	5.91	6.32	16.74	5.92	4.63	2.79	1.84	0.25
1971–80	7.84	7.39	17.19	7.30	4.74	3.21	1.53	1.49
1981–90	5.91	7.36	20.49	7.15	5.31	3.32	1.99	-0.65
1991–2000	6.90	8.72	21.81	8.25	5.67	3.28	2.39	-0.68
2001–10	5.15	3.45	16.30	2.50	4.39	2.44	1.95	1.35
2011–20	3.76	4.67	7.89	4.39	3.05	1.70	1.35	-0.25
B. Contribution to growth (%)								
1971–2020	5.91	3.89	0.37	3.52	1.77	1.06	0.71	0.25
1971–80	7.84	4.47	0.09	4.38	1.88	1.28	0.61	1.49
1981–90	5.91	4.45	0.19	4.26	2.11	1.32	0.79	-0.65
1991–2000	6.90	5.49	0.47	5.02	2.09	1.20	0.89	-0.68
2001–10	5.15	2.25	0.74	1.51	1.55	0.87	0.68	1.35
2011–20	3.76	2.79	0.38	2.41	1.22	0.66	0.56	-0.25
C. Percentage share to growth (%)								
1971–2020	100	65.8	6.26	59.56	29.9	17.9	12.0	4.2
1971–80	100	57.0	1.15	55.87	24.0	16.3	7.8	19.0
1981–90	100	75.3	3.21	72.08	35.7	22.3	13.4	-11.0
1991–2000	100	79.6	6.81	72.75	30.3	17.4	12.9	-9.9
2001–10	100	43.7	14.37	29.32	30.1	16.9	13.2	26.2
2011–20	100	74.2	10.11	64.10	32.4	17.6	14.9	-6.6

Source: APO Productivity Database 2022 Version 1, and author's computation.

CHART 1

CONTRIBUTION TO GDP GROWTH, 1971–2020, 1971–80, 1981–90, 1991–2000, 2001–10, AND 2011–20



Source: Illustrated from Table 1.

1.3 Sources of Labor Productivity Growth

On the other hand, the sources of labor productivity growth in Malaysia are shown in Table 2 and Chart 2, for the period 1971–2020, and sub-periods 1971–80, 1981–90, 1991–2000, 2001–10 and 2011–20. Its average growth rates were 3.1% for 1971–2020; contributed by 2.2% in capital deepening and 0.7% labor quality and 0.3% in TFP. The average labor productivity growth was 4.6% in 1971–80, falling to 2.6% in 1981–90, rising again to 3.6% in 1991–2000, and starting to fall again to 2.7% in 2001–10 and to 2.1% in 2011–20. During these periods, except in 2001–10, capital deepening contributed an average of 54.6% in 1971–80, rose to 94.6% in 1981–90, lowered slightly to 93.9% in 1991–2010, and further reduced to 85.0% in 2011–20, while labor quality contributed to an average of 22.8% during the five decades of 1971–2020. Nevertheless, the main contributor to capital deepening was from non-IT capital input for the periods 1971–1980, 1981–90, 1991–2001 and 2011–20, except in 2001–10 in which non-IT capital contributed only 2.0%. On the other hand, TFP contribution to labor productivity growth was low, but its contribution increased to 32.2% in 1971–80 and 50.0% in 2001–10. In fact, these higher contribution in TFP compensated for the low contribution in capital deepening to labor productivity growth in 1971–80 and 2001–10.

Looking at Table 1 and Table 2, we can observe that the performance of the output growth for the past five decades "mirror" the growth in labor productivity during the same periods. This implies that labor productivity growth has an important role in affecting output growth in Malaysia.

TABLE 2

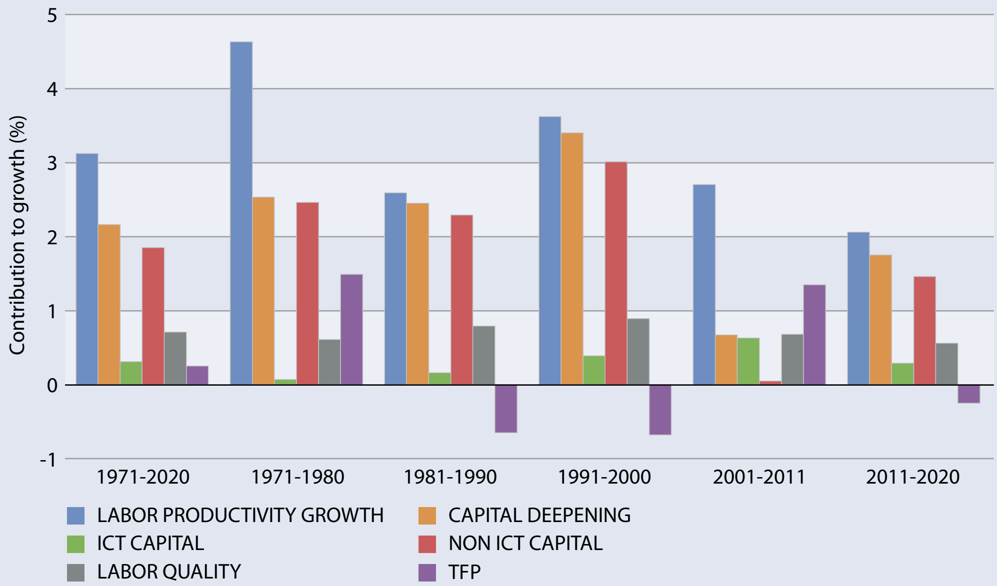
SOURCES OF LABOR PRODUCTIVITY GROWTH, 1971–2020 AND SUB-PERIODS

Periods	Labor productivity growth	Capital deepening	ICT capital	Non-ICT capital	Labor quality	TFP
A. Contribution to growth (%)						
1971–2020	3.12	2.16	0.31	1.85	0.71	0.25
1971–80	4.63	2.53	0.07	2.46	0.61	1.49
1981–90	2.59	2.45	0.16	2.29	0.79	-0.65
1991–2000	3.62	3.40	0.39	3.01	0.89	-0.68
2001–10	2.70	0.67	0.63	0.05	0.68	1.35
2011–20	2.06	1.75	0.29	1.46	0.56	-0.25
B. Percentage share to growth (%)						
1971–2020	100	69.2	9.9	59.3	22.8	8.0
1971–80	100	54.6	1.5	53.1	13.2	32.2
1981–90	100	94.6	6.2	88.4	30.5	-25.1
1991–2000	100	93.9	10.8	83.1	24.6	-18.8
2001–10	100	24.8	23.3	1.9	25.2	50.0
2011–20	100	85.0	14.1	70.9	27.2	-12.1

Source: APO Productivity Database 2022 Version 1, and author's computation

CHART 2

CONTRIBUTION TO LABOR PRODUCTIVITY GROWTH, 1971–2020, 1971–80, 1981–90, 1991–2000, 2001–10, AND 2011–20



Source: Illustrated from Table 2.

2. (DE)INDUSTRIALIZATION TRENDS

2.1 Trends of Agricultural, Manufacturing and Services Shares in GDP and Employment

It has been recognized that industrialization has long been considered the key route by which economies can sustain long-term economic growth and standard of living. Industrialization involves the move from the traditional agriculture-based economy to a manufacturing-based economy. According to Kaldor [9] and Kuznets [10], in the early stages of economic development, the agriculture sector is the main sources of output and employment. As the economy progress and as income increases, output and employment in the agriculture sector shifts to the manufacturing sector as the next engine of growth. The manufacturing sector has been considered a technologically dynamic sector. It has the ability to attain greater levels of capital accumulation, economies of scale and technological progress compared with the agriculture sector. Furthermore, the growth in the manufacturing sector tends to speed up the rate of technological development of the whole economy, partially because of the absorption of surplus labor and the creation and diffusion of invention in certain industries through linkage effect [11, 12]. Nevertheless, deindustrialization occurs when the focus of economic development shifts from the manufacturing sector to the services sector, suggesting that consumer demand has shifted away from manufacturing towards services.

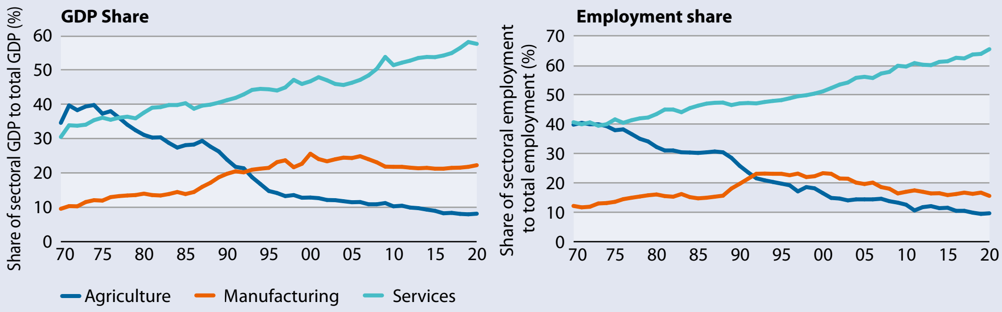
Deindustrialization has been considered an inevitable consequence of the progress of economic development, whereby as income per capita grows over time, manufacturing grows at the expense of the agricultural sector, and up to a certain optimal point, the contribution of the manufacturing sector declines and that of services sector rises progressively [13]. At that particular turning point of income per capita, the employment share of the services sector starts to grow at the expense of the manufacturing sector, since productivity gains allow the manufacturing activities to function with fewer employees and the services sector is able to absorb the additional labor from the manufacturing sector [14]. Rawthorn and Ramasamy [16], Palma [16] and Rodrik [17] defined the term "deindustrialization" as the decline in the share of employment (to total employment) and/or share of GDP (to total GDP) of the manufacturing sector.

In Malaysia, the trends in the share of GDP in the agriculture, manufacturing and services sectors for the period 1970–2020 are depicted in Figure 2, as well in Table 3 and Chart 3 for the sub-periods. As shown in Figure 2, the share of agriculture in GDP was higher than the manufacturing sector in the early 1970s, contributing to almost 40% in total GDP. However, it declined quite rapidly until 1995, after which it tapered off gradually to below 10% of GDP by 2013–20. The share of the manufacturing sector to GDP, on the other hand, shows a steady increase from about 10% of GDP in early 1970s until it peaked in 2000, registering a share in GDP of 26%. Thereafter, the share of the manufacturing in GDP started declining until 2009, when it stabilized around 22% of GDP. At the peak of 2000, Malaysia registered a per capita income level of around USD6,500.00 (constant 2015=100, upper middle-income group), which is considered lower than the peak in which industrialized nations deindustrialization at income level of USD10,000.00 in current price [18], and around USD9,500.00 per capita income in 1995 purchasing power parity [19].

On the other hand, the share of the services sector in GDP has shown a remarkable increase from about 34% in GDP in the early 1970s to 58% of GDP in 2020. Table 3 and Chart 3 show the performance of the share of the three sectors to GDP by sub-periods. As shown in Chart 3, the share of the agriculture and manufacturing sectors shrunk as we move from 1971–80 to 2011–20, while the share of the service sector in GDP rose over time. Nevertheless, the manufacturing share of GDP and employment seem to have levelled off after 2011, and in fact show a slow upward trend by 2015–19.

FIGURE 2

TRENDS OF AGRICULTURE, MANUFACTURING AND SERVICES GDP SHARE TO TOTAL GDP, AND EMPLOYMENT SHARE TO TOTAL EMPLOYMENT IN MALAYSIA 1970-2020



Source: Computed from APO [4].

TABLE 3

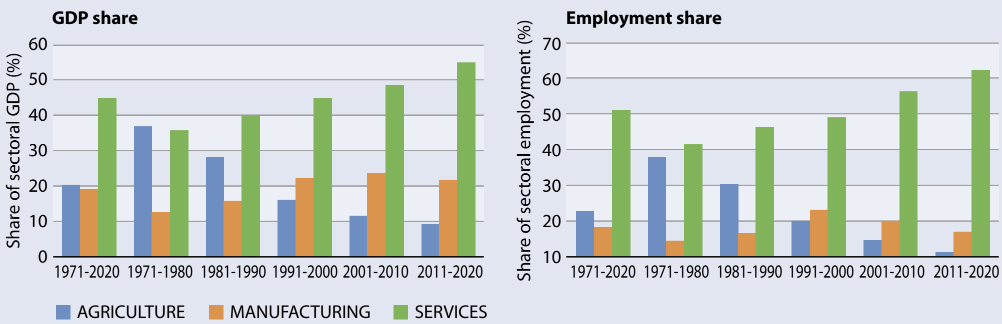
SHARE OF SECTORAL GDP AND SECTORAL EMPLOYMENT, 1971–2020 AND SUB-PERIODS

Periods	Share of sectoral GDP (%)			Share of sectoral employment (%)		
	Agriculture	Manufacturing	Services	Agriculture	Manufacturing	Services
1971–2020	20.2	19.1	44.6	22.5	18.0	51.0
1971–80	36.6	12.4	35.5	37.6	14.2	41.3
1981–90	28.1	15.6	39.8	30.1	16.3	46.2
1991–2000	16.0	22.1	44.7	19.8	22.9	48.9
2001–10	11.5	23.6	48.4	14.3	19.8	56.3
2011–20	9.0	21.6	54.7	11.0	16.7	62.3

Note: Computed from APO Productivity Database 2022 Version 1.0

CHART 3

SHARE OF SECTORAL GDP TO TOTAL GDP AND EMPLOYMENT TO TOTAL EMPLOYMENT FOR 1971–2020, AND SUB–PERIODS 1971–80, 1981–90, 1991–2000, 2001–10, AND 2011–20



Source: Illustrated from Table 3.

The share of employment in the agriculture, manufacturing and services sectors in total employment are shown in Figure 2, Table 3, and Chart 3. An almost similar scenario is clearly observed in Figure 2, in which the share of employment in manufacturing sector is a mirror image to the share of employment in the agriculture sector. Starting with 40% share of employment in the agriculture sector, it continued to declined gradually until it reached a share of 10% in 2020. On the other hand, the share of employment in the manufacturing sector steadily increased from about 12% in total employment in the early 1970s and reached a peak at about 24% share in total employment in 2000, and thereafter the share of employment in the manufacturing sector declined moderately until 2020 with a share of 16% to total employment. However, the share of employment in the services sector increased steadily, from about 41% in 1970 to 66% in 2020. Table 3 and Chart 3 illustrate the trends in share of employment in the three sectors to total employment by sub-periods. The chart clearly shows that the share of employment in the services sectors has increased during the last five decades, while both the share of employment in agriculture and manufacturing sectors have been shrinking over the five decades. However, the decrease in share in manufacturing is not as much as in the agriculture sector.

Both the performance of the manufacturing output share to total output and employment share to total employment demonstrate a deindustrialization process in Malaysia since 2000. These scenarios concur with the findings by Rasiah [2] and Rasiah et al. [3]. As shown by both Figure 2 and Table 3, Malaysia experienced premature deindustrialization as (1) Malaysia's share of manufacturing GDP in total GDP reached its peak at the per capita income, which is less than the per capita income experienced by the developed nations, and (2) the decrease in employment share was less than the decrease in GDP share. This characterizes a premature deindustrialization phenomenon in Malaysia [20].

There are various reasons to suspect the causes of deindustrialization and Malaysia's slow economic growth, in particular after the Asian financial crisis. Among the factors are: (i) low private investment involvement, (ii) foreign workers, (iii) shortage of human capital, (iv) increasing competition from other countries, and (v) technology.

Low private investment. The influx of foreign direct investment (FDI) has been the driving force behind the growth of manufactured exports in Malaysia over the two decades before the Asian financial crisis. Menon [21] found that Malaysia's foreign direct investment (FDI) did not see a recovery similar to those of other nations hit by the crisis. Although there was a little increase in economic recovery in 2010 and 2011, the majority of foreign direct investment (FDI) was directed into the services sector, particularly in real estate, rather than the industrial sector. According to Menon [21], the overdependence on foreign direct investment (FDI) is believed to have hindered the development of domestic enterprises, innovation, and overall economic growth. However, the limited foreign direct investment (FDI) might be offset by an augmentation in investment by local private companies. Regrettably, in Malaysia, the private investment of local businesses was displaced by the governmental corporations known as government-linked companies (GLCs). Gomez et al. [22] said that the creation of these government-linked corporations (GLCs) is driven by their close affiliations with political elites, enabling them to secure economic benefits. Menon [21] argues that GLCs are widespread in various sectors and possess substantial market power. Furthermore, their privileged access to government and regulatory agencies allows them to gain advantages, making them a formidable obstacle to competition and the establishment of new private firms. Menon and Ng [23] have shown that when GLCs hold a significant portion of sector revenue, private investment in that area is deterred. Menon and Ng [23] conducted empirical research showing that when government-linked corporations (GLCs) have a stake of 60% or more in the revenue of a certain sector, it leads to a large decrease in investment by domestic private enterprises in that area.

Foreign workers. The use of foreign labor plays a significant role in the economic development of Malaysia [24]. The introduction of foreign labor into the Malaysian economy started due to a shortage of domestic workers in the manufacturing industry during the early 1990s [25]. Tan [1] states that the influx of foreign workers has played a crucial role in mitigating labor shortages in Malaysia and sustaining development in the manufacturing sector, even in the face of deindustrialization after 2000. However, a significant issue with the nation's reliance on foreign labor is their comparatively lower level of skills in comparison to domestic workers [24]. According to the World Bank [26], a mere 5% of foreign workers in Malaysia were employed in high-skilled occupations in 2014, while 44% of low-skilled foreign workers were engaged in elementary occupations. Regrettably, the arrival of low-skilled foreign workers has had a detrimental impact on labor productivity in the sector. This is because they replace capital and hinder automation, as evidenced by studies conducted by Rasiah et al. [3] and Tham and Liew [27, 28]. Furthermore, their presence discourages innovation and upgrading, as firms have little motivation to invest in skills, as highlighted by Hill [29]. Consequently, multinational corporations are less inclined to engage in higher value-added activities, as noted by Menon [21]. The influx of foreign workers in the industrial sector caused a decline in local wages and hindered the transition from labor-intensive to knowledge-based and technology-driven manufacturing activity.

Shortage of human capital. UNDP's study in 2005 highlighted significant shortcomings in Malaysia's human capital, despite the Malaysian government's attempts to transition from an exclusive English-medium education system catering to the urban middle class to one that offered universal primary education by 1990. However, despite these efforts, Malaysia saw a lower percentage of graduates in the field of science and technology. The scarcity of human resources has been documented since the attainment of full employment in the early 1990s [30]. The continued existence of skill shortages, despite a rise in the number of new graduates, suggests a significant discrepancy between the demand and supply of skills. Hill [29] argues that the scarcity of human capital has impeded Malaysia's progress in technology and hindered its attainment of high-income status. According to Menon [21], the key to enhancing manufacturing may be to enhance the skill levels of local workers rather than only limiting the employment of low-skilled overseas workers. Malaysia has a higher inflow of labor compared to its outflow, making it a net importer of labor. However, Malaysia has a higher outflow of skilled individuals compared to its inflow, making it a net exporter of skills.

Increasing competition from other countries. Asyraf et al. [20] found that the Malaysian economy is undergoing deindustrialization, as shown by a decrease in both employment and the manufacturing sector's contribution to output. This decline in employment is not due to increased productivity, but rather a result of reduced competitiveness. The decline in competitiveness may be partially attributed to China's accession to the World Trade Organization (WTO), which corresponded with the diminishing importance of Malaysia's manufacturing employment share. The competition for foreign direct investment (FDI) and the process of industrial upgrading have been impacted by the growing competition from the People's Republic of China and other member nations of the Association of Southeast Asian Nations (ASEAN) [30]. Nevertheless, Malaysia is not the only country experiencing a decline in competitiveness compared to PR China. Other Asian countries have also seen a reduction in employment within low skill industries. However, what sets apart other nations like the ROK and Taiwan is their ability to avoid premature deindustrialization by generating jobs in other lucrative sectors of the manufacturing value chain. This contrast is not as evident in Malaysia.

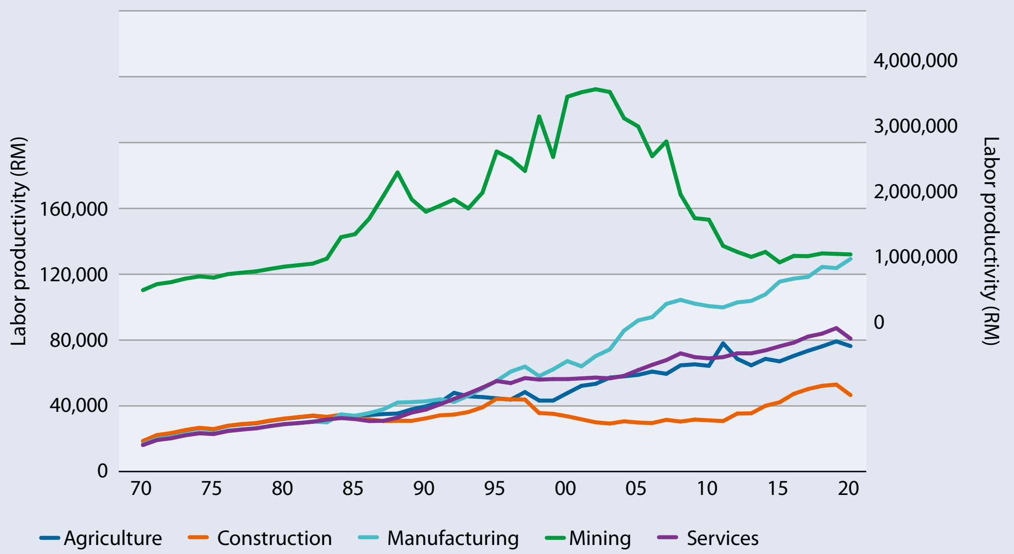
Technology. The influx of low-skilled immigrant labor into the manufacturing sector has facilitated the availability of inexpensive workforce for the industry, hence safeguarding their competitiveness in the global export market [22]. The industry's lack of urgency has hindered the implementation of automation, innovations, and technical advancements. Based on the International Federation of Robotics [31], Malaysia had a low robot-to-worker ratio of 34 robots per 10,000 workers in the manufacturing sector in 2016, which is far below the average of 74. This number is much lower compared to other ASEAN member nations, such as Thailand (45) and Singapore (488). One potential explanation is that Small and Medium Enterprises, SMEs, make up about 98% of the whole industry in Malaysia [32]. The small and medium-sized enterprises (SMEs) have limited ability to effectively assimilate new knowledge, as shown by the research and development (R&D) skills possessed by their R&D personnel. The research conducted by Chandran et al. [33] suggests that international and bigger companies possess superior absorptive potential compared to local and small companies. Consequently, these small and medium-sized enterprises (SMEs) lack the ability to identify technical opportunities, resulting in inadequate formation and utilisation of university-industry connections that may facilitate research and development cooperation.

2.2 Trend in Labor Productivity by Industry

The trend in labor productivity by industry in Malaysia is shown in Figure 3, Table 4 and Chart 4. As shown in Figure 3, labor productivity in the mining sector, despite being the highest, started to climb until it reached its peak in early 2000, and thereafter started to fall until stabilizing from 2015–2020. Other sectors show increasing trends in labor productivity, especially in the manufacturing sector, followed by services, agriculture, and the construction sector.

FIGURE 3

TREND IN LABOR PRODUCTIVITY BY INDUSTRY IN MALAYSIA, 1970–2020



Source: APO [4].

TABLE 4

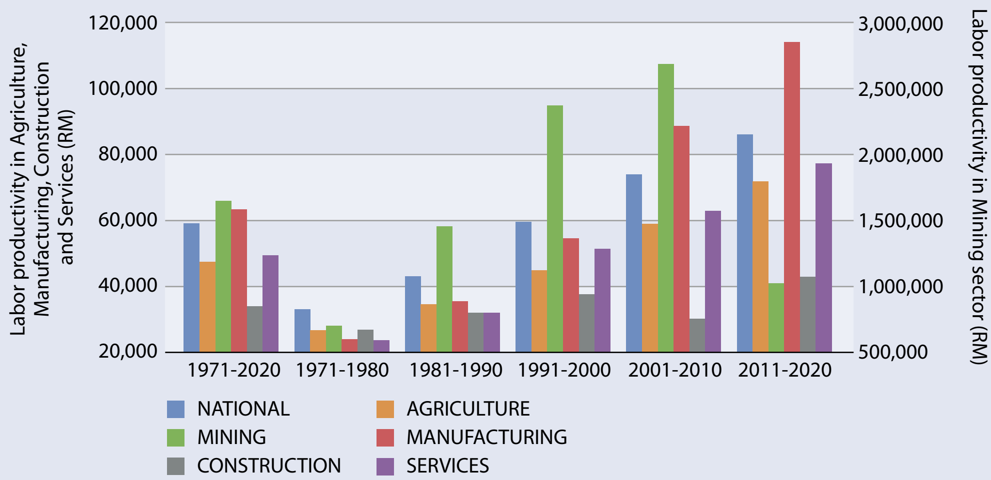
SECTORAL LABOR PRODUCTIVITY (RM), 1971–2020 AND SUB-PERIODS

Periods	National	Agriculture	Mining	Manufacturing	Construction	Services
1971–2020	59,044	47,252	1,646,590	63,269	33,702	49,318
1971–80	32,846	26,508	696,813	23,668	26,637	23,400
1981–90	42,849	34,351	1,454,757	35,281	31,805	31,767
1991–2000	59,436	44,661	2,371,892	54,520	37,469	51,286
2001–10	73,966	58,921	2,691,569	88,680	29,913	62,902
2011–20	86,125	71,821	1,017,920	114,197	42,684	77,236

Note: Computed from APO Productivity Database 2022 Version 1.0

CHART 3

LABOR PRODUCTIVITY BY INDUSTRY IN MALAYSIA FOR 1971–2020, AND SUB-PERIODS 1971–80, 1981–90, 1991–2000, 2001–10, AND 2011–20.



Source: Illustrated from Table 4.

On the other hand, Table 4 and Chart 4 clearly demonstrate that for the last ten decades, the labor productivity in the manufacturing sector contributes the highest average level, followed by mining, services, agriculture, and construction. The manufacturing labor productivity during 2011–20 has increased 4.8 times compared to the level of labor productivity in 1971–80. For the services sector, between 1971–80 and 2011–20, labor productivity has increased 3.3 times during those periods.

2.3 Decomposition of Labor Productivity by Industry

The decomposition of the labor productivity growth by industry is shown in Table 5 and is illustrated in Chart 5 and Figure 4. For this analysis, we have used data from the Department of Statistics Malaysia. The data is limited to the year 2005 onwards as data on compensation to employees and operating surplus by industry is only available from 2005. Using equation (2) and deriving capital stock using $K_t = [\frac{GFCF_t}{g_{GFCF} + \delta}]$, where K_t is capital stock, $GFCF_t$ is the level of gross fixed capital formation, δ is rate of depreciation which is assumed to be 3% per year, and g_{GFCF} is average growth in gross fixed capital formation [34, 35], the calculated labor productivity growth, capital intensity and total factor productivity by industry – agriculture, construction, manufacturing, mining and services – is presented in Table 5, Chart 6 and Figure 4. For Table 5 and Chart 5, the performance of the labor productivity growth is divided into three periods, 2007–20, 2007–13 and 2014–20.

For the period 2007–20, capital intensity has been the main contributor to labor productivity growth (except for mining) in agriculture, construction, manufacturing and services sectors. In fact, capital intensity contributed positively to the growth of labor productivity in all sectors during the period 2007–13. On the other hand, total factor productivity or technical progress contributed positively to labor productivity growth in the construction, manufacturing, mining and services sectors for the period 2007–20 and only in construction and services during the period 2007–13.

For the period 2014–20, the labor productivity growth in the agriculture, construction and manufacturing sectors were contributed by capital intensity as well as total factor productivity. In fact, total factor productivity drove labor productivity growth in the agriculture, construction, manufacturing, and the services sectors during the period 2014–20. As shown in Figure 4, the role of capital intensity and total factor productivity are rather complementarity, in the sense that when capital intensity is low, total factor productivity is high, thus stabilizing the growth in labor productivity.

TABLE 5

DECOMPOSITION IN LABOR PRODUCTIVITY BY INDUSTRY

		Contribution to growth (%)		
		2007–20	2007–13	2014–20
National	Labor productivity growth	1.25	0.43	2.07
	Capital intensity	0.85	2.48	-0.77
	Total factor productivity	0.39	-2.05	2.84
Agriculture	Labor productivity growth	1.94	1.38	2.50
	Capital intensity	3.83	5.11	2.55
	Total factor productivity	-1.89	-3.74	-0.04
Construction	Labor productivity growth	3.63	2.90	4.36
	Capital intensity	1.82	2.13	1.50
	Total factor productivity	1.82	0.77	2.86
Manufacturing	Labor productivity growth	2.37	1.51	3.24
	Capital intensity	1.71	2.95	0.47
	Total factor productivity	0.66	-1.45	2.77
Mining	Labor productivity growth	-5.44	-11.71	0.83
	Capital intensity	-0.53	6.87	-7.93
	Total factor productivity	-4.92	-18.59	8.75
Services	Labor productivity growth	1.67	1.56	1.77
	Capital intensity	0.38	0.97	-0.20
	Total factor productivity	1.28	0.59	1.97

Source: Computed from APO Productivity Database 2022 Version 1.0, and Department of Statistics Malaysia.

CHART 5

DECOMPOSITION OF LABOR PRODUCTIVITY BY INDUSTRY IN MALAYSIA, 2007–20, 2007–13 AND 2014–20

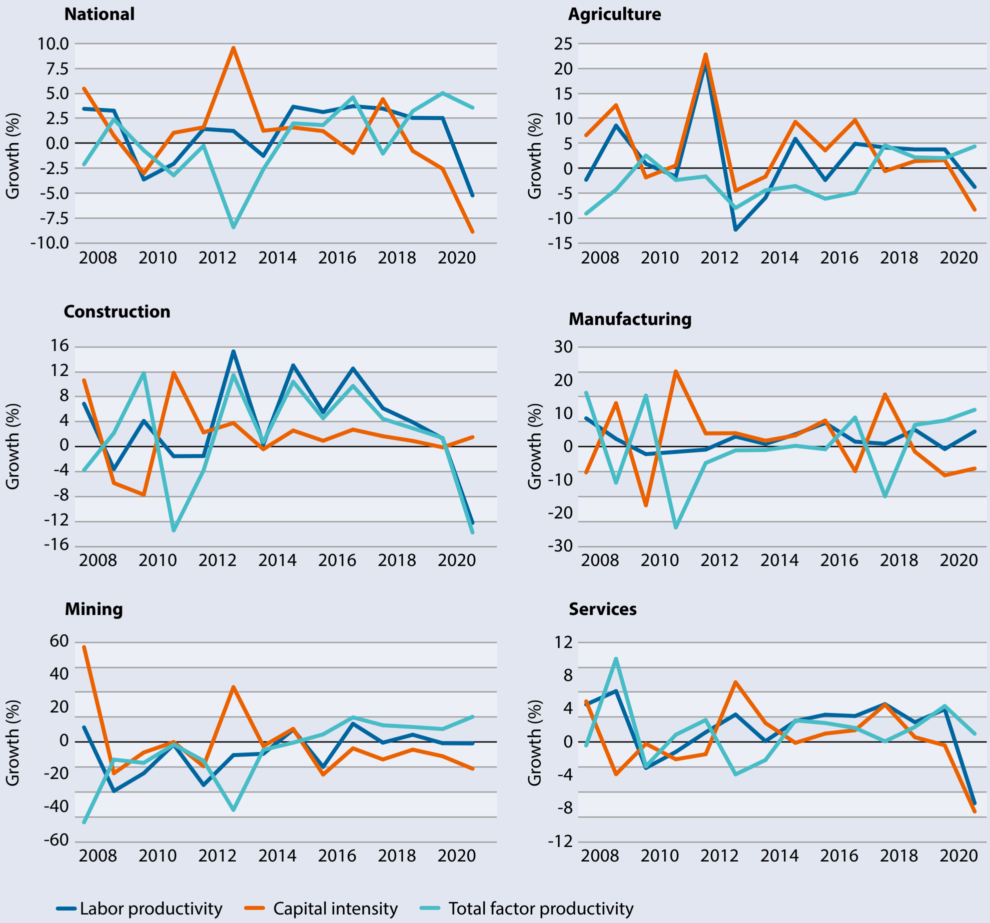
Source: Illustrated from Table 5.

2.4 Decomposition of Labor Productivity in Within Effect and Structural Change Effect

Sectoral productivity could be a potential source of productivity growth as workers move from the less productive sectors, such as agriculture, to more productive sectors, such as manufacturing and market services. The shift-share analysis or productivity growth decomposition method can be used to investigate the labor productivity growth and labor reallocation between sectors that may influence the aggregate growth. In other words, by using shift-share analysis, we can uncover the contribution of structural change and the intra-sectoral effect to labor productivity growth. The contribution of structural change to labor productivity growth takes place through the reallocation of resources either to more productive sectors or to sectors with higher labor productivity growth rates. Labor can move across sectors, from low productivity sectors to high-productivity sectors, thus increasing overall labor productivity in the economy. Meanwhile, the intra-sectoral effect or the within effects illustrate the rise in labor productivity that could have occurred even in the absence of structural

FIGURE 4

TRENDS IN COMPOSITION OF LABOR PRODUCTIVITY BY INDUSTRY IN MALAYSIA, 2007–20



changes. It corresponds to the productivity gains achieved due to the internal improvements in productivity in each sector. Productivity can grow within economic sectors through capital accumulation, improvements in technology change, and improvement in production methods.

Following McMillan and Rodrik [36] and McMillan et al. [37], the productivity growth decomposition is expressed as

$$\Delta Y_t = \sum_{i=1}^{n} \omega_{i,t-k} \Delta y_{i,t} + \sum_{i=1}^{n} y_{i,t} \Delta \omega_{i,t} \qquad (5)$$

where Y_t and $y_{i,t}$ refer to economy-wide and sectoral labor productivity levels, respectively, and $\omega_{i,t}$ is the share of employment in sector i. The Δ operator denotes the change in productivity or employment shares between t-k and t. The first term is the within effect component, while the second term is the structural change effect.

The results of the shift-share analysis are presented in Table 6. In Panel A, labor productivity growth in Malaysia for the periods 1971–2020, and sub-periods 1971–80, 1981–90, 1991–2000, 2001–10, and 2011–20, is influenced by the within-effect and structural change effect. The average labor productivity growth is mostly coming from the within-effect contribution. This implies that labor productivity growth in Malaysia is dominated by the internal improvement within the sector, probably through capital accumulation, improvement in technology change, and improved efficiency in production method, indicating overall efficiency enhancements within the economy's sectors.

On the other hand, the structural change effect shows negative values for almost all periods except for 2001–10, suggesting that labor moved from sectors with higher productivity growth to sectors with lower productivity growth, thus reducing employment shares in those sectors. For example, for the period 1971–2020, of this 4.47%, productivity growth within sectors accounted for 4.89%, while structural change accounted for negative 0.42%. Thus, for the entire period of five decades, structural change was growth-reducing, while productivity growth was sourced from improvement within the sectors. Furthermore, moving from period to period, as the average within effect grows slower, so does the labor productivity growth during the same periods.

TABLE 6

AGGREGATE LABOR PRODUCTIVITY GROWTH BY INDUSTRY, 1971–2020 AND SUB-PERIODS

Industry	Labor productivity growth (%)	Within effect (%)	Structural change effect (%)		Industry	Labor productivity growth (%)	Within effect (%)	Structural change effect (%)
Panel A:								
Total								
1971–2020	4.47	4.89	-0.42					
1971–80	3.68	4.88	-1.20					
1981–90	2.36	4.14	-1.78					
1991–2000	3.01	4.50	-1.48					
2001–10	1.96	1.73	0.23					
2011–20	1.52	1.61	-0.09					
Panel B:								
	1971–2020					1971–80		
Total	4.47	4.89	-0.42		Total	3.68	4.88	-1.20
Agriculture		1.58	-1.67		Agriculture		1.47	-0.93
Construction		0.10	0.08		Construction		0.21	0.09
Manufacturing		0.94	0.35		Manufacturing		0.38	0.44
Mining		0.49	-0.65		Mining		1.42	-1.15
Services		1.78	1.47		Services		1.40	0.35
	1981–90					1991–2000		
Total	2.36	4.14	-1.78		Total	3.01	4.50	-1.48
Agriculture		0.55	-0.54		Agriculture		0.27	-0.67
Construction		-0.01	-0.05		Construction		-0.01	0.09
Manufacturing		0.54	0.47		Manufacturing		1.01	0.25
Mining		2.09	-1.86		Mining		1.78	-1.61
Services		0.97	0.20		Services		1.45	0.45
	2001–10					2011–20		
Total	1.96	1.73	0.23		Total	1.52	1.61	-0.09
Agriculture		0.28	-0.22		Agriculture		-0.02	-0.10
Construction		-0.01	0.04		Construction		0.20	-0.10
Manufacturing		1.33	-0.94		Manufacturing		0.67	-0.31
Mining		-0.86	0.59		Mining		-0.11	-0.07
Services		0.98	0.78		Services		0.88	0.48

CHART 6

SECTORAL CONTRIBUTION TO PRODUCTIVITY GROWTH FROM WITHIN AND STRUCTURAL CHANGE

Source: Illustrated from Table 6.

The contribution for each sector to the total within effect and structural change effect is tabulated in Panel B of Table 6, and illustrated in Chart 6. For example, for the period 1971–2020, of this 4.89% growth in within effect, the services sector contributed the most with 1.78%, followed by agriculture 1.58%, manufacturing 0.94%, mining 0.49%, and construction 0.10%. However, moving from one period to the next, the contribution of agriculture reduced from 1.47% in 1971–80 to -0.02% in 2011–20, while both the manufacturing and services sectors increased their contribution, moving from 1971–1980 to 2011–20. However, the contribution of the services sector to the within effect dominates and is larger than the contribution from the manufacturing sector.

For the structural change effect, labor moving from lower productivity growth sectors to higher productivity growth sectors is shown by the services sector for all period and sub-periods. The agriculture sector and mining sector (except in 2001–10) are always growth-reducing. The positive contribution of the manufacturing sector to structural change effect was during the whole period of 1971–2020, and sub-periods 1971–80, 1981–90, 1991–2000, while growth-reducing for sub-periods 2001–10 and 2011–20. Thus, it is clear that during the deindustrialization period of 2001–

20, the contribution of the manufacturing sector in share to GDP and employment declined, and the main contributor to structural change effect is the services sector during this period.

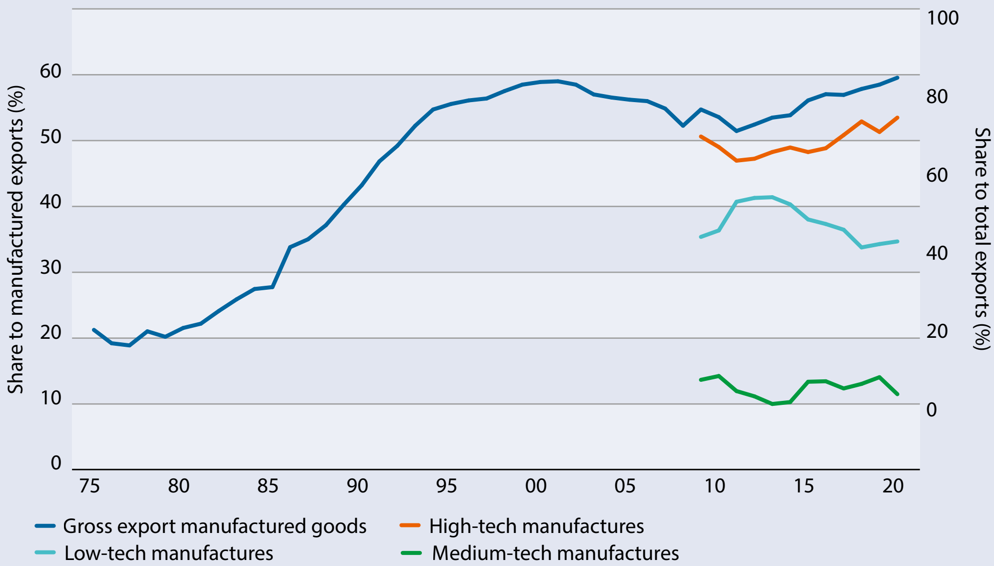
2.5 Changes in Composition of Exports by Level of Technology

Malaysia has been stuck in the upper middle-income country category for the last three decades, that is, since 1992. Aghion and Howitt [38] argue that innovation-driven growth is the key to leap out from the middle-income trap. A country, therefore, must constantly produce new ideas by adopting and developing new technologies to develop sustainable growth. On the other hand, Lucas [39] argues that the country has to embark on a large scale and must be a larger exporter in high-technology goods. Kayalvizhi and Thenmozhi [40] agree that trading in innovation-based goods will benefit a country from being stuck at the middle-income trap.

In Figure 5, the trend in the share of gross export of manufactured goods to total export for the period 1975–2020 has been remarkable during the industrialization of 1975–2000, registering an average of 6.0% growth. However, thereafter, the share started to decline until 2011, and then it started increasing moderately to 2020. The average growth for the period 2001–20 was a mere 0.1%. Furthermore, on the other hand, Figure 5 demonstrates the trends in the share of low-, medium- and high-technology exports (% of manufactured exports) in Malaysia for the period 2009–20. In 2009, high-technology exports contributed about 51% of total manufactured exports in Malaysia, while the remaining 35% and 14% were contributed by the low- and medium-technology exports, respectively. Despite ups and downs, the high-technology exporters have marginally increased to 54% of total manufactured exports by 2020. However, the low-technology exports maintained shares at 35%, while the medium-technology export shrunk to 11% of total manufactures exports in 2020. This is not a good scenario if Malaysia is to escape from the middle-income trap very soon.

FIGURE 5

TRENDS IN LOW-, MEDIUM- AND HIGH-TECHNOLOGY EXPORTS, 2009–20



Source: Computed from WDI.

2.6 Sectoral Labor Productivity in Relative to High Income Countries

The trends in labor productivity (in 2017 PPP price) by industry for Malaysia and selected high-income countries of Japan, the Republic of Korea (ROK), Singapore and United Arab Emirate (UAE) for the period 1970–2020 is depicted in Figure 6 for the agriculture, construction, manufacturing, mining and services sectors. The absolute values of labor productivity for these countries are tabulated in Table 7 for the periods 1971–2020, and their sub-periods 1971–80, 1981–90, 1991–2000, 2001–10, and 2011–20 and Chart 7 respectively for the agricultural, construction, manufacturing, mining, and services sectors for the same period and sub-periods.

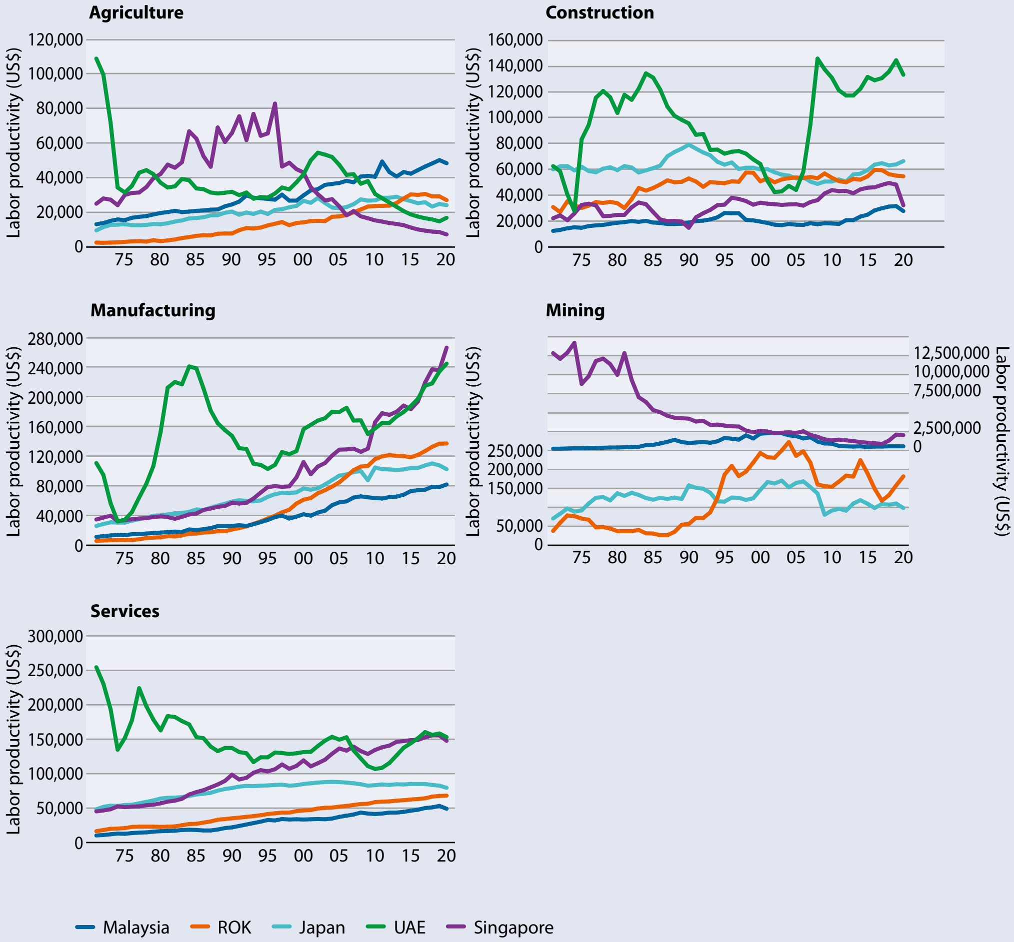
In the agriculture sector, labor productivity has been on a declining trend for both Singapore and the UAE, while labor productivity shows an increasing trend for Japan, the ROK, and Malaysia. It can be seen that beyond 2010, Malaysia registered the highest labor productivity followed by Japan and ROK. For the construction sector, labor productivity in the UAE fluctuated and reached a higher level of productivity after 2010, while Japan, the ROK, Singapore and Malaysia show moderate increase in labor productivity, but with Malaysia having the lowest labor productivity in this sector.

A different picture is shown by the labor productivity in the manufacturing sector, in which all countries show quite rapid increasing trends. Singapore shows the fastest growing in labor productivity followed by UAE, the ROK, Japan, and Malaysia. For the mining sector, UAE shows the most productive in labor usage and is followed by Malaysia. This is understandable, since both countries have large oil and gas industries. As for the services sector, UAE shows a declining trend since 1971 until mid-1990, when it starts to increase and then fall again until 2010, and thereafter coming back up again and matching Singapore. Singapore labor productivity increased quite rapidly and reached the level of labor productivity of UAE by 2020. On the other hand, labor productivity for Japan, ROK, and Malaysia increased moderately during the 1971–2020 period, with Malaysia the least productive.

Furthermore, as shown in Table 7 and Chart 7, except for agriculture and mining sectors, Malaysia ranks lowest in terms of labor productivity in the construction, manufacturing and services sectors.

FIGURE 6

TREND IN LABOR PRODUCTIVITY IN AGRICULTURE IN JAPAN, ROK, MALAYSIA, SINGAPORE AND UNITED ARAB EMIRATES (UAE) FOR PERIOD 1971–2020.



Source: Computed from APO [4].

TABLE 7

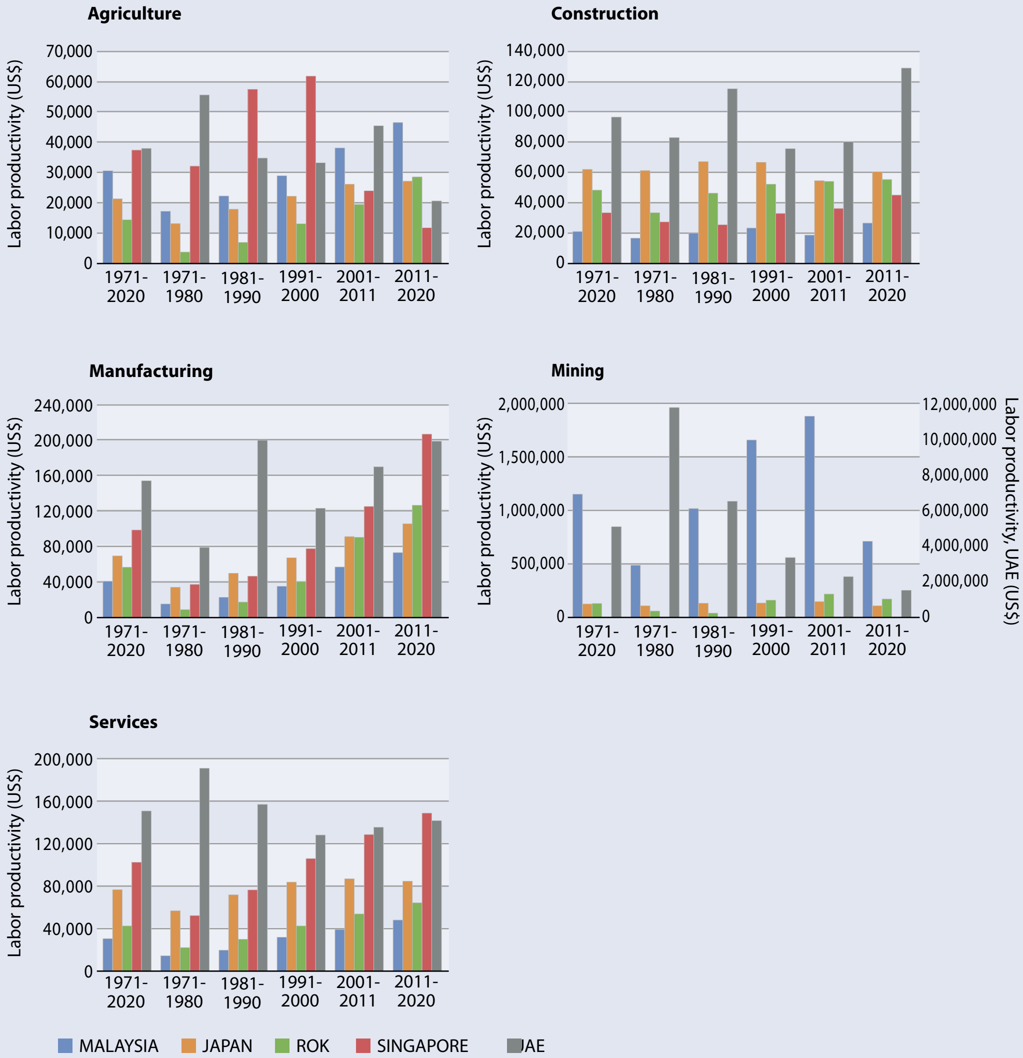
SECTORAL LABOR PRODUCTIVITY IN MALAYSIA AND SELECTED HIGH-INCOME COUNTRIES (2017 PPP)

Periods	Japan	ROK	Malaysia	Singapore	UAE
Agriculture					
1971–2020	21,262	14,342	30,586	37,428	37,942
1971–80	13,125	3,715	17,158	32,154	55,652
1981–90	17,837	6,922	22,235	57,468	34,769
1991–2000	22,138	13,068	28,909	61,880	33,240
2001–10	26,103	19,465	38,140	23,910	45,461
2011–20	27,109	28,543	46,490	11,728	20,587
Construction					
1971–2020	62,043	48,316	20,960	33,410	96,666
1971–80	61,268	33,415	16,566	27,299	83,103
1981–90	67,199	46,400	19,780	25,472	115,282
1991–2000	66,656	52,174	23,302	32,922	75,693
2001–10	54,558	54,175	18,604	36,225	80,270
2011–20	60,532	55,417	26,546	45,133	128,982
Manufacturing					
1971–2020	69,638	56,761	40,631	98,915	15,4646
1971–80	34,101	87,49	15,200	37,159	79,209
1981–90	49,712	17,130	22,658	46,503	200,525
1991–2000	67,296	40,448	35,013	77,790	123,451
2001–10	91,347	90,636	56,950	125,642	170,473
2011–20	105,735	126,841	73,337	207,482	199,572
Mining					
1971–2020	126,133	130,621	1,161,637	0	5,132,886
1971–80	107,670	59,094	491,588	0	11,882,739
1981–90	133,086	39,769	1,026,303	0	6,568,260
1991–2000	134,205	162,362	1,673,323	0	3,381,986
2001–10	148,023	219,828	1,898,850	0	2,303,051
2011–20	107,681	172,050	718,123	0	1,528,394
Services					
1971–2020	77,114	42,789	30,893	102,923	151,303
1971–80	57,018	22,370	14,678	52,722	191,728
1981–90	72,155	30,087	19,921	76,811	157,644
1991–2000	84,127	42,744	32,121	106,513	128,732
2001–10	87,264	54,123	39,387	129,204	136,033
2011–20	85,005	64,623	48,359	149,368	142,377

Source: Computed from APO Productivity Database 2022 Version 1.0

CHART 7

LABOR PRODUCTIVITY IN MALAYSIA AND SELECTED HIGH-INCOME COUNTRIES FOR PERIOD 1971–2020, AND SUB-PERIODS 1971–80, 1981–90, 1991–2000, 2001–10 AND 2011–20



Source: Illustrated from Table 7.

2.7 What Can We Learn From the El Salvador Premature Deindustrialization Phenomenon?

As discussed in earlier sections, deindustrialization could be considered a normal phenomenon that occurs in many economies. In this section, we provide a case study for another country, particularly El Salvador, which is also experiencing a deindustrialization trend. The manufacturing sector's share to total GDP fell from 25% in 2001 to 20% in 2013, and as a result of this phenomenon, the Salvadoran economy has been prone to persistent stagnation ever since the mid-1990s, with a mean annual growth rate for the period of 1.92% [14]. Thus, El Salvador is chosen due to its significant trend of premature deindustrialization during the period of 1990 to 2017 as being reported in Caceres [14, 41], and Ulku and Zaourak [42].

In terms of its economic performance, El Salvador has seen a modest rate of growth that has helped decrease poverty and inequality in recent years, albeit the growth has not been enough to bring the country's income levels closer to those of wealthier nations. Key poverty indicators, such as the Gini coefficient, showed improvement, decreasing from 50% to 39% between 1995 and 2018, surpassing the average reduction in inequality for Latin America and the Caribbean (LAC). Despite progress in reducing inequality, El Salvador's GDP per capita relative to the United States has notably declined. In 1965, it was 11.4%, but by 2017, it dropped to 6.5%. The major decline occurred during the civil war from 1979 to 1989. Since 1990, there has been only a marginal improvement of less than one percentage point in the relative GDP, indicating a slowdown in the growth rate of real per capita output.

El Salvador's economic expansion was primarily fueled by an increase in both labor and capital, rather than a boost in overall productivity. From 1980 to 2017, using the growth accounting method, labor contributed an average of 1.1% to annual GDP growth, followed by capital and human capital, which contributed 1% and 0.8%, respectively. However, the overall total factor productivity (TFP) had a negative impact on economic growth, reducing it by 1.1% during the same period. This suggests that slow productivity growth has been a barrier to narrowing the gap between El Salvador and wealthier nations.

El Salvador has experienced a different trend compared to the typical pattern seen in industrial sectors, both in terms of their contribution to GDP and total employment. Unlike the traditional hump-shaped path of industry, the share of industry in GDP has followed a unique trend. It decreased from around 30% in the late 1970s to 23% in the late 1980s, rose to 28% in the early 2000s, and has since stabilized at that level in recent years. Similarly, in terms of total employment, the industrial sector has seen a decline, shrinking from 27% in 1991 to 22% in 2018. Meanwhile, the services sector has consistently grown in both its contribution to GDP and total employment during the same period. Overall, these trends signify a process of deindustrialization for El Salvador.

Cross-country regressions following the growth diagnostic approach showed that there are six main factors that act as significant constraints on El Salvador's economic growth. The details of the following factors are as follows:

Security Concerns. While crime rates have shown a decline in recent years, security remains the most significant challenge for businesses in El Salvador, acting as a binding constraint to overall growth. The World Bank Enterprise Survey reveals that almost half of the country's firms identify crime as a major obstacle, with 80% of them reporting payments for security services. Thus, crime is a binding constraint for growth in El Salvador.

Innovation Deficiency. El Salvador lags behind its peers in research and development (R&D), the number of researchers, and innovation activities, contributing to lower productivity. The 2019 Global Innovation Index ranks El Salvador 108 out of 129, placing it behind all Latin American and Caribbean (LAC) countries except Bolivia and Nicaragua. El Salvador underperforms in innovation and it is negatively associated with economic performance.

Human Capital Challenges. El Salvador's education system produces subpar outcomes compared to its peers due to factors such as low mandatory schooling years, a scarcity of schools in rural areas, youth involvement in gangs, and high poverty rates. The brain drains resulting from significant out-migration further exacerbate human capital deficiencies, posing a binding constraint on growth.

Property Rights Weakness. Property rights in El Salvador are weaker compared to regional peers with higher aspirations and incomes. Regression analysis linking the property rights index to real GDP per capita suggests that weaker property rights act as a binding constraint on output per capita in El Salvador. Weaker property rights are a binding constraint for output per capita in El Salvador.

Corruptions Issues. Past political administrations in El Salvador have been plagued by corruption scandals, undermining the credibility of institutions. Approximately half of all firms in the country identify corruption as a major constraint, indicating that corruption is likely to impede El Salvador's growth.

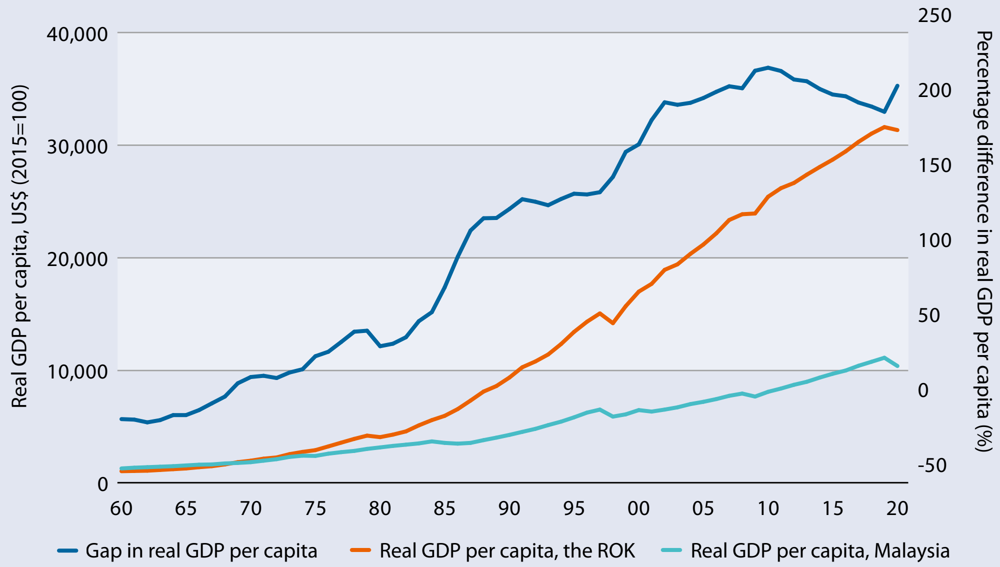
Finance Accessibility Challenges. While El Salvador trails its peers in bank access, access to finance does not seem to be a constraint for most firms, except for small and medium enterprises (SMEs). This is attributed to funding opportunities with excessively high collateral requirements, making it challenging for Salvadoran SMEs to secure loans.

2.8 Why Malaysia is Lagging Behind the Republic of Korea?

In the 1960s and the 1970s, the ROK and Malaysia pursued comparable trajectories of stages in economic development. In 1960, the ROK's per capita real GDP was USD1,028.00 while Malaysia's per capita real GDP was a bit higher at USD1,286.00. However, by 1969, the ROK's per capita real GDP had surpassed Malaysia' per capita real GDP by USD65.60. Subsequently, from 1970 onwards the ROK increased its per capita income rapidly and advanced into the league of affluent countries, but Malaysia remained stuck in the "Middle-Income Trap" and lagged behind the ROK's level of economic development. The ROK pursued a challenging strategy of advancing in value chains and dominating global markets for high-technology manufactured exports, whereas Malaysia underwent deindustrialization and faced a manufacturing sector with traditional reliance on labor intensive production dependent on low-skilled foreign workers. If in

FIGURE 7

TREND IN PER CAPITA REAL GDP BETWEEN MALAYSIA AND THE ROK, 1960–2020



Source: World Development Indicator, World Bank

1960, Malaysia's per capita income is about 1.2 times the income of the ROK, by the year 2020, the income of the ROK is triple that of Malaysia's per capita income. Nonetheless, as shown in Figure 7, the gap in per capita income between the ROK and Malaysia has increased steadily from 1970 to 2010, but thereafter the gap has been reducing. Thus, is Malaysia's per capita GDP converging to the ROK's per capita GDP?

Whether Malaysia has been long-run converging to the ROK is an empirical question. A simple test to determine whether a country has been converging to the economy of a reference country is by testing for stochastic convergence, an approach proposed by Bernard and Durlauf [43, 44]. According to Bernard and Durlauf, stochastic convergence asks whether permanent movements in one country's per capita income are associated with permanent movements in another country' income; that is, it examines whether common stochastic elements matter, and how persistent the differences among countries' income are. The stochastic convergence requires that relative regional incomes are stationary where the shocks to a stationary time series are temporary. They proposed the concept of long-run absolute convergence, long-run conditional convergence, and the long-run convergence of catching-up.

However, it is Oxley and Greasley [45] who proposed testing the above long-run absolute convergence, long-run conditional convergence and the long-run convergence of catching-up by using the following augmented Dickey-Fuller, ADF [46, 47] regression of the form,

$$\Delta \mathrm{rgdppc}_{qt} = \alpha + \delta t + \beta \mathrm{rgdppc}_{qt-1} + \sum_{k=1}^{p} \theta_k \Delta \mathrm{rgdppc}_{qt-k} + \epsilon_t \qquad t = 1, \ldots, T \qquad (6)$$

where ϵ_t is the error term and k=1,…,p ADF lags. The statistical tests are interpreted as follows. First, if rgdppc_{qt} (i.e., rgdppc_{qt}=$\mathrm{logrgdppc}_{qt}$=$\mathrm{logrgdppc}_{it}$-$\mathrm{logrgdppc}_{jt}$) contains a unit root (i.e., β=0), log real GDP per capita for country i, $\mathrm{logrgdppc}_{it}$ and country j, $\mathrm{logrgdppc}_{jt}$ diverge over time. Second, if rgdppc_{qt} is stationary (i.e., no stochastic trend, or β<0) and (a) α=0 and δ=0 (i.e the absence of a deterministic trend) indicates absolute convergence between country i and j. In this case, the poor country is growing faster than the rich country given the initial condition so that the gap between the two countries becomes zero; (b) α≠0 and δ=0 indicate conditional convergence whereby the gap between the two countries diminishes in the course of time and finally becomes a constant; (c) α≠0 and δ≠0 indicates catching-up between country i and j. According to Oxley and Greasley [45], catching-up differs from conditional convergence in that the latter relates to some particular period T equated with long-run steady state equilibrium. In this case the existence of a time trend in the non-stationary rgdppc_{qt} would imply a narrowing of the (per capita income) gap or simply that the countries though catching-up had not yet converged. Conversely, the absence of a time trend in the stationary series implies that catching-up has been completed.

Table 8 below shows the unit root tests on per capita real GDP for Malaysia and the ROK, as well as the test for long-run convergence. It is clear that the per capita real GDP in both countries exhibit nonstationary in levels, while their first differences are stationary. In other words, $\mathrm{rgdppc}_{i,jt}$ is I(1) while $\Delta\mathrm{rgdppc}_{i,jt}$ is I(0). On the other hand, the last row of Table 8 demonstrates the results of the convergence tests. Column 2 indicates the test for absolute convergence and the result suggest that the unit root in the difference in per capita real GDP between Malaysia and the ROK cannot be rejected, thus suggesting that there is no absolute convergence between Malaysia and the ROK. The third column, which indicates the test for conditional convergence, also suggests that convergence between the ROK and Malaysia did not happen during the period 1970–2020. Column 4 shows the test for convergence in catching-up. However, the unit root results do not support the idea that Malaysia is catching-up to the ROK economy. As such we can conclude that both economies diverge from each other for the period 1970–2020.

TABLE 8

RESULTS OF UNIT ROOT ON PER CAPITA REAL GDP AND STOCHASTIC CONVERGENCE, 1970–2020

Variables	Level:			First-difference:	
	No intercept & no trend	Intercept	Intercept & trend	Intercept	Intercept & trend
Malaysia, $rgdppc_{it}$	-	-2.3703 (0)	-2.1277 (0)	-5.4510**(0)	-5.7936**(0)
ROK, $rgdppc_{jt}$	-	-2.4742 (5)	0.4946 (0)	-4.6833**(0)	-6.5714**(0)
Test of convergence in $rgdppc_{qt}$:					
t-stats on β	1.1005 (1)	-1.6925 (1)	-1.4824 (1)	-	-

Notes: Asterisk ** denotes statistically significant at 5% level. The calculated statistics are those computed in MacKinnon [48]. The optimal lag length in round brackets (…) was chosen based on SC criterion. All variables are in logarithm.

As mentioned earlier, Malaysia experienced deindustrialization in the year 2000 in both its share of manufacturing output to GDP and manufacturing employment to total employment. On the other hand, the ROK experienced deindustrialization in the late 1980s [15, 19, 49]. In 1989, the share of the manufacturing employment to total employment reached its peak at 26.7%, after which it declined quite rapidly to 16.3% by 2020. Nevertheless, the share of manufacturing output to total GDP shows a brief drop when it reached a peak in 1988 at 20.1% and fell to 19.6% in 1989, but interestingly by 1990 onwards the manufacturing output share to GDP increased steadily until it reached 29.2% in 2020 (see Figure 8). In agreement with Lim [49], "the Korean economy has already been in the process of deindustrialization from the late 1980s in terms of employment and nominal output but, by contrast, has not yet entered on to a full-blown stage of deindustrialization."

The ROK's remarkable transition from a war-ravaged, agricultural nation in the mid-20th century to a global economic powerhouse today may be attributed to a number of significant policies [50–53]. Notable policies include:

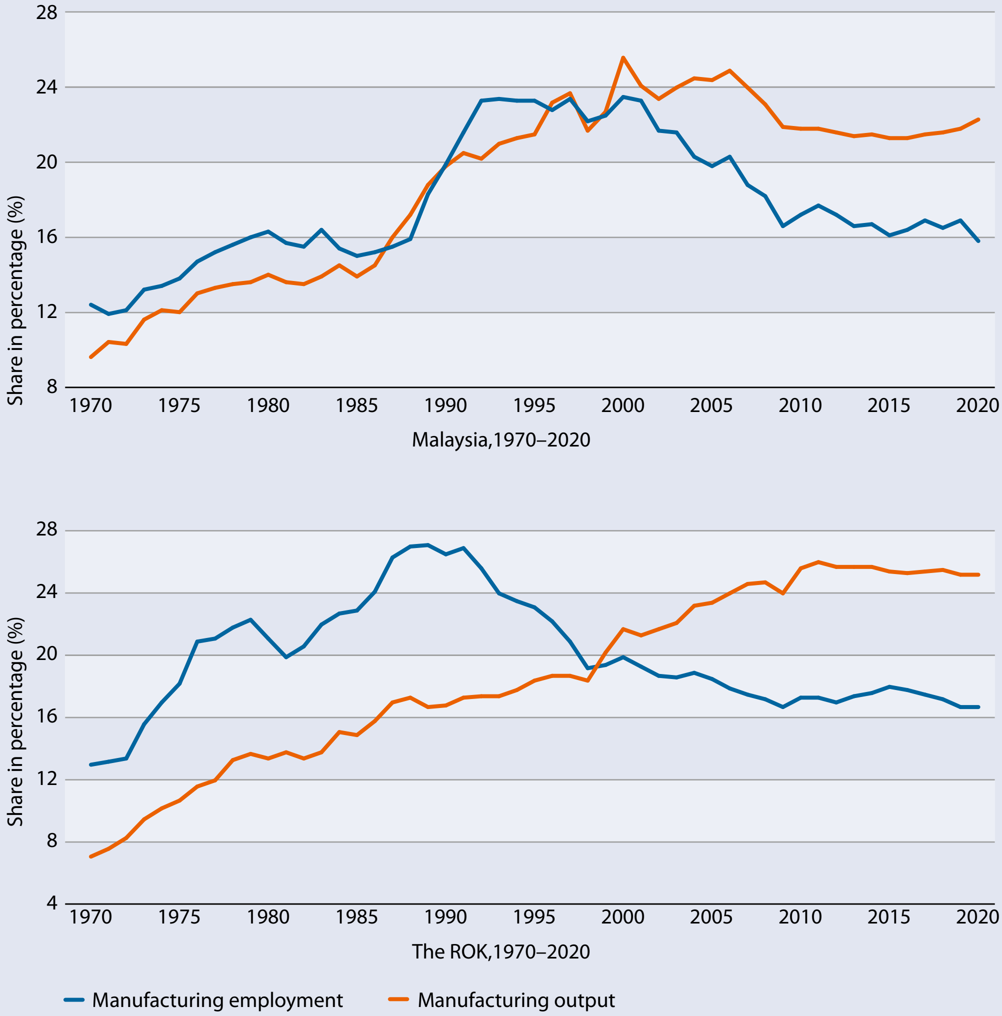
Export-Oriented Industrialization. The ROK adopted an export-oriented industrialization approach, prioritising the expansion of its manufacturing sector and the sale of products to global markets. This approach was bolstered by measures like as export subsidies, tariff protection for local sectors, and investment incentives.

Government-Led Development. The economic growth of the ROK was primarily driven by the government, which took on a key role in directing the process via the implementation of long-term strategies and specific interventions. The government allocated funds, guided investments, and established industrial goals via bodies such as the Economic Planning Board and subsequently the Ministry of Trade, Industry, and Energy.

Education and Human Capital Development. The ROK made significant investments in education and skill development, acknowledging the crucial role of human capital in driving economic success. The country's industrialization and technical advances were facilitated by universal access to education, a demanding curriculum, and a strong focus on STEM (science, technology, engineering, and mathematics) courses, which contributed to the development of a highly trained workforce.

FIGURE 8

TREND IN SHARE OF MANUFACTURING OUTPUT AND EMPLOYMENT FOR MALAYSIA AND THE ROK



Source: Computed from APO [4].

Infrastructure Development. The ROK made significant investments in the development of modern infrastructure, including transport networks, telecommunications systems, energy facilities, and industrial zones. This infrastructure bolstered industrial expansion, streamlined commerce, and attracted foreign capital.

Industrial Cluster Development. The establishment of industrial parks by the Korean government has offered industries cost-effective and competitive manufacturing sites. The Korean government not only provided physical space, but also made efforts to cultivate industrial clusters where resident enterprises were supported by interconnected business services in a supply chain. The emergence of significant industrial complexes was followed by concurrent initiatives to enhance research and human resource capacities in different areas. The government promoted the establishment of universities and technical institutions in close proximity to industrial parks, with the purpose of transforming them into specialised research and development, teaching, and training centres for the chosen industries.

Financial Sector Reform. The ROK undertook financial sector reforms to effectively mobilize savings, distribute capital in an efficient manner, and provide support for industrial growth. Measures such as targeted lending, the creation of dedicated financial institutions, and the opening up of financial markets had a role in fostering the development of local businesses.

Technology and Innovation Policies. The ROK implemented technology and innovation policies as a top priority to ensure competitiveness in global markets via technical advancement and industrial improvement. The government supported research and development by providing grants, tax incentives, and establishing partnerships with private firms. Institutions such as the Korea Advanced Institute of Science and Technology (KAIST) have played a vital role in promoting innovation and technological progress. In the 1970s, R&D activity in the ROK was insignificant because the traditional growth strategy in the ROK was input-oriented, particularly capital-input-oriented growth based on simple technology. However, since the mid-1980s, the ROK began to focus on technology-oriented growth and dramatically increased its R&D spending in the 2000s.

Globalization of Korean Industries. The globalization of key sectors in the ROK such as automobiles and electronics has not led to a decline in local industrial activity. Instead, the ROK has successfully enhanced its industrial and inventive capacities inside its own borders. Korean abroad manufacturing is strongly connected with domestic production via collaborative globalisation and domestic cooperation. Despite Korean automakers and first-tier suppliers sourcing their own suppliers from outside, they still rely on domestically made components, resulting in increased exports of parts as Korean firms expand globally. The globalization of these firms has not led to deindustrialization at home due to the significant strengthening of indigenous industrial capabilities.

Trade Liberalization. Trade liberalization in the ROK was the progressive removal of protectionist measures for local sectors, followed by the pursuit of free trade agreements. This strategy aimed to increase market access and boost exports. The ROK's integration into the global economy was assisted by its participation in international organization such as the General Agreement on Tariffs and Trade (GATT) and subsequently the World Trade Organization (WTO).

The implementation of these programmes, together with elements such as a robust work ethic, social unity, and geopolitical conditions, have played a significant role in the ROK's impressive economic growth and its transition into a developed country.

3. ECONOMIC ANALYSIS OF PREMATURE DEINDUSTRIALIZATION IN MALAYSIA

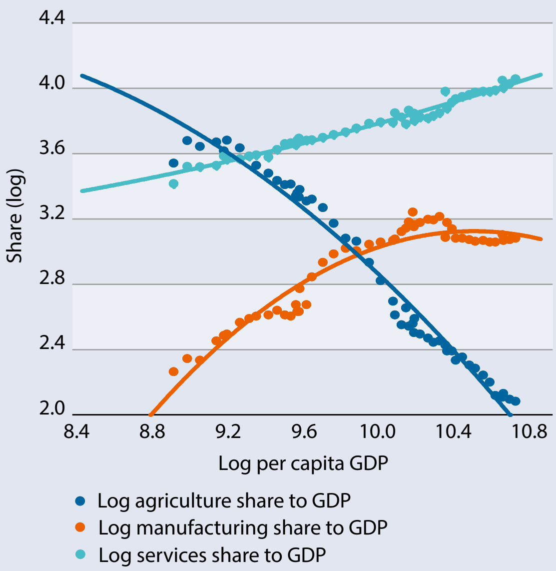
3.1 Is Manufacturing Sector the Engine of Economic Growth?

Deindustrialization is a common economic phenomenon that happens when a country moves from an industry-based economy to a service-based economy. This happened to developed economies several decades ago. For example, the OECD countries began deindustrialization in the late-1960s and some of the high-income countries in East Asia entered this phase in the late 1980s [16]. However, premature deindustrialization occurs when a country's manufacturing sector is slowing down with its share to output falling after reaching a peak, while the services sector is gaining as the next engine of growth, but before the manufacturing sector has gained its peak at an appropriate time. In fact, studies have shown that developing countries have reached "peak manufacturing" in employment and value-added shares at a much earlier point than advanced countries in terms of income per person [17, 18]. On the other hand, reindustrialization is represented by a sustained increase in both the share of manufacturing in total employment and in GDP [54, 55]. As for Malaysia, the works of Rasiah [2] and Rasiah et al. [3] have demonstrated that Malaysia started deindustrialization in the year 2000.

In Figure 9, we show the scatter plot between per capita GDP and the share of agriculture, manufacturing and services to GDP (in logarithm). Share of agriculture to GDP is negatively correlated with per capita GDP, but in contrast, the correlation between the services share to GDP and per capita GDP is positive. On the other hand, the manufacturing share to GDP is correlated in a nonlinear fashion with per capita GDP, exhibiting a nonlinear relationship, with increasing manufacturing share to GDP at lower level of per capita GDP and after reaching a peak, and thereafter, it starts to decline, exhibiting an inverted U-shaped curve. This suggests the process of deindustrialization is happening in Malaysia.

FIGURE 9

SCATTER PLOT BETWEEN PER CAPITA GDP (LOG) WITH AGRICULTURE, MANUFACTURING AND SERVICES SHARE TO GDP (LOG)



To determine whether the manufacturing sector contributes to economic growth and development in Malaysia prior to the period of premature industrialization and economic slowdown, we test Kaldor's [56] growth laws consisting of first, second, and third laws during the periods 1970–2020, 1970–2000, and 2001–20. We intend to check whether the manufacturing sector continued playing its role as the engine of growth post-premature deindustrialization.

Kaldor's first law says that there exists a strong relation between the growth of manufacturing output and the growth of GDP [57]. Kaldor argues that the more rapid the rate of growth of the manufacturing sector, the higher the rate of growth of the economy as a whole. To test Kaldor's first law, the following variants of regressions are estimated,

$$\mathrm{grgdp_t} = \alpha_0 + \alpha_1 \mathrm{gmfg_t} + \epsilon_{1t} \quad (7)$$

$$\mathrm{grgdp_t} = \alpha_0 + \alpha_1 (\mathrm{gmfg_t} - \mathrm{gnonmfg_t}) + \epsilon_{2t} \quad (8)$$

$$\mathrm{grgdp_t} = \alpha_0 + \alpha_1 \mathrm{gagr_t} + \epsilon_{3t} \quad (9)$$

$$\mathrm{grgdp_t} = \alpha_0 + \alpha_1 \mathrm{gser_t} + \epsilon_{4t} \quad (10)$$

Estimating Equations (8) to (10) is to overcome the problem of spurious correlation that is evident in Equation (7). Thus, these three equations provide alternative specifications to Equation (7), since the manufacturing sector may contribute a relatively large part of total output and could give an artificially high correlation. The variables included in the above equations are $grgdp_t$, $gmfg_t$, $gnonmfg_t$, $gagr_t$ and $gser_t$, respectively representing growth in real GDP, manufacturing output, non-manufacturing output, agricultural output and services sector output. It is expected that the relationship between $grgdp_t$ and its determinant is positive and the coefficient is less than unity. All descriptions of the variables and sources of data are described in Table A1 in Appendix A.

To estimate Equations (7) to (10), we test each variable for the order of integration using the conventional augmented Dickey-Fuller unit root test procedure. Unit root test results shown in Table A2 in Appendix A indicate that all growth variables are stationary at levels. Thus, these results suggest that $grgdp_t$, $gmfg_t$, $gnonmfg_t$, $gagr_t$ and $gser_t$ are all I(0). In view that all growth variables are stationary at levels, Ordinary Least square (OLS) is appropriate to estimate the above regressions. In all estimated regressions, Ordinary Least Square (OLS) with robust standard error due to Newey-West [58] approach of eliminating both autocorrelation and heteroscedasticity possibly presence in the model was used in the analysis.

Table 9 shows the results of estimating Equations (7) to (10) for the periods 1971–2020, 1971–2000 and 2001–20. For the whole period of 1971–2020, the results suggest that the manufacturing sector was indeed the engine of growth. The variable $gmfg_t$ is positive and significant. Other determinants - $gnonmfg_t$, $gagr_t$ and $gser_t$ also show positive signs and significance. However, the correlation between $grgdp_t$ and $gmfg_t$ is higher than the other sectors. Next, looking at the performance of the manufacturing sector prior to premature deindustrialization (1971–2000) and post-premature deindustrialization (2001–20), results in Table 9 clearly suggest that the manufacturing sector is still the engine of growth in both periods. Interestingly, the services sector also play a role in propelling economic growth in Malaysia for both periods. Nevertheless, the growth in non-manufacturing ($gnonmfg_t$) and agriculture ($gagr_t$) sectors have no important role in Malaysia's economic development during 2001–20.

TABLE 9

RESULTS ON TESTING KALDOR'S FIRST LAW

Dependent variable:	Independent variables:				
	Constant	$gmfg_t$	$gmfg\text{-}gnonmfg_t$	$gagr_t$	$gser_t$
1971–2020					
$grorgdp_t$	2.5413*** (4.6906) R^2=0.744	0.4354*** (10.152)			
$grorgdp_t$	5.2337*** (8.5164) R^2=0.356		0.4147*** (5.3677)		
$grorgdp_t$	5.0745*** (5.7868) R^2=0.177			0.3143*** (2.7613)	
$grorgdp_t$	0.9682 (1.1069) R^2=0.642				0.6838*** (5.9822)
1971–2000					
$grorgdp_t$	2.5427*** (2.8843) R^2=0.736	0.4228*** (8.5497)			
$grorgdp_t$	5.4625*** (4.2849) R^2=0.342		0.4231*** (2.8296)		
$grorgdp_t$	6.1683*** (5.1486) R^2=0.157			0.2658* (2.0320)	
$grorgdp_t$	1.3733 (0.9691) R^2=0.640				0.6644*** (4.0735)
2001–2020					
$grorgdp_t$	2.1848** (2.3995) R^2=0.663	0.5883*** (4.2850)			
$grorgdp_t$	4.6533*** (5.7950) R^2=0.068		0.2588 (1.4107)		
$grorgdp_t$	3.6003*** (3.3658) R^2=0.098			0.3702 (1.2945)	
$grorgdp_t$	0.8595 (0.7702) R^2				0.6391*** (4.1039)

Notes: Asterisks ***,**,* denote statistically significant at the 1%, 5% and 10% level, respectively. Figures in round bracket, (…) denote t-statistics.

Kaldor's second law states that there is a strong positive relation between the rate of growth of productivity in manufacturing sector and the growth of manufacturing output [57]. This is a result of increasing returns to scale, in the sense that the expansion of manufacturing output promotes 'learning by doing' and induces technical progress, thereby increasing productivity [59]. To test Kaldor's second law, we estimate the following regression using Ordinary Least Square (OLS) with robust standard error due to Newey-West [58] approach of eliminating both autocorrelation and heteroscedasticity possibly presence in the model,

$$\mathrm{gprodmfg_t} = \beta_0 + \beta_1 \mathrm{gmfg_t} + \varepsilon_{1t} \qquad (11)$$

$$\mathrm{gempmfg_t} = \beta_0 + \beta_1 \mathrm{gmfg_t} + \varepsilon_{2t} \qquad (12)$$

where $\mathrm{gprodmfg_t}$ and $\mathrm{gempmfg_t}$ are the growth in labor productivity in the manufacturing sector and growth in employment in the manufacturing sector, respectively.

In Panel A in Table 10, we present Kaldor's second law for all three different periods. The results clearly suggest that there is a positive and strong relationship between the growth in labor productivity in the manufacturing output and growth in manufacturing output for the whole period 1971–2020 and 1971-2001, while there is a strong and positive relationship between growth in employment in the manufacturing sector and growth in manufacturing output in all three periods – 1971–2020, 1971–2000 and 2001–20. These results indicate the importance of the manufacturing sector contributing to increasing labor productivity in the sector (except for period 2001–20) and employment pre- and port-premature deindustrialization periods.

On the other hand, Kaldor's third law states that the faster the growth of manufacturing output, the faster the rate of labor transference from nonmanufacturing to manufacturing, so that overall productivity growth is positively related to the growth of output and employment in manufacturing and negatively associated with the growth of employment outside manufacturing [57]. The law suggests that the rate of growth of productivity as a whole depends on the performance of the manufacturing sector, which not only leads to faster growth of productivity in manufacturing but also has spill over effects on the whole economy.

To test the third law, we estimate the following regression,

$$\mathrm{gprod_t} = \theta_0 + \theta_1 \mathrm{gmfg_t} + \theta_2 \mathrm{gempnonmfg_t} + \mu_{1t} \qquad (13)$$

$$\mathrm{gprod_t} = \theta_0 + \theta_1 \mathrm{gmfg_t} + \theta_2 \mathrm{gempagr_t} + \mu_{2t} \qquad (14)$$

$$\mathrm{gprod_t} = \theta_0 + \theta_1 \mathrm{gmfg_t} + \theta_2 \mathrm{gempser_t} + \mu_{3t} \qquad (15)$$

where $\mathrm{gprod_t}$, $\mathrm{gempnonmfg_t}$, $\mathrm{gempagr_t}$ and $\mathrm{gempser_t}$ are growth in national labor productivity, growth in employment in nonmanufacturing, agriculture and services sectors, respectively. It is expected that the overall productivity is positively correlated with output growth in manufacturing sector, and negatively associated with the growth of employment outside manufacturing sectors [60].

TABLE 10

RESULTS ON TESTING KALDOR'S SECOND AND THIRD LAWS

Dependent variable:	Independent variables:				
	Constant	$gmfg_t$	$gempnonmfg_t$	$gempagr_t$	$gempser_t$
A. Kaldor's second law					
1971–2020					
$gprodmfg_t$	0.2648	0.5046***			
	(0.3314)	(6.1672)			
	R^2=0.430				
$gempmfg_t$	-0.1562	0.4683***			
	(-0.2055)	(5.8003)			
	R^2=0.398				
1971–2000					
$gprodmfg_t$	-1.6230**	0.6100***			
	(-2.4597)	(10.377)			
	R^2=0.430				
$gempmfg_t$	1.6267**	0.3657***			
	(2.2406)	(5.8829)			
	R^2=0.398				
2001–20					
$gprodmfg_t$	1.8527*	0.3706			
	(1.9776)	(1.4244)			
	R^2=0.067				
$gempmfg_t$	-1.7457*	0.6335**			
	(-1.8911)	(2.4394)			
	R^2=0.244				
B. Kaldor's third law					
1971–2020					
$gprod_t$	2.3143***	0.3173***	-0.6735***		
	(4.7914)	(9.6265)	(-5.4249)		
	R^2=0.696				
$gprod_t$	(0.4233	0.3222***		-0.1515**	
	(0.9251)	(8.5951)		(-2.3963)	
	R^2=0.570				
$gprod_t$	2.1168**	0.3272***			-0.4456***
	(2.4713)	(7.7774)			(-2.9651)
	R^2=0.614				
1971–2000					
$gprod_t$	2.2757***	0.3119***	-0.7308***		
	(3.5608)	(8.7647)	(-4.6383)		
	R^2=0.728				
$gprod_t$	0.5130	0.3047***		-0.2569**	
	(0.8734)	(6.4507)		(-2.2444)	
	R^2=0.604				
$gprod_t$	1.8260	0.3226***			-0.3922**
	(1.4524)	(6.2633)			(-2.0583)
	R^2=0.602				
2001–20					
$gprod_t$	2.0996***	0.4981***	-0.6977***		
	(3.3177)	(4.9669)	(-3.9262)		
	R^2=0.599				
$gprod_t$	0.1686	0.4519***		-0.1027*	
	(0.2422)	(4.3443)		(-2.0639)	
	R^2=0.401				
$gprod_t$	2.3746	0.4298***			-0.5660**
	(1.6273)	(3.4908)			(-2.3345)
	R^2=0.517				

Notes: Asterisks ***,**,* denote statistically significant at the 1%, 5% and 10% level, respectively. Figures in round bracket, (…) denote t-statistics.

The results of Kaldor's third law are presented in Panel B in Table 10. In all estimated regressions, Ordinary Least Square (OLS) with robust standard error due to Newey-West [58] approach of eliminating both autocorrelation and heteroscedasticity possibly presence in the model was used. The results for all three periods overwhelmingly support the assertion that the growth of the manufacturing sector propel growth in the labor productivity in the economy. The estimate coefficients for $gmfg_t$ are all positive and statistically significant in all equations and periods.

The results of Kaldor's first, second, and third laws as presented in Table 9 and Table 10 suggest that the economic growth and labor productivity growth in the Malaysian economy depends greatly on the expansion and growth of the manufacturing sector. As a matter of fact, despite premature deindustrialization and slow growth beyond the year 2000, the manufacturing sector continues being central to the economic growth and productivity in Malaysia.

3.2 What is Causing the Premature Deindustrialization of the Malaysian Economy?

To determine the period of deindustrialization empirically, we estimate the following model [15, 61, 62],

$$\mathrm{mfgy_t} = \alpha_0 + \alpha_1 \mathrm{rgdppc_t} + \alpha_2 \mathrm{rgdppc_t^2} + \alpha_3 \mathrm{taxy_t} + \alpha_4 \mathrm{expy_t} + \alpha_5 \mathrm{finy_t} + \alpha_6 \mathrm{invy_t} + \alpha_7 \mathrm{misery_t}$$
$$+ \mathrm{dum1975} + \mathrm{dum1985} + \mathrm{dum1997} + \mathrm{dum2009} + \mu_t \qquad (16)$$

where all variables are in logarithm, with $mfgy_t$ as the ratio of manufacturing sector's gross domestic product to national gross domestic product (GDP); $rgdppc_t$ and $rgdppc_t^2$ are per capita GDP and per capita GDP square, respectively. It is expected that the relationship between manufacturing-output ratio and per capita GDP is nonlinear, with $\alpha_1>0$ and $\alpha_2<0$, thus suggesting an inverted U-shaped curve. The per capita GDP at the peak manufacturing share ($rgdppc_t^*$) is computed as $rgdppc_t^* = \exp(rgdppc_t^e)$, where $rgdppc^e = -\hat{\alpha}_1/2\hat{\alpha}_2$. The control variables are: $taxy_t$ is taxation (ratio of tax revenue to GDP), $expy_t$ is export (ratio of total export to GDP), $finy_t$ is financial development (ratio of broad money to GDP), inv_t is investment (ratio of gross fixed capital formation to GDP) and misery index (inflation plus unemployment rates). The dummy variables taken into consideration are dum1975, dum1985, dum1997 and dum2009, which refer to the first oil shock of 1975, commodity price crisis of 1985, Asian financial crisis in 1997 and the global financial crisis in 2009, respectively.

The above Equation (16) is estimated using the Ordinary Least Square (OLS) with robust standard error due to Newey-West [58] approach of eliminating both autocorrelation and heteroscedasticity possibly presence in the model. The annual data used in the study ranges from 1970–2020. Table A1 lists and describes the variables used in the study. The estimated regression Equation (16) is presented in Table 11. However, for easy reference, the estimated regression's result is presented below (with asterisks *** and ** denote statistically significant at 1% and 5% level, respectively),

$$\mathrm{mfgy_t} = -23.841(-3.6731)^{***} + 5.0233(3.6437)\mathrm{rgdppc_t}^{***} - 0.2404(-3.4758)\mathrm{rgdppc_t^2}^{***}$$
$$-0.2471(-2.7971)\mathrm{taxy_t}^{***} + 0.3665(7.3714)\mathrm{expy_t}^{***} - 0.0955(-3.2486)\mathrm{finy_t}^{***}$$
$$+0.0925(2.3061)\mathrm{invy_t}^{**} - 0.0412(-2.3887)\mathrm{misery_t}^{**} + 0.0336(2.3009)\mathrm{dum1975}^{***}$$
$$-0.0510(-2.2413)\mathrm{dum1985}^{**} - 0.0874(-5.9889)\mathrm{dum1997}^{***} - 0.0427(-4.0567)\mathrm{dum2009}^{***}$$
$$\hat{R}^2 = 0.983; \qquad \mathrm{DF_{t-stat}} = -4.601^{******} \qquad \mathrm{ypc_t^e} = \mathrm{RM36{,}557(2012)}$$

Initially, we have attempted to follow Rodrik [17] by including both population and population square in the estimated model above, but since both variables are insignificant, we have subsequently dropped these two variables. We have tested for the order of integration for all variables, that is, the test for unit root as shown in Table A2 in Appendix A, and it is suggested that all variables are I(1), and the cointegration test using the standard Engle-Granger two-step procedure indicated by the Dickey-Fuller t-statistics ($DF_{t\text{-stat}}= -4.601$) that the variables are cointegrated (reject null hypothesis of no cointegration).

The estimated coefficients, $\hat{\alpha}_1>0$ and $\hat{\alpha}_2<0$ are both significant, and suggest that the relationship between $mfgy_t$ and ypc_t is nonlinear and exhibits an inverted U-shaped curve. This evidence suggests that Malaysia's manufacturing share to GDP has reached its peak at some optimal point and thereafter the share has started to decrease. The estimated turning point in the share of manufacturing output to GDP was about MYR36,557 around 2012 and equivalent to USD8,700.00 (2015=100). This turning point for the manufacturing share in Malaysia is lower than the developed country's point of deindustrialization between 1965–70 of about USD23,000.00–USD25,000.00 for the U.S., and USD17,000.00–USD20,000.00 per capita GDP (2015=100) for the U.K. This result points to the premature deindustrialization experienced by Malaysia. Thus, our empirical results suggest that Malaysia experienced deindustrialization prematurely in 2012 with a per capita GDP of almost USD9,000.00.

All the control variables are significant and taxation, financial development, and misery index affect manufacturing share negatively, while export and investment affect manufacturing share positively. The dummy variables that represent the events of globalization indicate that the first oil crisis (dum1975) enhance manufacturing share to GDP, while commodity price crisis, Asian financial crisis, and global financial crisis reduce manufacturing share to GDP in Malaysia.

3.3 Assessing the Premature Deindustrialization Risk in Malaysia

Nevertheless, to assess the premature deindustrialization risk in Malaysia, in this study, we adopt the model used by Taguchi and Tsukada [63]. They employed the concept of "latecomer index" to examine the positions of the manufacturing-income nexus. According to them, the latecomer index facilitates the identification of downward shifts in latecomers' manufacturing-income nexus, regardless of the existence of an industrialization peak. Even for a latecomer that has not reached its peak, its downward shift suggests an upcoming peak-out at a lower manufacturing share in a lower income stage, implying a symptom of premature deindustrialization.

Thus, to demonstrate the shifts in the latecomer country's manufacturing-income relationship and verify premature deindustrialization or reindustrialization risk, the following model is specified,

$$\begin{aligned} mfgy_t &= \alpha_0 + \alpha_1 rgdppc_t + \alpha_2 rgdpc_t^2 + \beta_1 lac_t + \beta_2 lacdum1985_t + \beta_3 lacdum1997_t \\ &+\beta_4 lacdum2009_t + \beta_5 lacdummp8-9_t + \beta_6 lacdummp10-11_t + \varepsilon_t \qquad (17) \end{aligned}$$

where all variables are in logarithm with $mfgy_t$ is the ratio of manufacturing sector's gross domestic product to national gross domestic product (GDP); $rgdppc_t$ and $rgdppc_t^2$ are per capita GDP and per capita GDP square, respectively. It is expected that the relationship between manufacturing-output ratio between population and per capita GDP is nonlinear, with $\alpha_1>0$ and $\alpha_2<0$, thus, suggesting an inverted U-shaped curve.

The latecomer index, lac^t is the ratio of per capita GDP of Malaysia relative to the per capita GDP of the benchmark country (in this case, we use the U.S.). The latecomer index is the most critical variable for identifying premature deindustrialization. A significant positive value of β_1, which refers to the linkage between a country's delayed development and its lower manufacturing-output ratio and represents the downwards shift of the country's manufacturing-income curve, can substantiate the occurrence of premature deindustrialization, implying that Malaysia would reach its industrial output ratio peak at a lower income level than the U.S. On the other hand, if β_1 is significant and negative, a latecomer country is expected to experience reindustrialization or recovery from deindustrialization [63].

The cross-terms of the latecomer index with time dummies for 1985 (lacdum1985), 1997 (lacdum1997), 2009 (lacdum2009), 2001–10 (lacdummp8-9); and 2011–20 (lacdummp10-11) represent the international events of the commodity crisis in 1985, the Asian financial crisis in 1997, the global financial crisis in 2009, and global industrialization, which gained momentum during the period 2001–20. The global industrialization of 2001-20 was divided into two sub-periods of 2001–10 and 2011–20, which also represent the 8th and 9th Malaysia Plans, and 10th and 11th Malaysia Plans. It is expected that the premature deindustrialization and/or reindustrialization are affected by these events.

To estimate the above Equation (17), we employed the Ordinary Least Square (OLS) with robust standard error due to the Newey-West [58] approach of eliminating both autocorrelation and heteroscedasticity possibly present in the model. The annual data used in the study ranges from 1970–2020. Table A1 listed and described the variables used in the study. The regression results are shown in Table 11 below. For easy reference, we present the result below,

$$\begin{gathered}
\mathrm{mfgy}_t = -29.092(-3.4704)*** + 5.1120(3.1541)\mathrm{rgdppc}_t *** - 0.2075(-2.5032)\mathrm{rgdppc}_t^2 ** \\
-0.8783(-2.1194)\mathrm{lac}_t ** + 0.0705(6.2673)\mathrm{lacdum1985}_t *** - 0.0369(-1.8225)\mathrm{lacdum1997}_t \\
+0.0457(2.6641)\mathrm{lacdum2009}_t ** + 0.0290(1.4603)\mathrm{lacdummp8-9}_t \\
+0.1191(2.7024)\mathrm{lacdummp10-11}_t *** \\
\widehat{R}^2 = 0.960; \qquad \mathrm{DF}_{t-stat} = -4.086***
\end{gathered}$$

We have tested for the order of integration for all variables as presented in Table A2, that is, the test for unit root suggesting that all variables are I(1), and the cointegration test using the standard Engle-Granger two-step procedure indicates by the Dickey-Fuller t-statistics ($DF_{t\text{-}stat}$) that the variables are cointegrated.

The above results suggest a nonlinear relationship between manufacturing-output ratio and per capita GDP, demonstrating an inverted U-shaped curve. The estimated coefficient of the latecomer index, which is our variable of interest, shows a negative sign and statistically significance at the 5% level. This signifies that Malaysia, as a latecomer relative to the U.S., has experienced reindustrialization or recovery from deindustrialization. Nevertheless, the significant and positive sign on the estimated coefficients of the cross-terms such as $lacdum85_t$ $lacdum09_t$ and $lacdummp10\text{-}11_t$ indicate that the commodity price crisis in 1985, the global financial crisis of 2009 and the global industrialization of 2011–20 have depressed manufacturing activities in Malaysia, thereby contributing to the risk of premature deindustrialization. Among the coefficient sizes, lacdummp10-11 is the largest, suggesting that globalization effect worldwide is a major factor that contributed to the premature deindustrialization risk in Malaysia. Coincidently, these results also suggest that the 10th and 11th Malaysia Plans do not help to cushion the negative impact towards premature deindustrialization.

3.4 Impact of Premature Deindustrialization on Productivity: An Empirical Analysis

Labor productivity is important in the sense that it enhances efficiency in the production process, thus contributing to higher output and subsequently to higher economic growth. Since the manufacturing sector is the major driver of economic growth, it is pertinent that higher labor productivity in this sector is sustained to enhance economic growth. In fact, Brynjolfsson [64] and Acemoglu et al. [65] have pointed that deindustrialization process was accompanied by a decline in productivity growth.

To ascertain the impact of premature deindustrialization on labor productivity in Malaysia's manufacturing sector, we specify the following model [66, 67],

$$\mathrm{lprodmfg}_t = \gamma_0 + \gamma_1 \mathrm{mfgy}_t + \gamma_2 \mathrm{cey}_t + \gamma_3 \mathrm{tech}_t + \gamma_4 \mathrm{edu}_t + \gamma_5 \mathrm{finy}_t + \gamma_6 \mathrm{dum1985} + \gamma_7 \mathrm{dum2009} + \epsilon_t \quad (18)$$

where all variables are in logarithm, with $\mathrm{lprodmfg}_t$ equals labor productivity in the manufacturing sector; mfgy_t is manufacturing-output ratio; cey_t is labor wage proxy by the ratio of compensation of employee to total income (i.e. total of compensation of employee and operating surplus); tech_t is technology proxy using total factor productivity index; edu_t is education level proxy using school enrolment in tertiary education; finy_t is financial development proxy using the ratio of broad money to GDP. The dummy variables, dum1985 and dum2009, represent economic crises in 1985 and 2009.

It is expected that $\gamma_1<0$, if industrialization leads to a decrease in labor productivity; while if $\gamma_1>0$, if industrialization leads to increase in labor productivity. All control variables are expected to show positive impact if they have a role in increasing labor productivity. The dummy variables are expected to show negative if they reduce labor productivity during the crises, while a positive sign signifies the crises enhance labor productivity.

We employed the Ordinary Least Square (OLS) with robust standard error due to the Newey-West approach in eliminating both autocorrelation and heteroscedasticity possibly present in the model. The estimated regression result is shown in Table 11 below. However, for easy reference, the result is presented below,

$$\begin{aligned}\mathrm{lprodmfg}_t = {} & 8.0498(38.526)^{***} + 0.4633(5.2573)\mathrm{mfgy}_t^{***} + 0.5259(2.6758)\mathrm{cey}_t^{**} \\ & + 1.8368(7.7448)\mathrm{tech}_t^{***} + 0.4258(18.880)\mathrm{edu}_t^{***} + 0.2036(3.3818)\mathrm{finy}_t^{***} \\ & + 0.0976(2.4061)\mathrm{dum1985}_t^{**} + 0.1493(6.4961)\mathrm{dum2009}_t^{***} \\ & \widehat{R}^2 = 0.990; \qquad \mathrm{DF}_{t-stat} = -3.491^{***}\end{aligned}$$

All variables have been tested for unit root and the results suggest non-stationary at level for all variables. Cointegration is tested on Equation (18) using the standard Engle-Granger two-step procedure, and the results suggest that the variables are cointegrated as shown by the Dickey-Fuller t-statistics of -3.491 which is statistically significant at the 1% level.

The estimated model above indicates that premature deindustrialization as measured by the manufacturing-output ratio shows positive and statistical significance at the 1% level. This implies that a 1% increase in manufacturing-output ratio will increase 0.5% in labor productivity in Malaysia. This positive relation is further supported by increasing labor wage (proxy by compensation of employee), technology, education and financial development. Furthermore, the commodity price in 1985 and the global financial crises do not reduce labor productivity during the period under study.

3.5 Impact of Premature Deindustrialization on Economic Growth: An Empirical Analysis

Since the seminal papers by Romer [68] and Lucas [69], economists believed that long-term economic growth can be achieved through technological progress. Unlike the neoclassical growth theory that assumes technological progress as exogenous, the proponents of the endogenous growth model argue that technology can be internalized as input in production function through human capital development. Human capital may directly affect economic development and growth or indirectly, in particular through the generation of technology. In fact, history has proven that humans innovate. An increase in human capital may induce a rise in the number of innovative entrepreneurs and products, thus indirectly spurring economic development through the channel of innovation. An innovative society has brought humanity from the industrial revolution in the 19th century to the digital economy of the present day.

Malaysia's outstanding economic performance over several decades has been attributed to technological innovation drives, with support from the government through its science, technology and innovation policies in the 1980s [70]. According to the report by MOSTI [71], 66.3% of the manufacturing companies surveyed claimed that a majority of product innovation comprises new or significantly improved products, while 53.0% of the companies in the services sector made similar claims. This innovation can be classified as new to the world, new in the market, and new to the company. With this achievement, Malaysia is ranked 35 (out of 129 countries) in the 2019 Global Innovation Index.

Nevertheless, to measure the impact of premature deindustrialization on economic growth, we estimate the following model [72, 73] for Malaysia,

$$\mathrm{rgdp}_t = \varphi_0 + \varphi_1 \mathrm{mfgy}_t + \varphi_2 \mathrm{cey}_t + \varphi_3 \mathrm{tech}_t + \varphi_4 \mathrm{edu}_t + \varphi_5 \mathrm{finy}_t + \varphi_6 \mathrm{ur}_t + \varphi_7 \mathrm{dum1985} + \gamma_7 \mathrm{dum2009} + \omega_t \qquad (19)$$

where all variables are in logarithmic, with rgdp_t as a proxy for economic growth measures by real GDP; mfgy_t is manufacturing-output ratio; cey_t is ratio of compensation of employee to GDP (i.e., total of compensation of employee and operating surplus); ttech_t is technology proxy using total factor productivity index; edu_t is education level proxy using school enrolment in tertiary education; finy_t is financial development using proxy by ratio of broad money to GDP; and ur_t is unemployment rate. The dummy variables, dum1985 and dum2009, represent economic crises in 1985 and 2009. Data description and sources are presented in Table A1 in Appendix A.

We employed the Ordinary Least Square (OLS) with robust standard error due to the Newey-West approach in eliminating both autocorrelation and heteroscedasticity possibly present in the model. The result is presented below (see also Table 11),

$$\mathrm{rgdp}_t = 9.0520(32.383) *** + 0.9374(6.5583)\mathrm{mfgy}_t *** + 1.5637(7.5285)\mathrm{cey}_t ***$$
$$+2.6223(11.086)\mathrm{tech}_t *** + 0.5068(20.523)\mathrm{edu}_t *** + 0.3353(3.4242)\mathrm{finy}_t ***$$
$$-0.1744(-3.2832)\mathrm{ur}_t *** + 0.1441(3.0963)\mathrm{dum1985}_t *** + 0.1151(6.9454)\mathrm{dum2009}_t ***$$
$$\widehat{R}^2 = 0.993; \qquad \mathrm{DF}_{t-stat} = -4.707***$$

All variables have been tested for unit root (see Table A2) and the results suggest non-stationary at their level for all variables. Cointegration is tested on Equation (19) using the standard Engle-Granger two-step procedure, and the results suggest that the variables are cointegrated as shown by the Dickey-Fuller t-statistics of -4.707 which is statistically significant at the 1% level.

The above estimated model suggests that the premature deindustrialization variable shows positive and significant impact on economic growth proxy using real GDP in Malaysia. The impact of manufacturing-output ratio almost gives a one-to-one impact of real GDP. In fact, a 1% increase will increase Malaysia's real GDP by 0.9%. Technology, labor wage, education level, and financial development affect economic growth positively, while unemployment rate has an adverse effect on economic growth. On the other hand, the commodity price crisis of 1985 and the global financial crisis of 2009 showed no adverse effect on economic growth in Malaysia.

TABLE 11

RESULTS ON THE ECONOMIC ANALYSIS OF DEINDUSTRIALIZATION

Independent variables	Equation 16	Equation 17	Equation 18	Equation 19
	Dependent: $mfgy_t$	Dependent: $mfgy_t$	Dependent: $lprodmfg_t$	Dependent: $rgdp_t$
Constant	-23.841***	-29.092***	8.0498***	9.0520***
	(-3.6731)	(-3.4704)	(38.526)	(32.383)
$rgdppc_t$	5.0233***	5.1120***		
	(3.6437)	(3.1541)		
$rgdppc_t^2$	-0.2404***	-0.2075**		
	(-3.4758)	(-2.5032)		
$mfgy_t$			0.4633***	0.9374***
			(5.2573)	(6.5583)
$taxy_t$	-0.2471***			
	(-2.7971)			
$expy_t$	0.3665***			
	(7.3714)			
$finy_t$	-0.0955***		0.2036***	0.3353***
	(-3.2486)		(3.3818)	(3.4242)
$invy_t$	0.0925**			
	(2.3061)			
$misery_t$	-0.0412**			
	(-2.3887)			
lac_t		-0.8783**		
		(-2.1194)		
cey_t			0.5259**	1.5637***
			(2.6758)	(7.5285)

Independent variables	Equation 16	Equation 17	Equation 18	Equation 19
	Dependent: $mfgy_t$	Dependent: $mfgy_t$	Dependent: $lprodmfg_t$	Dependent: $rgdp_t$
$tech_t$			1.8368***	2.6223***
			(7.7448)	(11.086)
edu_t			0.4258***	0.5068***
			(18.880)	(20.523)
ur_t				-0.1744***
				(-3.2832)
$dum1975_t$	0.0336***			
	(2.3009)			
$dum1985_t$	-0.0510**		0.0976**	0.1441***
	(-2.2413)		(2.4061)	(3.0963)
$dum1997_t$	-0.0874***			
	(-5.9889)			
$dum2009_t$	-0.0427***		0.1493***	0.1151***
	(-4.0567)		(6.4961)	(6.9454)
$lacdum1985_t$		0.0705***		
		(6.2673)		
$lacdum1997_t$		-0.0369*		
		(-1.8225)		
$lacdum2009_t$		0.0457**		
		(2.6641)		
$lacdummp8-9_t$		0.0290		
		(1.4603)		
$lacdummp10-11_t$		0.1191***		
		(2.7024)		
R^2	0.983	0.960	0.990	0.993
$DF_{t\text{-stat}}$	-4.601***	-4.086***	-3.491***	-4.707***
$rgdppc_t^e$	RM36,557(2012)			

Notes: Asterisks ***,**,* denote statistically significant at the 1%, 5% and 10% level, respectively. $DF_{t\text{-stat}}$ denotes critical value for Dickey-Fuller unit root test, testing on the residual of the respective estimated equation. Figures in round brackets, (…) are t-statistics. All variables are in logarithm.

4. POLICY RECOMMENDATIONS

The empirical evidence in Section 3.1 makes it clear that there is a need to reindustrialize the manufacturing sector. The initial findings indicate that revitalizing this sector could have a significantly positive impact on both the overall economy and labor productivity. In fact, the effects of reindustrialization would nearly match those on real GDP on a one-to-one basis. This underscores the importance of directing efforts towards high value-added and impactful activities in the manufacturing sector to rejuvenate it and overcome its stagnant growth in recent years. Additionally, the shift-share analysis supports the idea that structural changes in manufacturing hinder overall productivity growth. If Malaysia wanted to shift to a high-income country, as has been done by other developed countries, it is imperative to revitalize the industrial sectors in boosting the economic development and life welfare.

This section is divided into two subsections focusing on policy recommendations. The first part assesses existing policies related to revitalizing Malaysia's industry, drawing from various national policy documents. The second part identifies current policy gaps and proposes future recommendations to address these shortcomings.

4.1 Existing Policy Recommendations

In this sub-section, the policy recommendations are categorized into three main parts, each addressing crucial aspects from supply, demand, and environmental perspectives. These perspectives provide a comprehensive framework for understanding and tackling the challenges faced by Malaysia's industrial sector.

4.1.1 Supply perspectives

Enhancing the Manufacturing Workforce Environment

Malaysia's labor market ecosystem continues to face challenges, particularly within the manufacturing sector. This is also supported and discussed in the Mid-term Review of the Twelfth Malaysia Plan [74] and the New Industrial Master Plan (NIMP) 2030 [75]. It was evident that Malaysia is facing challenges such as the prolonged reliance on low-skilled foreign workers and a rising trend of skills mismatch and talent shortages (related to brain drain issues). Considering the conventional theory of production function, where output hinges on labor and capital, inefficiencies in the labor market could impede overall output growth. Thus, there is a pressing need to swiftly enhance the entire labor market ecosystem, especially since Malaysia aims to have approximately 35.1% of high-skilled workers in total employment by 2025 (as targeted in the Twelfth Malaysia Plan). However, as of 2020, this figure only stood at around 29%.

To tackle these issues, it is proposed to implement a multi-tiered levy for low-skilled workers. The levy system, where higher fees are imposed on low-skilled labor, creates a financial motivation for businesses to invest in automated processes. Moreover, it is suggested to enhance Technical and Vocational Education and Training (TVET) programs, focusing on high-skilled jobs in critical sectors to bridge the gap between skills and industry needs. It is also crucial for the government to review the existing labor compensation structure due to the ongoing talent outflow in Malaysia. Implementing new wage models could attract more local high-skilled talents and help mitigate the brain drain.

Elevating Productivity through Technology and Innovation Adoption

As Malaysia strives to achieve high-income status, a crucial factor to consider is the expansion of both innovation and technological capabilities. These factors are key drivers for long-term growth, paving the way for the transition to a high-income economy. The Mid-term Review of the Twelfth Malaysia Plan (MTR 12MP) highlights a noticeable lack of motivation to adopt advanced technology and a readiness gap to transition to Industry 4.0 (4IR), particularly in the manufacturing sector. Additionally, there is a concerning decline in private investment trends in Research & Development & Commercialization & Innovation (R&D&C&I) activities.

To address this, the government must actively encourage businesses to embrace automation and technology, propelling the next phase of industrial transformation. It is crucial to shift towards smart manufacturing, leveraging advanced 4IR technology, especially for Small and Medium Enterprises (SMEs). This can be accomplished by optimizing existing innovation hubs, fortifying the startup ecosystem, and ensuring preparedness for 4IR infrastructure, along with providing integrated facilities for innovators. A more coordinated collaboration between commercialization and innovation initiatives can be strengthened through these measures. Additionally, governments can introduce new conditions in manufacturing license approval, incorporating smart manufacturing elements, and provide supportive incentives.

4.1.2 Demand perspectives

Transitioning to Exporting Medium- and High-Tech Manufacturing

The prominence of low-tech manufactured goods, constituting more than one-third of Malaysia's total manufactured exports, poses a significant challenge in overcoming the middle-income trap and advancing into a higher economic stratum. While high-tech manufactured goods contribute substantially to the export portfolio, the dominance of low-tech goods necessitates a proactive shift towards exporting medium- and high-tech manufacturing. Compounding the issue, the urgency of this transition is underscored by the current growth rate of the share of gross exports of manufactured goods to total exports. Despite some progress, the pace is considered moderate compared to earlier periods, specifically the span from 1975–2000.

To promptly tackle this challenge, the government needs to create a more favorable environment for high-tech innovation and production. This can be achieved by setting up technology parks or clusters that bring together companies, research institutions, and educational facilities as mentioned in MTR 12MP. Additionally, providing tax incentives and grants to companies involved in research and development activities would encourage the creation of innovative high-tech products. To further support companies, particularly SMEs, programs should be implemented to help them navigate regulatory requirements and access international markets for high-tech exports. Moreover, offering incentives for the development and export of environmentally friendly high-tech products aligns with global sustainability trends.

Creates industry foundations through quality investment

As highlighted in MTR 12MP, there is a lack of investment in term of automation, new technology and innovation. This is because shifting towards a higher level of automation in industries necessitates substantial funding and capitalization. The current scenario poses challenges, particularly for MSMEs, which constitute over 98% of overall establishments in Malaysia. This group often faces limited access to funds and struggles to cope with operational costs. To address this, a collaborative effort between the government and industries is crucial.

From the government's perspective, creating an enabling business environment domestically is paramount. This involves reducing red tape and streamlining regulatory processes. Additionally, significant investments in robust infrastructure are essential. Improved infrastructure not only enhances supply chain efficiency but also reduces operational expenses and improves market accessibility, thereby stimulating demand for products and services. Furthermore, the government should strategically screen and prioritize investment approvals. Emphasis should be placed on investments that promote automation, high-end technology production, and high-value-added activities. This approach ensures sustained industry growth and competitiveness.

On the industry front, a fundamental shift in mindset is essential, moving from being mere technology users to becoming technology producers. Rather than depending on imported technologies, which can escalate operational costs, a more holistic approach is required to enable local industries to manufacture high-demand technologies. Collaborative innovation hubs and networking platforms play a vital role in sparking creativity and nurturing innovative ideas across industries. This shift towards technology production not only garners heightened investor interest but also attracts substantial capital investment. As an example, the surging demand for Artificial Intelligence (AI) has captured the attention of global investors, leading to increased investments in AI-driven ventures.

4.1.3 Environmental perspectives

Capitalize and shifting towards the new emerging green industries

The concept of green economy has gained significant attention in recent years, as it offers a potential remedy to reduce the existing exploitation of the ecosystem while considering economic development. Malaysia has been gearing towards sustainability since the early 2000s. However, economic and population growth, along with rapid urbanization, will drive a rise in energy demand, which is expected to increase by 2% annually until 2050, as highlighted in National Energy Transition Roadmap (NETR) [76]. Fossil fuels remain the dominant contributors to Malaysia's energy supply and have a significant influence in shaping the country's energy landscape. As of 2020, four energy sources dominated the national total primary energy supply mix. Natural gas accounted for the largest portion at 42.4%, followed by crude oil and petroleum products at 27.3%, and coal at 26.4%. Renewables, including hydropower, solar, and bioenergy, constituted just a mere 3.9%. As Malaysia strives to increase industrialization efforts, the current industries' practices require improvement to meet the sustainability targets through green economy.

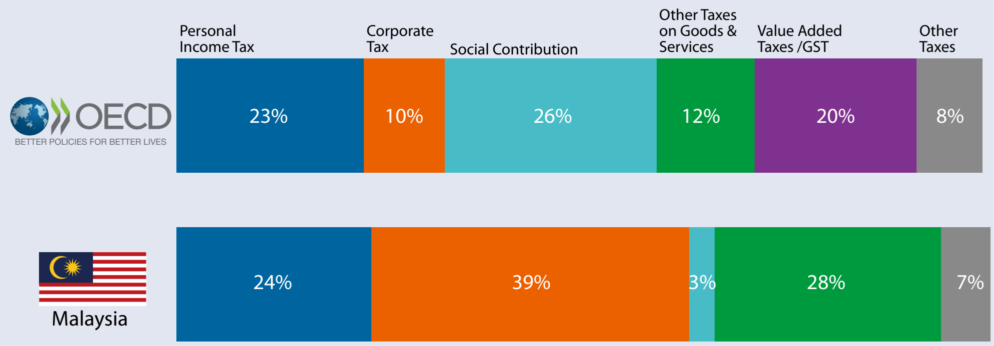
The Twelfth Plan (12^{th} MP) outlines the aspiration for the nation to achieve net-zero GHG emissions as early as 2050. Achieving a more sustainable approach to industrialization requires not only technological innovation but a comprehensive shift in Malaysia's strategies and policies in managing the energy transition. Key aspects of this transition include prioritizing renewable energy (RE) generation, particularly through solar photovoltaic (PV) and hydropower, alongside enhancing grid infrastructure, and promoting green mobility. Shifting towards this green economy will encourage the use of RE and electric vehicles (EV), as well as scaling up the manufacturing of RE and EV charging infrastructure. Transitioning towards a green economy will not only support the growth of emerging green industries, but also stimulate the creation of green jobs, further contributing to Malaysia's sustainable development goals.

4.2 Future Policy Suggestions

After reviewing available policies related to reindustrialization, it is crucial to note that there are several key policy shortcomings that need to be addressed.

FIGURE 10

SHARE OF TAX STRUCTURE IN TOTAL TAX REVENUE, 2020



Source: Illustrated based on report Revenue Statistics in Asia and the Pacific [77].

Strengthening government fiscal management

The existing national policy documents outline numerous initiatives aimed at incentivizing and boosting the supply and demand within manufacturing industries. However, these efforts may not be sustainable unless the government secures additional sources of income to support this vital sector in Malaysia. Therefore, there is a need for the Malaysian government to re-strategize its fiscal management approach without compromising support for industries while maintaining governance capability. Empirical findings from the assessment of premature deindustrialization risks underscore the significant negative impact of taxation on industrial growth. The current taxation structure creates an unfavorable business environment for manufacturers, leading to increased production costs. Hence, immediate tax reform in the taxation structure is imperative to alleviate these challenges for industries.

One potential option is to implement taxation reforms by considering a reduction in corporate tax rates. This is particularly relevant as Malaysia's corporate tax as a percentage of total tax revenue is nearly four times higher than that of OECD countries (Figure 10). Lowering corporate taxes can incentivize investment in technology and innovation, thereby enhancing competitiveness. Additionally, transitioning from the Sales and Service Tax (SST) to Goods and Services Tax (GST), also known as Value-added Tax (VAT), could be explored. GST offers a more comprehensive and transparent taxation system, addressing issues such as tax evasion, leakage, and the shadow economy. This transition could potentially increase revenue while contributing to a more robust fiscal position for the Malaysian government, thereby fostering domestic economic development.

Inclusion of blue economy as complementary to green economy

Complementing the green economy with the blue economy would be advantageous. While the green economy focuses primarily on energy and transport sectors and secondarily on agriculture and forestry, the blue economy targets the sustainability of fishery, marine, and coastal resources and finds roots in the green economy. The importance of the blue economy is emphasized in 12 MP, since this concept seeks to promote economic growth, social inclusion, and preservation or improvement of livelihoods while at the same time ensuring environmental sustainability.

Malaysia leverages its expansive maritime space, which is double the country's land area, by capitalizing on economic activities within and around its oceans, seas, and coastal areas. The marine-based or blue economy currently contributes approximately 23% of Malaysia's GDP [78]. Given the significant economic contribution of these activities, it is important to prioritize sustainability at their core.

To further drive industrialization, Malaysia should explore the potential of establishing manufacturing clusters focused on blue economy industries in addition to green economy sectors. These could include marine equipment and technology, sustainable aquaculture, marine biotechnology, and coastal tourism infrastructure. By providing infrastructure, incentives, and support services, Malaysia can attract investment and foster innovation in these areas. Moreover, these sectors have the potential to create more jobs and promote economic growth in the future.

Empowering domestic industrialization

As highlighted in the New Industrial Master Plan (NIMP) 2030, the issue of a loose economic linkage in the domestic value chain underscores a critical concern for Malaysia's economic sustainability. While NIMP 2030 emphasizes deepening these linkages, it does not specifically address the heavy dependence on imports, particularly concerning the collaboration between large industries and MSMEs. This oversight raises the necessity for a more thorough analysis to identify industries that require increased attention due to their high dependency on imported goods.

Malaysia's economic landscape has been primarily driven by domestic consumption in recent decades. However, this reliance on imports poses risks, especially during global economic fluctuations and supply chain disruptions. To address this issue and strengthen domestic economic linkages, Import Substitution Industrialization (ISI) emerges as a viable strategy. ISI involves developing local industries to produce goods that were previously imported, thereby reducing dependency on external sources and fostering a more self-reliant economy.

By implementing ISI strategically, Malaysia can focus on sectors that are highly import-dependent, such as certain manufacturing industries. This targeted approach enables the country to enhance its domestic value chains, promote technological advancement, create employment opportunities, and improve overall economic resilience. Additionally, ISI contributes to aligning with the objectives of NIMP 2030 by deepening linkages within the domestic economy and enhancing collaboration between different sectors, particularly between large industries and MSMEs. Ultimately, this strategy could significantly contribute to Malaysia's reindustrialization efforts and drive sustainable economic growth in the long run.

5. CONCLUSION

For the past fifty years, Malaysia has experienced a steady increase in its per capita GDP. In fact, its per capita GDP has increased sixfold from 1970 to 2020. During these five decades of economic growth, Malaysia's economic growth momentum has been disrupted by several major economic crises. The most notable ones are the first oil shock of 1974–75, the commodity price crisis of 1985–86, the Asian financial crisis in 1997, the global financial crisis of 2008–09 and the unprecedented COVID-19 pandemic in 2020–21. Despite having a remarkable average annual growth of 5.9% for the 1971–2020 period, Malaysia's economic performance over the ten year period is less impressive: after experiencing a strong growth in 1971–80, 1981–90 and 1991–2000 with 7.8%, 5.9% and 6.9% respectively, the growth after 2000 is slowing down. The periods 2001–10 and 2011–20 saw an average growth of 5.2% and 3.8% respectively. The growth in per capita GDP in Malaysia is closely related to the growth in labor productivity. The growth in per capita GDP "mirrors" the growth in labor productivity, as we moved from one sub-period to the next sub-period. For example, we observed similar upward and downward trends in labor productivity growth to the trend in economic growth.

In the 1970s, the Malaysian economy was dependent on the agriculture sector, but this scenario changed in the 1980s when Malaysia embarked on privatization and industrialization. The manufacturing sector has been given the great push to drive the economy to a new height. Since the mid-1980s, the manufacturing GDP share to total GDP has surged until it peaked in 2000, and thereafter it started to decrease ever since. The decrease in the share of manufacturing GDP to total GDP after it reached its optimal point is called "deindustrialization". Deindustrialization is a common phenomenon experienced by both developed and developing countries. Unfortunately, Malaysia's deindustrialization has been dubbed a premature deindustrialization as the manufacturing share of GDP to total GDP reached its peak below the threshold level experienced by the developed nations.

The slowing of Malaysia's per capita GDP growth is related to the performance of the manufacturing sector during the deindustrialization period of 2001–20. Our empirical analysis showed that there is almost a one-to-one relationship between real GDP and manufacturing share to GDP. A 1% decrease in the manufacturing sector share to GDP will reduce real GDP by 0.9%. Further analysis indicates that a reduction in tax rate and an increase in manufactured export and investment rate able to enhance share of manufacturing GDP to total GDP, and in turn will increase economic growth. Thus, to reindustrialize or revitalize the role of the manufacturing sector as the main driver of Malaysia's economic growth, affirmative effort in deploying appropriate policy to push the manufacturing sector to a new height in growth should be given very important consideration.

As a result, several policy recommendations have been discussed, drawing from national policy documents and categorized into three main areas: supply, demand, and environmental perspectives. On the supply side, it is crucial to enhance the manufacturing workforce environment and increase productivity through technology and innovation adoption. From the demand side, transitioning to export medium- and high-tech manufacturing and establishing industry foundations through quality investment are recommended. Finally, from an environmental standpoint, focusing on emerging green industries are essential. However, there are additional policy shortcomings that lead to three future policy recommendations, including strengthening government fiscal measures, incorporating blue economy initiatives, and empowering domestic industrialization.

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Appendix

TABLE A1

LIST OF VARIABLES, DESCRIPTIONS AND DATA SOURCES

Variables	Description	Sources
$mfgy_t$	Ratio of manufacturing sector's gross domestic product (GDP) to national GDP in RM (constant=2020)	APO Productivity Database 2022 Version 1
pop_t	Total population, in million persons	World Development Indicator (WDI)
pop_t^2	Population square	Author's calculation
$rgdppc_t$	Per capita GDP, RM (constant=2015)	WDI
$rgdppc_t^2$	Per capita GDP square	Author's calculation
$taxy_t$	Ratio of tax revenue to GDP (%)	Asian Development Bank key indicators database
$expy_t$	Ratio of total export to GDP (%)	WDI
$invy_t$	Ratio of gross fixed capital formation to GDP (%)	WDI
$misery_t$	Summation of inflation and unemployment rates (%)	WDI
lac_t	Latecomer index. Measure as the ratio of per capita GDP Malaysia to per capita U.S. (USD, constant=2015)	WDI
$lacdum1985_t$	Cross-term between latecomer index and dummy variable for commodity crisis in 1985, with crisis equals one, and zero otherwise.	Author's calculation
$lacdum1997_t$	Cross-term between latecomer index and dummy variable for Asian financial crisis in 1997, with crisis equals one, and zero otherwise.	Author's calculation
$lacdum2009_t$	Cross-term between latecomer index and dummy variable for global financial crisis in 2009, with crisis equals one, and zero otherwise.	Author's calculation
$lacdummp8\text{-}9_t$	Cross-term between latecomer index and dummy variable for globalization in 2001–10, with crisis equals one, and zero otherwise. This period coincides with the 8th and 9th Malaysia Plans.	Author's calculation
$lacdummp10\text{-}11_t$	Cross-term between latecomer index and dummy variable for globalization in 2011–20, with crisis equals one, and zero otherwise. This period coincides with the 8th and 9th Malaysia Plans.	Author's calculation
$lprodmfgy_t$	Labor productivity in manufacturing sector. Measured by ratio of manufacturing sector's GDP (constant=2020) to employment in manufacturing sector.	APO
cey_t	Labor wages (%). Measured by ratio of compensation of employees to total income (total income equals compensation of employees plus operating surplus and mixed income)	APO
$tech_t$	Technology index. Measured by using total factor productivity (2010=1.0)	APO
edu_t	Education level. Measured using school enrolment, tertiary (% gross).	WDI
$finy_t$	Financial development. Measured using broad money (% of GDP)	WDI
$dum1975_t$	Dummy variable for first oil price crisis, with crisis equals 1, and 0 otherwise.	Author's calculation
$dum1985_t$	Dummy variable for commodity price crisis, with crisis equals 1, and 0 otherwise.	Author's calculation

Variables	Description	Sources
$dum1997_t$	Dummy variable for Asian financial crisis, with crisis equals 1, and 0 otherwise.	Author's calculation
$dum2009_t$	Dummy variable for global financial crisis, with crisis equals 1, and 0 otherwise.	Author's calculation
$rgdp_t$	Economic growth. Measured using real GDP in RM (constant=2015)	WDI
ur_t	Unemployment rate (%)	WDI
$grgdp_t$	Percentage growth in real GDP	WDI and author's calculation
$gmfg_t$	Percentage growth in real GDP manufacturing sector	WDI and author's calculation
$gempmfg_t$	Percentage growth in employment in manufacturing sector	APO and author's calculation
$gmfg\text{-}gnonmfg_t$	Difference in Percentage growth in real GDP in manufacturing and non-manufacturing sectors	APO and author's calculation
$gagr_t$	Percentage growth in real GDP in agriculture sector	WDI and author's calculation
$gser_t$	Percentage growth in real GDP in services sector	WDI and author's calculation
$gprodmfg_t$	Percentage growth in labor productivity in manufacturing sector	APO and author's calculation
$gprod_t$	Percentage growth in national labor productivity	APO and author's calculation
$gempnonmfg_t$	Percentage growth in employment in non-manufacturing sector	APO and author's calculation
$gempagr_t$	Percentage growth in employment in agriculture sector	APO and author's calculation
$gempser_t$	Percentage growth in employment in services sector	APO and author's calculation

Notes: World Bank WDI database available at https://data.worldbank.org/indicator?tab=all; APO Productivity database available at https://www.apo-tokyo.org/productivitydatabook/

TABLE A2

RESULTS OF UNIT ROOT TESTS

Variables	Level:		First-difference:	
	Intercept	Intercept+trend	Intercept	Intercept+trend
$grgdp_t$	-5.5916***(0)	-6.1847***(0)	-	-
$gmfg_t$	-3.0503**(2)	-6.3707**(1)	-	-
$gempmfg_t$	-4.8878***(0)	-5.6126***(0)	-	-
$gmfg\text{-}gnonmfg_t$	-5.7057***(0)	-6.4423***(0)	-	-
$gagr_t$	-8.6727***(0)	-9.2089***(0)	-	-
$gser_t$	-4.9885***(0)	-5.4382***(0)	-	-
$gprodmfg_t$	-8.0420***(0)	-8.0594***(0)	-	-
$gprod_t$	-5.5990***(0)	-6.1103***(0)	-	-
$gempnonmfg_t$	-7.5290***(0)	-7.4917***(0)	-	-
$gempagr_t$	-8.1725***(0)	-8.1482***(0)	-	-
$gempser_t$	-3.4378**(2)	-3.5415**(2)	-	-
$mfgy_t$	-1.5668 (3)	-1.2187 (0)	-3.0187**(2)	-5.9205***(1)
$rgdppc_t$	-2.2885 (0)	-1.8528 (0)	-5.5179***(0)	-5.9120***(0)
$rgdppc_t^2$	-1.8839 (0)	-1.9847 (0)	-5.6430***(0)	-5.8766***(0)

Variables	Level:		First-difference:	
	Intercept	Intercept+trend	Intercept	Intercept+trend
lac_t	-1.7902 (1)	-2.5356 (0)	-4.8938***(0)	-4.9849***(0)
$prodmfg_t$	-1.7008 (0)	-2.9026 (0)	-7.9485***(0)	-7.9465***(0)
cey_t	-2.0939 (0)	-1.9602 (0)	-8.3580***(0)	-8.4354***(0)
$tech_t$	-2.3220 (0)	-2.2556 (0)	-6.4891***(0)	-6.4218***(0)
edu_t	-0.3195 (0)	-1.3542 (0)	-5.0983***(0)	-5.0433***(0)
$finy_t$	-2.6901 (0)	-2.8322 (0)	-6.9700***(0)	-6.7394***(1)
$rgdp_t$	-2.5649 (1)	-0.7195 (0)	-5.1140***(0)	-5.8576***(0)
ur_t	-1.7666 (0)	-1.3516 (0)	-5.5128***(0)	-5.5667***(0)
$taxy_t$	-1.2562 (0)	-2.6834 (0)	-7.9297***(0)	-8.2479***(0)
$expy_t$	-1.2223 (0)	0.1126 (0)	-5.5375***(0)	-5.8035***(0)
$invy_t$	-2.8738 (0)	-2.9902 (0)	-5.4486***(0)	-5.7415***(0)
$misery_t$	-1.0357 (2)	-3.3529 (3)	-8.7066***(1)	-8.6030***(1)

Notes: Asterisks *** denotes statistically significant at the 1% level. Unit root tests were performed using Augmented Dickey-Fuller test. The critical value is referred to McKinnon [48]. Figures in round bracket, (…) denote optimal lag length. All variables are in logarithm except for growth variables.

PAKISTAN

Executive Summary

Pakistan is the fifth most populous country with an agrarian base and a developing economy and has a similar fate to many developing economies. The component of WAR economy is an interesting element but does not directly reflect in the documented economy and does not play the vital role in the real Gross Domestic Product (GDP). The real GDP is the summation of agricultural sector, industrial sector, and services sector. The world bank indicators clearly depict the story of gradual decline in agricultural sectors over the last five decades, stagnation in the industrial sector and rising trend in the services sector. Inadequate industrial policies, lack of education, structural reforms from the loaning agencies like IMF and World Bank, VIP mindset of the bureaucratic control, lavish governmental expenditures, hyperinflation, volatility in the currency exchange rate due to political instability, open trade, and liberalization are the main causes of premature deindustrialization. Black money due to WAR economy and artificial growth in the so-called real estate sector de-routed the businessmen, investors and industrial tycoons instead of investing the money in manufacturing sector invest in the housing projects, shopping malls and encourage the low-level talent jobs to wholesale and retail sector linking with transport sector.

Premature deindustrialization influences the manufacturing output and decline in the employability in the manufacturing sector. High cost of production due to energy crises and high taxation further create the ripple effect when businessmen start the cost cutting initiatives; the most favored initiative is reduction in the employees as well as cut in the pay structure. Demotivated and frustrated employees further lower the labor productivity. There is a strong need for policymakers and experts of development economics to unveil the underlying causes / structures of the negative industrialization and explore the new plausible policies that may either derail the process of deindustrialization or contribute for industrialization. The systems thinkingS was used while developing the causal diagrams, having positive and negative feedback loops among the different interlinked, interconnected, and interdependent variables that have the feedback notion and are dynamic in nature. Most of the variables are used to develop the regression model for statistical analyses and to search the empirical evidence. Growth in manufacturing's share to GDP, along with rise in employment in the manufacturing sector, is a good indicator of industrialization. The variables that affect directly are going to reinforce the growth and those that affect indirectly are going to bring decline in the growth of the manufacturing sector. The outcome of the statistical software Minitab™ is multiple regression analysis, highlighting that those variables like foreign direct investment, trade opening, energy intensity, taxation, currency exchange rate and misery index (unemployment rate and inflation rate) are the main causes of premature deindustrialization, because rise in these variables end up with decline in the growth of manufacturing's share output to GDP.

Pakistan is the fifth most populous country in the world, consisting of 53% youth who need employability, good education, and quality lifestyle. Low pay structure of the agriculture sector is

the road blocker to join in agricultural activities, and shrinking salary packages in the manufacturing sector due to high cost of production compels the youth to explore opportunities in the services sector. Educated youth engage themselves in the digital world as freelancers and IT service providers, whereas uneducated youth engage themselves with low-talent and low productivity domains like wholesale and retail sectors, transport sector, and real estate sector. Consequently, the mindset of the youth, whether they are educated or uneducated, causes premature deindustrialization and shuts the door of industrial units. Policymakers must revisit the pay structure and associated benefits with the manufacturing sector to have quality staff and industry driven employees. Political stability with stable currency exchange rate, restricted and measured open trade, reduction in borrowing money, reduction in the energy tariff, machinery, and raw materials not only will bring industrialization, but growth in the productivity as well. Strengthening the institutions and good governance are the supporting pillars to re-track the country in the process of industrialization and prosperity.

1. Introduction

Economies of the developed countries that appear in the world map as an economic giant [34] strongly use the manufacturing sector as an engine of economic growth [37]. Industrialization was understood as one of the most decisive factors of economic development for both the 'advanced' and 'backward' economies [16]. Khaldor [21] describes the manufacturing sector as the key driver of national economic growth, the so-called Khaldor's law: the larger the positive gap between the growth rate of the manufacturing sector and that of GDP, the higher the growth rate of the economy as a whole; productivity growth of the manufacturing sector is faster when its output growth rate is faster. Rodrik [25] argued that the manufacturing sectors show the unconditional labor productivity convergence; the manufacturing sector absorbs more unskilled labor than agricultural and services sectors, and the manufacturing sector does not face the demand constraints [9] of a home market due to its tradability in international market and linking with global value chains. Economies based on trade and import lead a country to appear as a trading hub, and such an economy is both highly volatile and prone to political instability and fluctuation in currency exchange rate [40].

Industrialization means when the manufacturing share in output and in employment is rising. Sustained fall in share of manufacturing's output and in employment represents the deindustrialization process. Deindustrialization, or hollowing out of industry, is a controversial phenomenon [40]. Deindustrialization at higher level of per capita income and increased manufacturing output in developed countries is positive in nature due to technology adoption and higher level of automation. The deindustrialization in advanced countries has been accompanied with labor productivity improvement in manufacturing sectors, leading to the loss of employment in manufacturing sector rather than output [41]. Enhanced per capita income, rising share of manufacturing output and rising job loss in manufacturing are the indicators of deindustrialization in advanced economies or termed as positive deindustrialization. The different economies follow different development trajectories. Cark [7] and Fisher [13] highlighted the economy shifts from agricultural to manufacturing and from manufacturing to services.

Pakistan's economy depicts a gloomy picture, and various indicators show the grim economic situation [4]. Last fifty years' data indicates that there is no positive industrialization that will cause growth in productivity and the manufacturing sector; rather, deindustrialization is stronger, causing stagnation in the manufacturing output and share of employment in manufacturing sector. The pillars of the Pakistani economy are as under:

1. Agricultural Economy (Traditional and Low Productivity)

2. Industrial Economy (Modern and High Productivity)

3. Services Economy (Mixed can be low and high, but in Pakistan it is low productivity and low talent)

4. WAR Economy (Black Money, Illicit payments etc. end up low productivity and low talent)

The first three pillars prevail in every economy [9]. But in the Pakistani economy, the fourth component, WAR economy, cannot be ignored. Polarization in foreign affairs and inclination towards USA was a severe mistake. U.S. foreign policy used Pakistan against Russia and used India against China. U.S. strategists crafted well-designed policies and used them effectively. The U.S. encouraged military establishment to rule the country and to achieve her nefarious design using dictator power (Ayub Khan, Zia Ul Haq & Pervez Musharraf regime spanning over the period of 30 years) and in between their tenures, when the dictators were no more, the military establishment nominated the string-puppet interim governments before the revival of democratic process. WAR economy as a fourth economic pillar is the result of military rule and polarization in foreign affairs. Political parties took power as an opportunity to loot money for the next elections and never thought about the long-term industrial policies. Political leadership encouraged trade and to make money as a commission and kickbacks. Thus, there was a gradual shift from agricultural to manufacturing and from manufacturing to services; this was a deadly journey from industrialization to premature deindustrialization.

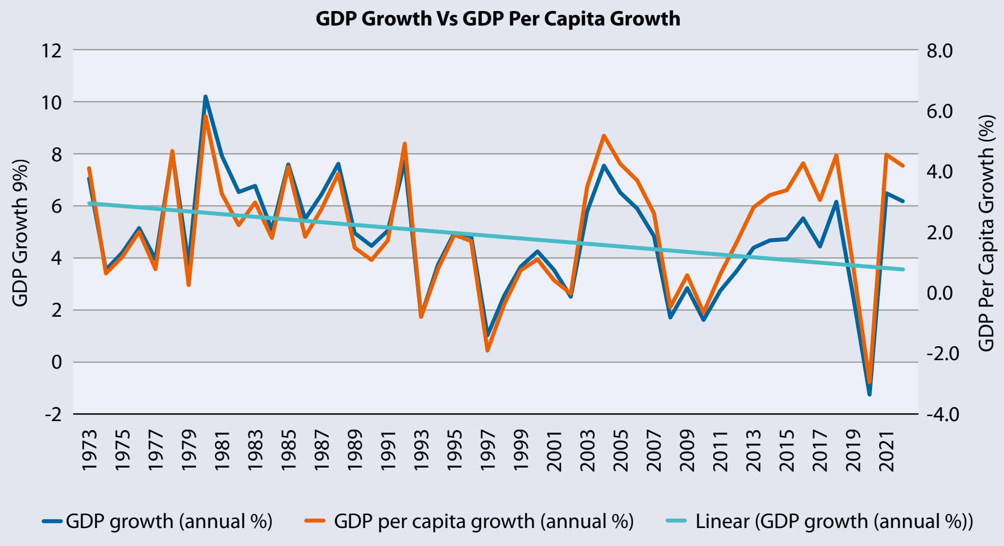
1.1 Background Statistics on Economic and Labor Productivity

1.2 GDP and GDP Per Capita Growth Rate

The manufacturing sector in Pakistan is facing serious crises from the last five decades since 1973. The last fifty years of data indicate the growth percentage in Gross Domestic Product (GDP) had a declining trend from 6% to 3.4% and GDP per capita growth percentage had a declining trend from 4.0% to almost 1.8%, as mentioned in Figure 1, whereas the GDP per capita income in USD has a rising trend, as shown in Figure 2. GDP in USD in millions increased every year until 2018. In 2018, there was a sharp decline due to change of government and currency exchange rate volatility. In 2020, there was the COVID-19 effect. Even then, the GDP had an upward trend onward and GDP per person employed was also the same, as shown in Figure 2. During the military regime, values of GDP and GDP per capita income were high due to authoritative and bureaucratic government style, ensuring the political stability and reduction in fluctuation in currency exchange rate. However, from a long-term perspective, there was serious damage to the economy irrespective of military regime or democratic regime. The priority of both types of governments was not industrialization. Consequently, negative industrialization was the outcome. Premature deindustrialization means an

FIGURE 1

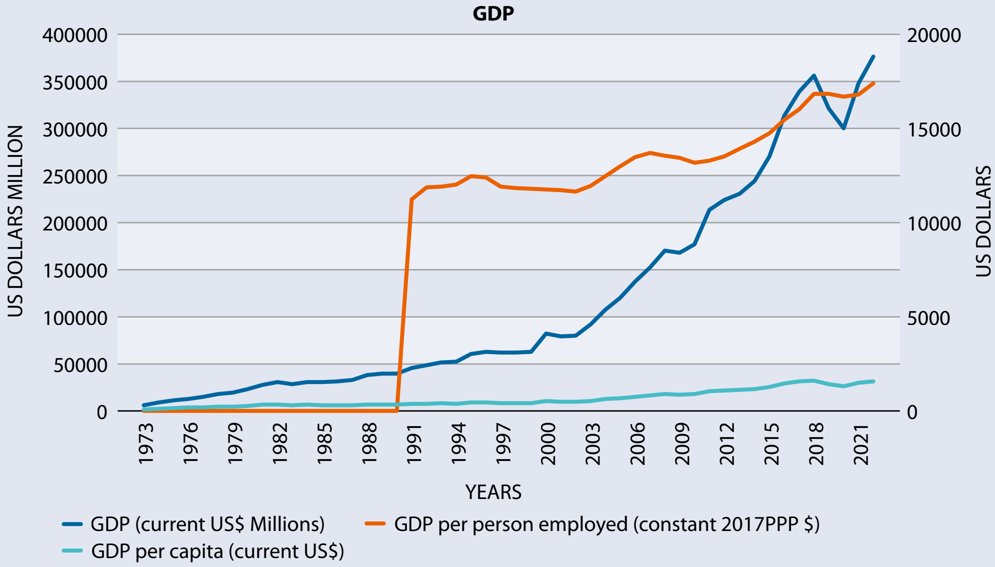
GDP GROWTH (%) AND GDP PER CAPITA GROWTH (%) AUTHOR'S OWN ELABORATION



Source: World Bank Indicators (Last Updated: 10/26/2023)

FIGURE 2

GDP GROWTH (USD MILLIONS), GDP PER PERSON EMPLOYED AND GDP PER CAPITA GROWTH (USD MILLIONS) (AUTHOR'S OWN ELABORATION)



Source: World Bank Indicators (Last Updated: 10/26/2023)

early decline in the industrial sector or a situation where the manufacturing sector and employment [11] suffer at low-income levels [12] before industrialization has taken place. Premature deindustrialization is the economic phenomenon that represents the shrinking of manufacturing in both employment and output in development countries [9]. Rodrik [25] describes deindustrialization as a sustained decline in the share of manufacturing in total employment, as well as in gross domestic output, whereas deindustrialization in developed countries (advanced economies) has been accompanied by labor productivity improvement in the manufacturing sector, leading to the loss of employment rather than the manufacturing output defined as a positive deindustrialization. Tregenna [33] defines deindustrialization in terms of sustained fall in share of manufacturing in GDP and in total employment.

There are multiple indicators that depict the true picture of premature deindustrialization. Turning into the service economies without realization and gaining the benefits of industrialization is a common economic phenomenon of developing countries and the same in Pakistan. Growth in the services sector in developing countries leads to low productivity activities, like wholesale and retail trade, transport services, and real estate services [26] (see in Figure 3. Types of services). Figure 3 indicates the types of services as objective evidence of premature deindustrialization in Pakistan. Positive deindustrialization in developed countries is due to technology deployment resulting in higher manufacturing output and reduction in employment and rapid shift in the employment activities from low-talent productivity to high-talent productivity. Premature industrialization in developed economies is an indicator of implementation of high-tech equipment and machinery [19], enhancement in the research and development initiatives, and entering the era of Industry 4.0 from Industry 2.0 and Industry 3.0. Whereas premature deindustrialization in developing economies [24] like Pakistan experiences shrinkage or stagnation in the manufacturing sector [11], growth in the services sector and growth in imported items from low-cost producers push the economy to be a trading hub, showing growth in transport and the retail sector, as shown in Figure 3, and continuous decline in the GDP per capita growth highlighted in Figure 1.

Three pillars of the Pakistani economy (agricultural, manufacturing and services) have documented an economy similar to most of the advanced and developing economies, and a fourth one (WAR economy) has two-fold components: documented and undocumented.

1) Agricultural Sector [5]

2) Industrial Sector (Documented but cottage and homemade are partially missing)

3) Services Sector (Documented but growth is artificial and fake especially in real estate sector)

4) WAR Economy/Support Initiatives/Activities (Documented Economy-FDIs, IMF Loans, Funds, Low Interest Rates, grants and relaxations in the sanctions whereas Undocumented Economy- Kickbacks, Money in exchange of WAR criminals, provision of WAR bases, drone attacks etc).

It is interesting to note that first three pillars of economy appear directly in the Gross Domestic Product (GDP) [7], but the last one does not appear directly. Rather, it indirectly plays a significant role in the economy and sets the values (corruption, dishonesty and cowardness) in the society, causing the long-term economic collapse. Black money (illicit payments) strengthens the Power Groups / Mafias that bring corrupt elite in the government, who craft short-sighted and inadequate industrial policies that ultimately reduce the share of manufacturing's output, closing down the manufacturing units, encouraging trade liberalization, reducing the import duties on finished products, imposing high duties on raw materials and machinery imports, causing premature deindustrialization in the economy (see in Figure 11, Appendix A in Figure 21, and Figure 22).

A stable share of manufacturing sector in GDP and in employment, increasing trade deficit every year, fluctuation in currency exchange rate, and growth in services sector (especially retail outlets, transport and real estate sectors) are a few factors for premature deindustrialization and justify the problem statement for the research problem under study.

The following are the research questions:

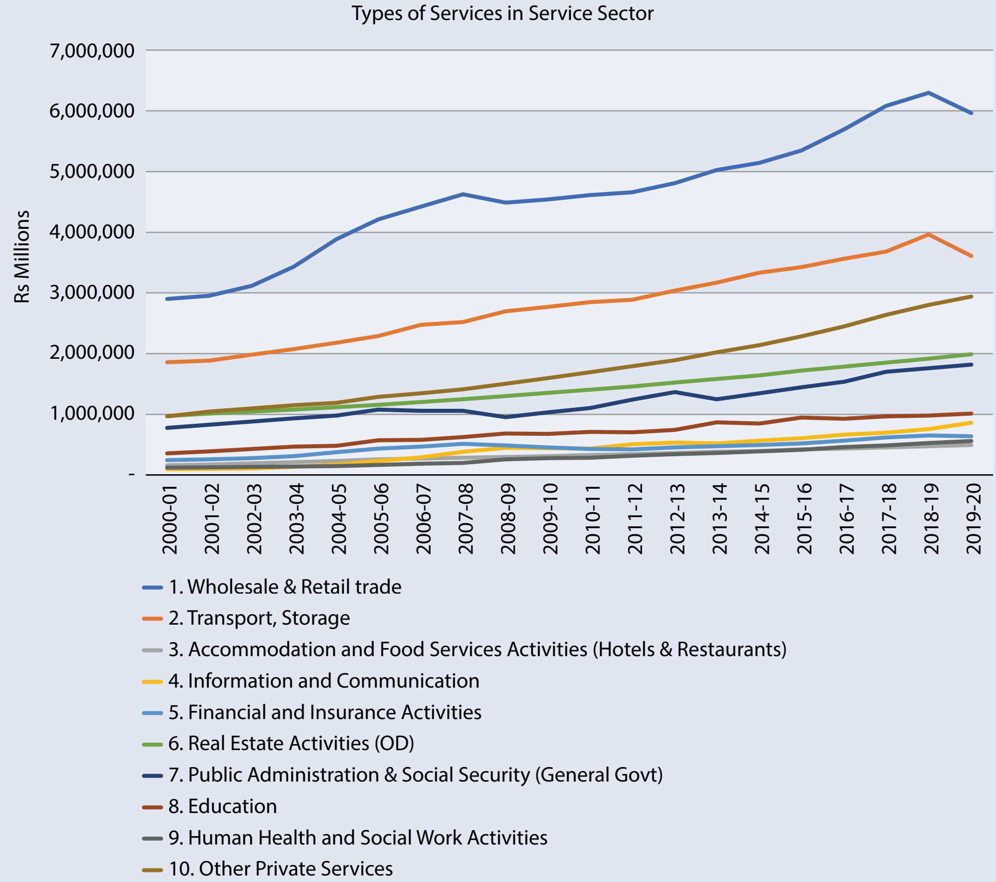
RQ-1 What are the causes and risks of premature deindustrialization in Pakistan?

RQ-2 What are the underlying structures of deindustrialization and its influence on long term productivity performance?

RQ-3 What are the innovative industrial policy interventions to initiate the industrialization process for productivity enhancement?

FIGURE 3

TYPES OF SERVICES IN SERVICE SECTOR (AUTHOR'S OWN ELABORATION)



Source: Pakistan Bureau of Statistics

1.3 Contribution to per Capita GDP Growth by Factor

Results from the decomposition of economic growth from various factors of input are reported in Table 1 and Figure 4. As shown in Table 1, Pakistan achieved a GDP growth of 4.63 % over the five decades from 1971–2020. Growth during this period was supported by 4.26% growth in capital input and 3.57% growth in labor input, and a 0.82% growth in TFP. During the sub-period of 1981–90 (during the military rule), the real growth of GDP in Pakistan was highest, showing the value of 6.27%. The overall trend of GDP growth in Pakistan is declining from 6.27% to 3.54%. It is interesting to note that during the military regime, growth rate is comparatively high, instead of democratic rule. That may be due to stability in currency exchange rate and inflation rate. Despite the decreasing average growth performance, growth in capital input is still high, with an average of 5.28% during the three sub-periods of 1971–80, 1981–90, and 1991–2000. On the other hand, the average growth of labor input only grew at the average of 3.4% for the same three sub-periods. That is a clear indication that the technology diffusion rate is faster than the previous periods. Furthermore, during these three sub-periods, the growth in Information, Communication and Technology (ICT) capital has been outstanding, with an average growth of 10.19%. In terms of contribution to GDP growth, capital input played a major role in this performance, with an average share of more than 43.85% for 1971–2020. Growth in ICT capital is higher than the growth in non-ICT capital for decades. During the five decades, the contribution to capital growth by non-ICT capital input was 46.9% in 1971–80, 41.95% in 1981–90, 51.49% in 1991–2000, 39.47% in 2001–10, and 27.4% in 2011–20. The contribution of labor input is about 38.44% on average in the last five decades. The performance of labor input is driven by 24.62% of hours worked and 13.82% in labor quality during the same period. Nevertheless, the contribution of TFP to GDP growth was around 17.71 and has never shown any negative growth in five decades, as shown from Table 1 and Figure 4. During the period of 1971–80 during the democratic government after the fall of Dhaka, the TFP 0.13 ever lowest in the history of Pakistan and contribution share to growth was only 2.88. The second lowest was in the period of 2001–10; during military regime, the TFP was 0.56 and its contribution to growth was only 14.93%.

TABLE 1

SOURCES OF GDP

		Real GDP Growth	Capital Input	ICT Capital	Non-ICT Capital	Labor Input	Hours Worked	Labor Quality	TFP
A	Growth %								
	1971–2020	4.63	4.26	10.11	4.18	3.57	2.29	1.28	0.82
	1971–80	4.52	4.66	8.2	4.65	4.25	2.74	1.5	0.13
	1981–90	6.27	6.41	15.62	6.32	3.56	2.46	1.1	1.54
	1991–2000	5.05	5.51	6.75	5.5	2.97	1.9	1.07	0.83
	2001–10	3.75	2.65	12.27	2.52	3.98	2.98	1	0.56
	2011–20	3.54	2.08	7.73	1.94	3.07	1.36	1.71	1.05
B	Contribution to Growth %								
	1971–2020	4.63	2.03	0.06	1.96	1.78	1.14	0.64	0.82
	1971–80	4.52	2.15	0.02	2.12	2.25	1.45	0.8	0.13
	1981–90	6.27	2.69	0.06	2.63	2.04	1.42	0.61	1.54
	1991–2000	5.05	2.65	0.04	2.6	1.57	1	0.57	0.83
	2001–10	3.75	1.59	0.1	1.48	1.6	1.19	0.41	0.56
	2011–20	3.54	1.06	0.1	0.97	1.43	0.63	0.79	1.05
C	Percentage Share to Growth (%)								
	1971–2020	100	43.84	1.3	42.33	38.44	24.62	13.82	17.71
	1971–80	100	47.57	0.44	46.9	49.78	32.08	17.7	2.88
	1981–90	100	42.9	0.96	41.95	32.54	22.65	9.73	24.56
	1991–2000	100	52.48	0.79	51.49	31.09	19.8	11.29	16.44
	2001–10	100	42.4	2.67	39.47	42.67	31.73	10.93	14.93
	2011–20	100	29.94	2.82	27.4	40.4	17.8	22.32	29.66

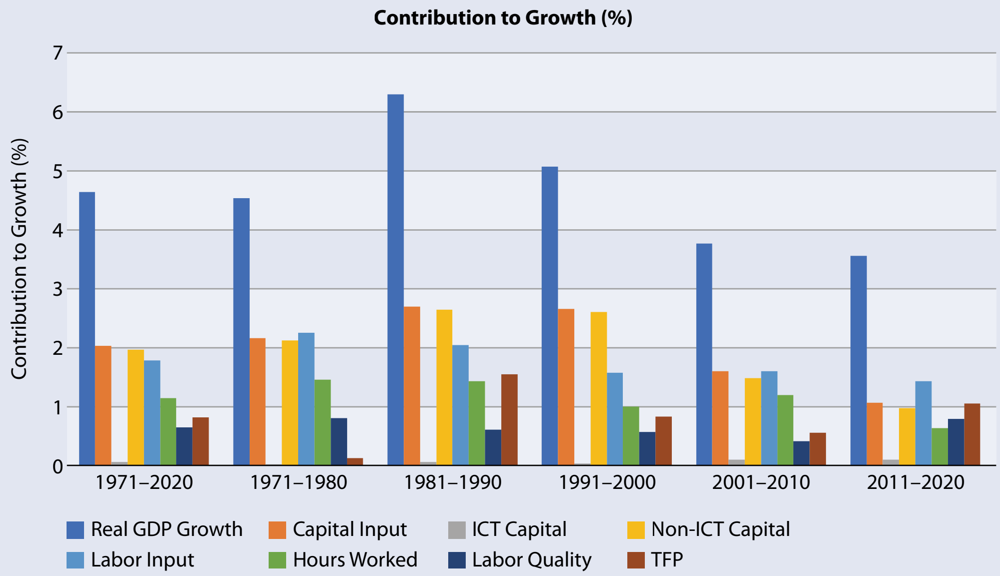
Source: APO Productivity Database 2022 Version 1 (October 31, 2022), (Author's own elaboration)

1.4 Sources of Labor Productivity Growth

The labor productivity of Pakistan has been tabulated and portraited from the report of Asian Productivity Organization data source, shown in Table 2 and in Figure 5. During the sub-periods 1971–80, 1981–90, 1991–2000, the capital deepening was increasing in every decade 0.86%, 1.66% and 1.75% respectively, bringing gradual increase in labor productivity with the support of technology diffusion generating labor saving. No doubt the capital deepening was more prominent in non-IT capital than in IT capital deepening. The average labor quality 0.64% and TFP was 0.82%. It is quite obvious that percentage share to labor productivity growth is due to capital deepening of non-IT capital. There is a need to focus on information technology (IT) education and skill and a competency-based education system. Development of the IT based infrastructure is the need of today to gain the real benefit of technology deployment. During the period of 2001–10, there was no investment especially in technology sector due to 9/11 happening (September, 11 2001). There was a war against terrorism from the land of Pakistan as a supporter to the U.S.

FIGURE 4

CONTRIBUTION TO GDP GROWTH (%) SOURCES OF GDP GROWTH



Source: APO Productivity Database 2022 Version 1 (October 31, 2022), (Author's own elaboration)

against Afghanistan. Capital deepening for the first time was negative -0.2%; for non-IT capital, it was -0.28% and had seriously affected the labor productivity 0.77%, the lowest in the last fifty years. The TFP in the period of 2001–10 was 0.56, slightly higher than the all-time lowest number in the history of country, which was 0.13 in the period of 1971–80.

TABLE 2

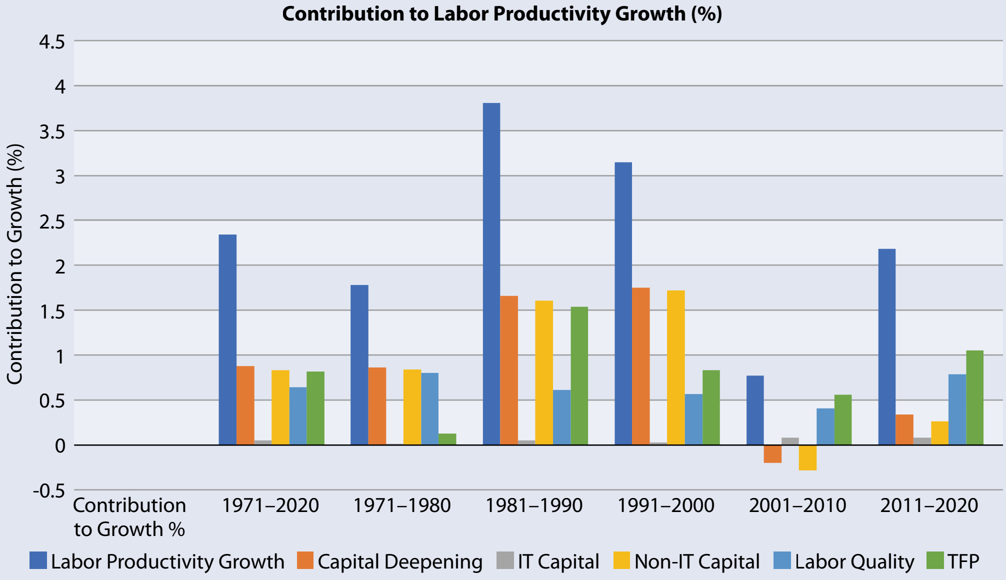
SOURCES OF LABOR PRODUCTIVITY GROWTH

	Periods	Labor Productivity Growth	Capital Deepening	IT Capital	Non-IT Capital	Labor Quality	TFP
A	Contribution to Growth %						
	1971–2020	2.34	0.88	0.05	0.83	0.64	0.82
	1971–80	1.78	0.86	0.01	0.84	0.8	0.13
	1981–90	3.81	1.66	0.05	1.61	0.61	1.54
	1991–2000	3.15	1.75	0.03	1.72	0.57	0.83
	2001–10	0.77	-0.2	0.08	-0.28	0.41	0.56
	2011–20	2.18	0.34	0.08	0.26	0.79	1.05
B	Percentage Share to Growth (%)						
	1971–2020	100	37.61	2.14	35.47	27.35	35.04
	1971–80	100	48.31	0.56	47.19	44.94	7.3
	1981–90	100	43.57	1.31	42.26	16.01	40.42
	1991–2000	100	55.56	0.95	54.6	18.1	26.35
	2001–10	100	-25.97	10.39	-36.36	53.25	72.73
	2011–20	100	15.6	3.67	11.93	36.24	48.17

Source: APO Productivity Database 2022 Version 1 (October 31, 2022), (Author's own elaboration)

FIGURE 5

CONTRIBUTION TO LABOR PRODUCTIVITY GROWTH (%), TFP AND CAPITAL DEEPENING



Source: APO Productivity Database 2022 Version 1 (October 31, 2022), (Author's own elaboration)

2. De-industrialization Trends

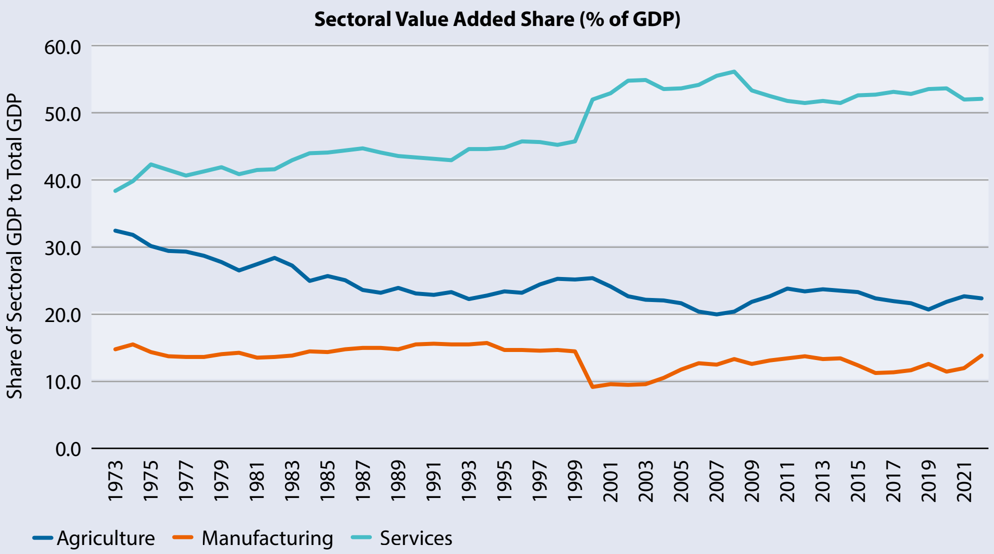
2.1 Trends in Agricultural, Manufacturing and Services Shares in GDP and Employment

Pakistan, being an agricultural economy, was no longer giving priority to the agricultural sector from 1973–99. Agricultural share of GDP had fallen from 32% to 23%, and over the next twenty years there was further decline from 23% to 22%. This was quite alarming for the nation, the fifth most populous country of the world. Pakistan would have to import food items like potato, onion, tomato etc. because the agricultural sector was the least interesting area to the government officials. From 1988–91, the structural reforms had been initiated under the pressure of International Monetary Fund (IMF) and trade openness was encouraged, reducing the duties on household items and food items. Consequently, there was a sharp decline in manufacturing share from 14% to 10%, and later on from the last twenty years there was no significant growth observed in the manufacturing sector (see in Figure 6). Political instability, fluctuations in currency exchange rate, and the implementation of the World Trade Organization (WTO) were the input for trade liberalization that was the killing instrument for the manufacturing sector. From the last fifty years, the growth in the manufacturing sector was hovering around 13% to 14% and seemed to be stagnant, whereas the service sector contribution to the GDP has been increasing every year (see in Figure 6). Share of services sectors had shown significant growth from 38% to 56% and then ended up around 52%. Unfortunately, the growth in services sector is in non-ICT and low productivity activities like real estate sector, retail business, and transport sector. Pakistan's economy faces numerous challenges at the national level; political instability, constantly changing regimes, short term and inadequate industrial policies, kickbacks and commission percentages are also the added factors for negative industrialization. Look at the causal loop diagrams shown in Appendix B.

In the 1970s, the agriculture sector was the largest employer of the people. Around 58% of the total employed people were associated with the agricultural sector, as shown in Figure 7. It is surprising that in the year 2020, the agriculture sector is still largest employer in terms of thousands of

FIGURE 6

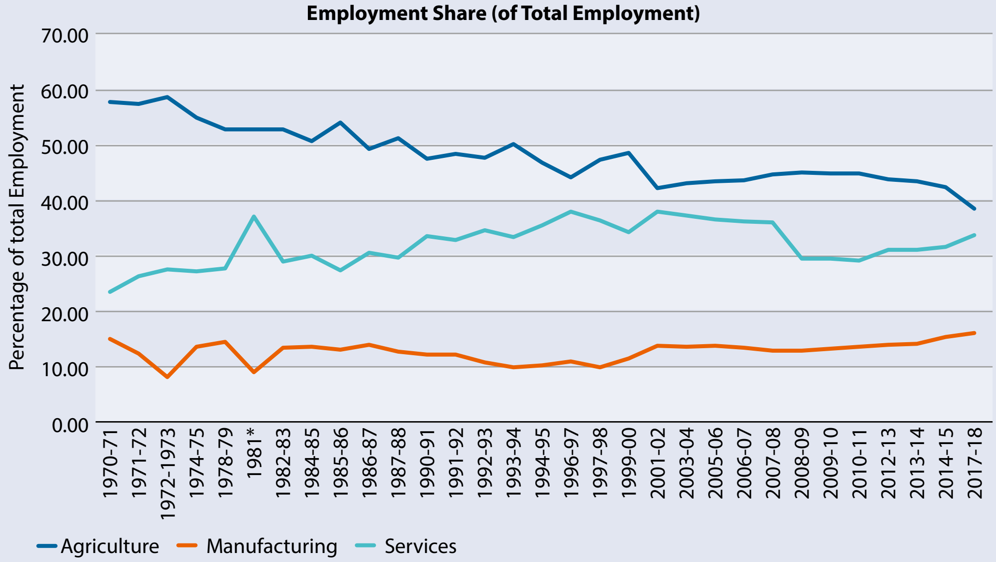
TRENDS IN AGRICULTURAL, MANUFACTURING AND SERVICES SHARES IN GDP



Source: World Bank Indicators (Last Updated: 10/26/2023)

FIGURE 7

TRENDS IN SHARE OF SECTOR EMPLOYMENT TO TOTAL EMPLOYMENT



Source: 50 Years of Pakistan in Statistics (Vol2 & Vol4), Pakistan Statistical Year Book, Labor force Survey. Pakistan Bureau of Statistics

persons, as shown in Figure 9. The manufacturing sector is the lowest among all, but slightly higher than the construction sector, as shown in Figure 9. Employment in the services sector is growing, with growth of 23% to 34% in five decades and continuing to grow higher and higher, as shown in Figure 7. For almost five decades, from 1971–2018, employment in the manufacturing sector was more or less the same, and from 2011 onward there was a significant increase from 13% to 16%, as highlighted in Figure 7.

2.2 Trend in Labor Productivity by Industry

Table 3 indicates the decomposition of the labor productivity in millions of PKR per person over a decade. There is a gradual rise in the mining sector until the year 2000, and from 2001–10 the growth is exponential. After that, from 2011–20 the growth is stable and seems to be saturated, as seen in Figure 8. Table 3 indicates that from the period of 2001–10, there is sharp increase, like an explosion in growth, and from 2011–20, the numbers remain the same, showing some sort of stability or saturation. The second highest sector in terms of labor productivity is the service sector, as shown in Figure 8. but if we study the Figure 3 along with Figure 8, the message is very clear that productivity growth is in low-talent activities, not high-talent activities.

2.3 Decomposition of Labor Productivity by Industry

The number of persons involved in the mining sector are less and output in terms of millions of PKR is much higher than any other sector. That is why labor productivity in the mining sector has an exponential growth — because of the highly valued product. Services has the second highest sector so far as growth in labor productivity is concerned, and then the manufacturing sector, followed by the agricultural sector. Persons employed in the agricultural sector are highest in number, and output yield in the agricultural sector is lowest. That is why there was a decline in labor productivity in the agricultural sector.

TABLE 3

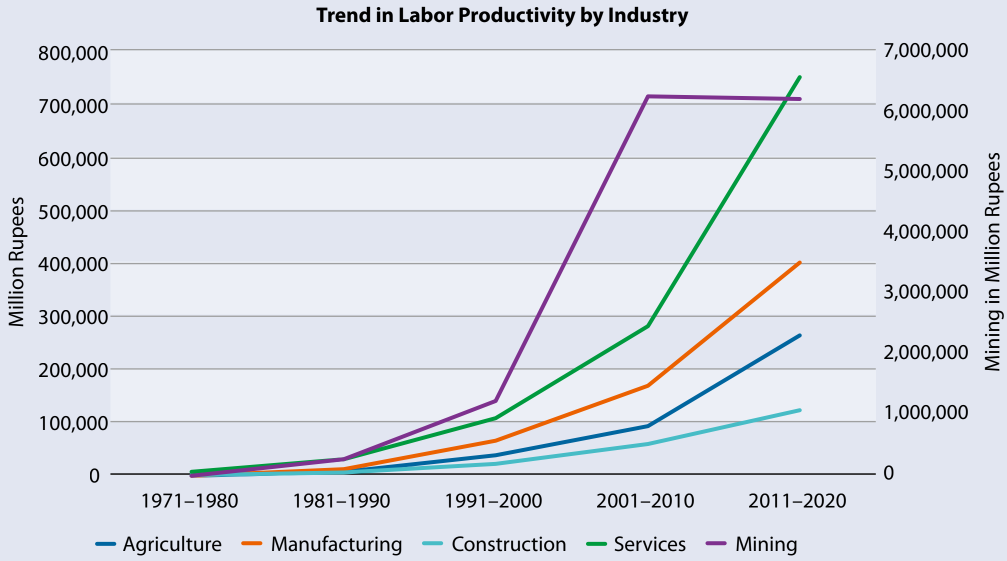
DECOMPOSITION OF LABOR PRODUCTIVITY BY INDUSTRY

	Agricultural	Mining	Manufacturing	Construction	Services
1971–80	3,644	29,875	3,811	4,405	10,442
1981–90	10,678	306,628	15,937	9,468	34,855
1991–2000	42,256	1,269,519	69,603	26,065	111,995
2001–10	97,029	6,315,419	173,905	64,075	286,642
2011–20	268,800	6,268,935	407,101	128,017	758,725

Source: APO Productivity Database 2022 Version 1 (October 31, 2022), (Author's own elaboration)

FIGURE 8

TREND IN LABOR PRODUCTIVITY BY INDUSTRY

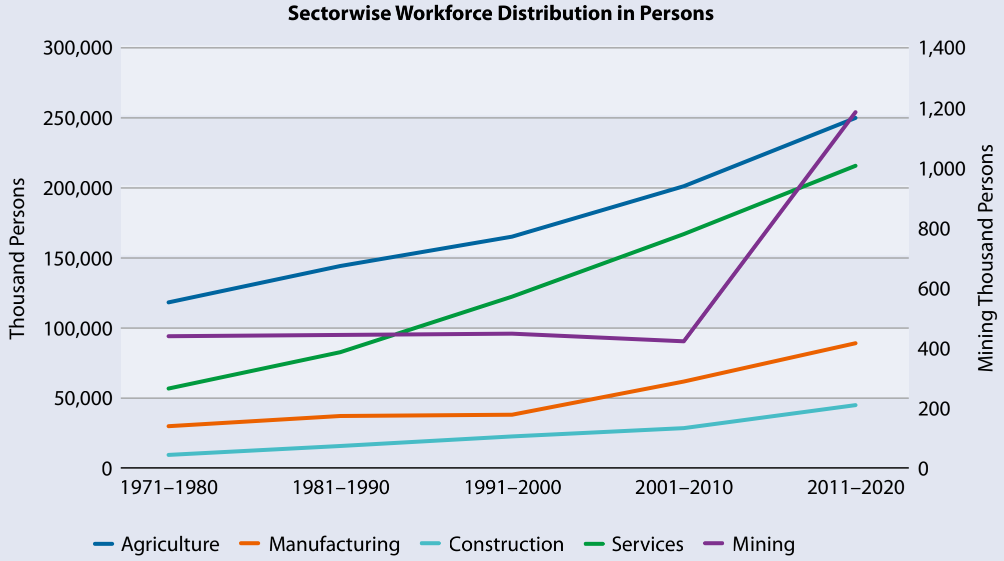


Source: APO Productivity Database 2022 Version 1 (October 31, 2022), (Author's own elaboration)

Figure 9 explains the sector wise workforce distribution. The agricultural sector is still the first priority, then the services sector, and third is the manufacturing sector. The construction sector gains the importance as a fourth sector, and mining, which is highest in labor productivity, has the lowest number of persons involved as an employee in this sector. The manufacturing sector is highly skewed; the largest exports are coming from the textile sector, as shown in Figure 21. The second highest are multiple manufacturers coming from the various goods produced. Figure 10 describes that the share of high-tech manufactures is almost 2% of the total manufactured goods, whereas the medium-tech manufactures contribute around 12%. The total is not more than 14% of the total manufactured items. This is a good indicator of premature deindustrialization [23].

FIGURE 9

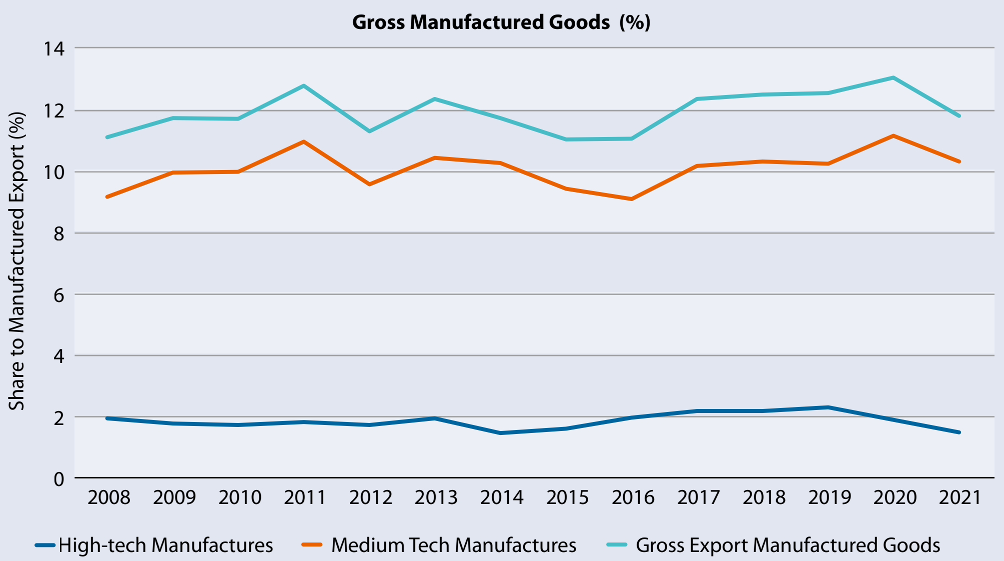
SECTOR WISE WORKFORCE DISTRIBUTION IN PERSONS EMPLOYED



Source: APO Productivity Database 2022 Version 1 (October 31, 2022), (Author's own elaboration)

FIGURE 10

TRENDS IN HIGH AND MEDIUM TECH EXPORTS (AUTHOR'S OWN ELABORATION)



Source: World Bank Indicators (Last Updated: 10/26/2023)

2.4 Economic Indicators to Assess Premature Deindustrialization

1. Shrinking share of Manufacturing Sector in GDP (see in Figure 7)

2. Widening Gap of Trade Deficit (import rate from low-cost producers is higher than export rate) (see in Appendix A shown in Figure 21)

3. Growth in Services (non-manufacturing) in GDP Sector (see in Figure 7)

4. Decreasing employment share in manufacturing (see in Figure 8)

5. GDP and GDP Per Capita Growth Rate (see in Figure 1 and Figure 2)

6. Globalization and Trade Openness (See in Figure 10, 11, 21 & Figure 22)

7. Volatility in Currency Exchange Rate (see in Figure 12)

8. Technological Progress (Export is highly skewed and lack of diversification in manufacturing sector shown in Figure 10 and in Figure 21)

9. Employment Shift from High Level to Low Level (See in Figure 3 and Figure 9)

3. Causes and Risks of Premature Deindustrialization

Deindustrialization is a widespread phenomenon in developing and developed economies throughout history, but the impact of deindustrialization is different for every country. Deindustrialization has a significant effect on economic growth and magnifies the vulnerability of economic growth. The Pakistani economy faces numerous challenges [22]. Multiple reasons can be identified that initiate the negative industrialization and stagnation in the manufacturing sector [41] and fake growth in services sector (especially in real estate sector) results in low productivity performance. In Pakistan, the deindustrialization is policy-induced on the demand of Washington-based institutions like World Bank (WB) and International Monetary Fund (IMF). Various causes and risks of premature deindustrialization are the outcome of these policies, and a few have been mentioned below:

3.1 Exchange Rate Volatility

During political turmoil in the country, people start holding the money in USD because the history indicates after every turmoil and regime change period, currency depreciates so there is good opportunity to generate money holding USD, creating artificial shortage during the turmoil period. Inflation rather hyperinflation [3] is created by Power Groups and Mafias due to political instability in the government. Each member of corrupt elite in power try to build their own personal assets by hook and by crook, as there is no rule of law; there is no one who will raise questions and stop them. They play with commodity products and daily consumable items used by the common people like rice, sugar, wheat, meat, milk, edible oil, vegetables, fruits, household manufactured items and petrol and keep on increasing the prices. The gap between have and have-not increases [5] and people focus odd jobs (low productivity and low talent) and low-level services to generate money to meet their day-to-day expenditures (short-term solution) [39] that is why the premature deindustrialization starts. Productivity erodes, manufacturing sector shrinks, and capitalists who have money invest for hoarding the items.

3.2 Reclassification of Jobs (Job shifts)

Direct drop in employment in the manufacturing sector and steep increase in employment in the service sector focus on deindustrialization as the opportunities in the manufacturing sector is diminishing and in services sector due to IT, digital platform and skilled based jobs are in the way. We have seen the share of capital in IT is very low as compared with non-IT capital so people who are switching the job and entering the domain of service sector, they are capturing low-talent and low productivity jobs. This is quite visible from the Figure 3 types of services. The people who are in the age group between 10 to 39 years are around 54% of the total population (see in Figure 19 and Figure 20). The last five decades of data indicate that the share of the manufacturing sector in GDP is almost stable, with no investment in the manufacturing sector, so people are bound to do the jobs of low-talent in the areas of wholesale and retail trade, as well as transport sector and real estate sector as a real estate agent or the owner of housing project.

3.3 Energy Crisis

Pakistan is rich in hydel resources, but hydel projects have no priority of either any political party or the military regime. Consequently, the government has signed up the coal-based and diesel-based projects (due to her nefarious interest like commissions & kickbacks) that leads to high energy costs killing the manufacturing sector and high carbon emissions [38]. Our second highest import is oil and oil-based products (see in Figure 11).

3.4 Short sighted and Inadequate Industrial Policy Support

There are a lot more national and international anti-state agents working to create chaos and to crush the country economically. Every time the country is at the stage of defaulter that goes for IMF loan and world bank support for immediate economic relief, with the support of international financial agencies like IMF and world bank, the superpowers dictate their terms and condition to subjugate the country economically. These agencies start the program on the name of structural change program or economic reforms program but indirectly exert the pressure on the bureaucrats and government officials to increase in energy cost, eliminate subsidies on food items, impose the tax on salaried class, encourage trade liberalization, impose high import duties on raw material and machinery, and reduce the duties on finished products. These are all weak economic productive structures. These structural reforms encourage growth in relatively unskilled services like tourism, retail, transport and real estate sectors. The businessmen do not invest on long term manufacturing projects; they import manufactured goods from low-cost producers and have more reliance on service sector. Such policies are the source of premature deindustrialization.

3.5 Lack of Technical and Skilled Workforce

Non-availability of employment opportunities in the industrial sector youth is inclined to non-technical education and other low productivity areas where they can generate their livelihood, like motor mechanics, order takers, delivery boys, salesmen, repair men, shop owners, etc. Skilled workforce and technical labor will increase with the employment opportunities in the high-tech industrial sector.

3.6 Trade Openness and Globalization

Trade openness leads to deindustrialization in developing economies imposing restrictions on exports and lowering the import duties on the finished products, widening the gap between imports and exports. Consequently, increase in imports of principal commodities will end up as a trade deficit. Being the signatory of the World Trade Organization (WTO), the government has signed the membership contract blindly. The government officials have never thought to protect the local industry and manufacturing sectors banning the import of finished manufactured items. WTO principles like most favorite nation (MFN) and national treatment (NT) are the final nail in the coffin of industrialization and one of the biggest challenges for premature deindustrialization. China played very well and captured the Pakistani market, being one of the largest importing territories in Eastern Asia. See in Figure 21 (Importing territories) and in Figure 22 (Imports from China and Eastern Asia).

3.7 Poor Infrastructure and Access to Markets

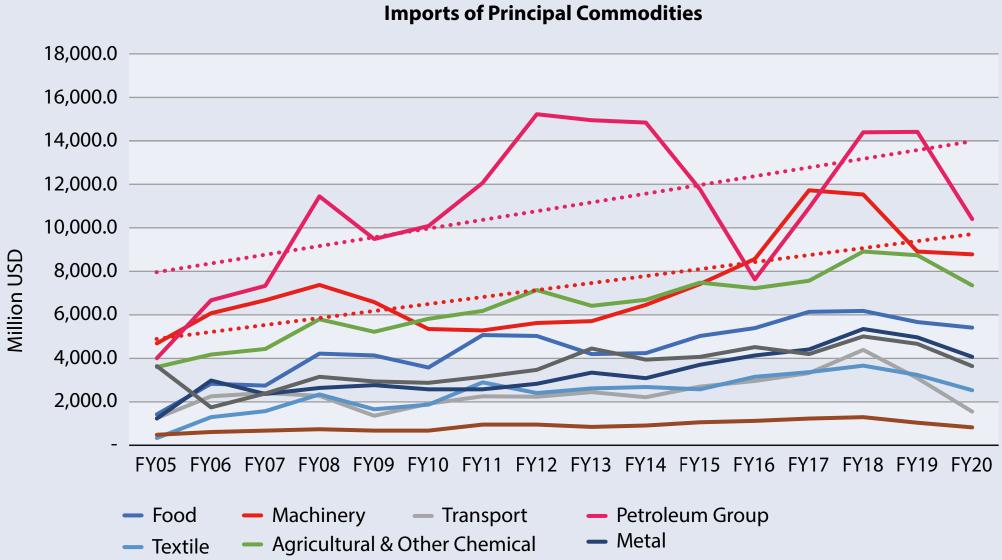
There is a need to have road infrastructure, economic zones, industrial estates, dumping stations, water treatment plants and roads linking to the market both from the urban and rural areas to boost manufacturing and agricultural products. Inspection and testing laboratories, IT labs, equipment for the technical education and computer laboratories for modern-day education system must be built.

3.8 Real Estate and Memon Model

Illicit money and black money from any source or from WAR Economy can easily be converted into white money by just investing in property and real estate business. Corrupt elite started to convert black money into white money using the property file transfer mechanism or so-called Memon model. Without doing anything or adding any real value to the national economy, this money-making model was developed. Due to energy shortages and high costs of production, there was a lot of attraction for the business community, instead of investing in the new industries and

FIGURE 11

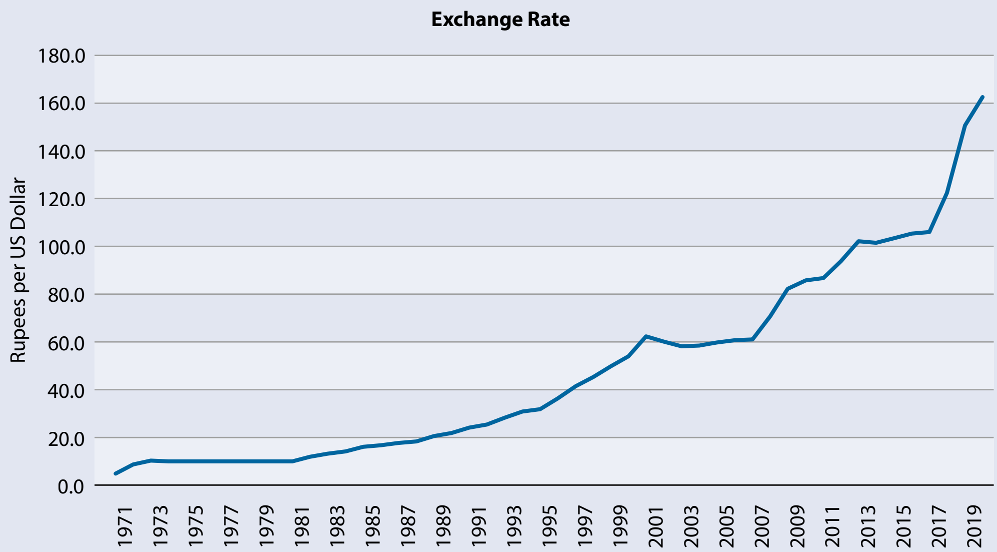
IMPORTS OF PRINCIPAL COMMODITIES (AUTHOR'S OWN ELABORATION)



Source: 50 Years of Pakistan in Statistics (Vol2 & Vol4), Pakistan Statistical Year Book, Labor force Survey. Pakistan Bureau of Statistics

FIGURE 12

REAL CURRENCY EXCHANGE RATE (AUTHOR'S OWN ELABORATION)



Source: APO Productivity Database 2022 Version 1 (October 31, 2022), (Author's own elaboration)

manufacturing sector invest in real estate service sector (shopping malls (Nishat Emporium and Packaging Mall are the few examples) and housing projects (DHA, Bahria and Eden group etc.). People are involved in low productivity activities and the outcome was premature deindustrialization.

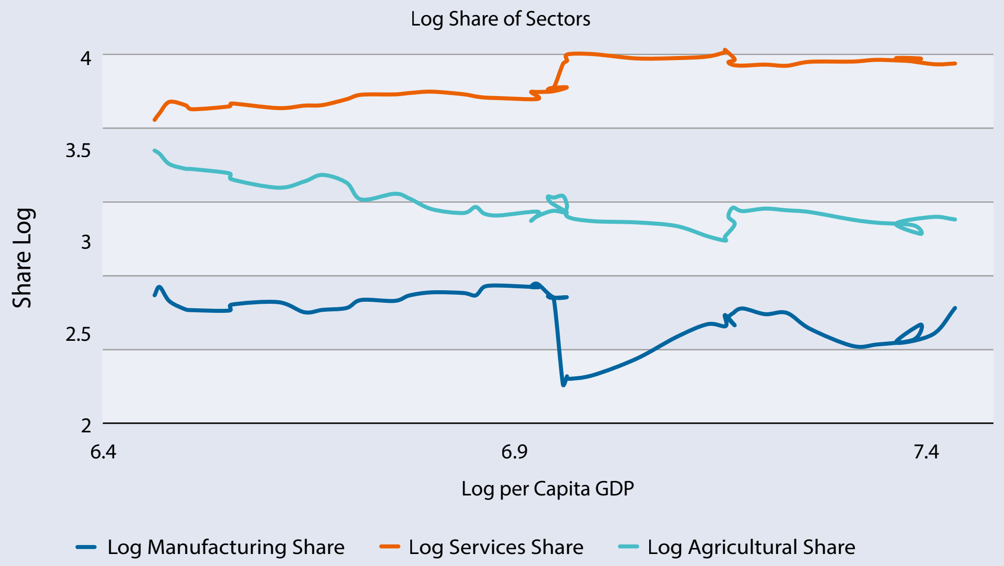
4. Impact of Premature Deindustrialization on Productivity Performance

4.1 Assessment of Premature Deindustrialization Risk

Deindustrialization happens when a country is moving from an industry-based economy to a service-based economy. The literature on deindustrialization primarily hypothesizes an inverted U-relationship between per capita income and share of manufacturing output. Figure 13 represents the scatter plot between per capita GDP and the share of agriculture, manufacturing and services to GDP (in logarithm). Share of agriculture to GDP is negatively correlated with per capita GDP, but in contrast, the correlation between the services share to GDP and per capita GDP is positive. So far as manufacturing share is concerned, manufacturing share to GDP is correlated in a curvilinear manner with per capita GDP showing a nonlinear relationship, with increasing manufacturing share to GDP at lower level of per capita GDP and after reaching a peak, and thereafter, it starts to decline, exhibiting an inverted humped shaped curve in nature. Thus, Kollmeyer's [20] study confirms the presence of an inverted-U relationship between share of manufacturing and per capita income, a powerful indicator of deindustrialization. Rodrik's study [25] study documented an inverted U-shaped relationship between manufacturing share of GDP and per capita GDP as a proven empirical analysis of premature deindustrialization across the world. Haraguchi, Cheng and Smeets [15] tested and documented the existence of an inverse U-shaped relationship between manufacturing share in GDP (dependent variable) and GDP per capita and its square (independent variable). This Figure 13 clearly suggests the process of deindustrialization is happening in Pakistan.

FIGURE 13

SCATTER DIAGRAM BETWEEN PER CAPITA GDP (LOG) WITH MANUFACTURING, AGRICULTURAL AND SERVICES SHARE TO GDP PER CAPITA (LOG) (AUTHOR'S OWN ELABORATION)



Source: World Bank Indicators (Last Updated: 10/26/2023)

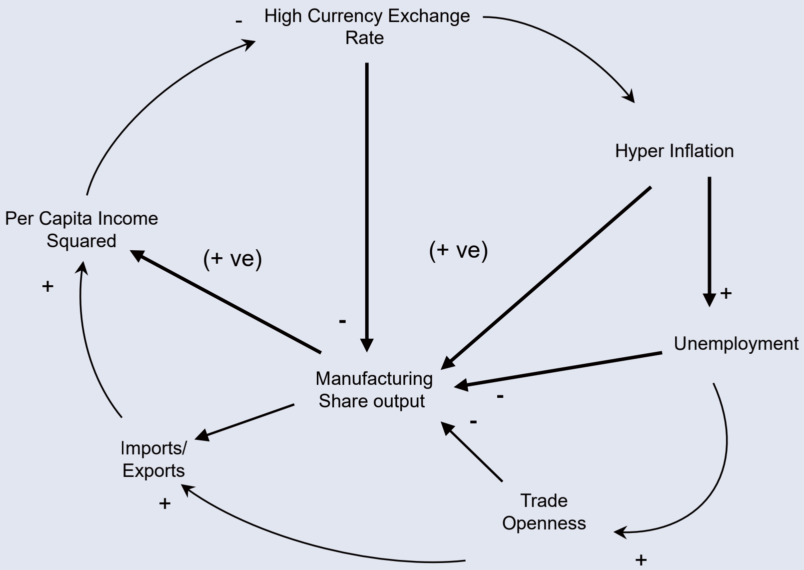
4.2 Multiple Regression Analysis

There is a need to conduct an econometric analysis to verify the risk of premature deindustrialization using the ordinary least square method (multiple regression) while taking the natural logarithm to make the data normal and reliable. Multiple Regression analysis is a statistical technique of determining the relative importance of various factors contributing to a given result (dependent variable manufacturing share) and the contribution of various factors have made to deindustrialization as conceived in our causal loop diagram shown in Figure 14.

The Causal Loop diagram, discussed in detail in the Appendix B, has been developed on the principle of systems thinking that ultimately leads to the development of simulated system dynamics model for policy design. Figure 14 highlights the dynamic and interlinked and interdependent variables that may cause the decline in the manufacturing share. Trade openness indicates that the more we are encouraging trade liberalization, increase in unemployment and hyperinflation will encourage the people to be more active in low productivity services-oriented activities. Consequently, there is decline in manufacturing output. Pre-simulation prediction is increase in net foreign direct investment, in taxation, in fixed capital formation, in energy intensity (energy cost) will contribute to lower the manufacturing output leading to premature deindustrialization. The feedback closed loop diagram shown in Figure 14 explains the manufacturing share of GDP has indirect relationship with per capita GDP squared, growth in foreign direct investment also reduces the manufacturing share. Increase in currency exchange rate, enhanced taxation structure, rising prices of energy cost, trade openness and higher value of misery index cause decline in manufacturing sector output. The literature is full of such studies; the augmented version of Chenery's [8] equation adding the squared term of per capita income and or population to investigate empirically the relationship between manufacturing share in GDP and/or employment and per capita income is tested and verified.

FIGURE 14

CAUSAL LOOP DIAGRAM OF MANUFACTURING SHARE WITH VARIOUS INTERLINKED VARIABLES



Before going for the empirical analysis, a list of dependent and independent variables has been developed and tabulated in Table 4 based on Figure 14 and causes and risks of premature deindustrialization.

TABLE 4

LIST OF VARIABLES, DESCRIPTIONS AND DATA SOURCES

Variables	Description	Unit of Measure	Data Sources	Remarks
Manfshare	Manufacturing Share	% of GDP	WDI	Percentage share of manufacturing's output
PCGDP	Per Capita GDP	% of GDP	WDI	Percentage of Per Capita Income
BM	Board Money	% of GDP	WDI	
FDINI	Foreign Direct Investment	% of GDP	WDI	Net Inflow FDI (% of GDP)
FCF	Fixed Capital Formation	% of GDP	WDI	Fixed Capital Formation (% of GDP)
EXP	Export	% of GDP	WDI	Export (% of GDP)
IMP	Import	% of GDP	WDI	Import (% of GDP)
TDOP	Trade Openness	% of GDP	WDI	Import+ Export (% of GDP)
TAX	Tax Revenue	% of GDP	WDI	Tax Revenue (% of GDP)
EI	Energy Intensity	(MJ / $ 2017 PPP)	WDI	Energy Intensity Level (MJ /$ 2017 PPP)
EXCR	Currency Exchange Rate	RCEXR Index Based on 2010	WDI	Real effective exchange rate index (2010 = 100)
Miser	Misery Index	% of GDP	WDI	(Summation of Unemployment rate and Inflation rate %)
LN	Natural Logarithm			Mathematical Function
PCGDP^2	Per Capita GDP Squared	% of GDP		Squared value of PCGDP

A log of manufacturing share output to GDP has been taken as the dependent variable, whereas per capita GDP, squared per capita GDP, board money, net foreign direct investment, exports, imports, trade openness, tax, energy intensity, currency exchange rate and misery index (summation of unemployment rate and inflation rate) have been taken as independent variables. Minitab software for statistical analysis is used for multiple regression. The results of the analysis are as under:

The multiple regression equation is

$$
\begin{aligned}
\text{LN ManfShare} = {} & 1.48 + 0.0336 \text{ LN PCGDP} - 0.0140 \text{ LN PCGDP}^{\wedge}2 + 0.174 \text{ LN BM} \\
& - 0.0243 \text{ LN FDINI} - 0.185 \text{ LN FCF} + 0.884 \text{ LN EXP} + 1.15 \text{ LN IMP} \\
& - 1.28 \text{ LN TDOP} - 0.00647 \text{ LN TAX} - 0.0688 \text{ LN EI} - 0.0166 \text{ LN EXCR} \\
& - 0.0543 \text{ LN} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (X)
\end{aligned}
$$

Quadradic/squared Percentage of per capita GDP is the main explanatory variable. The coefficient of the squared PCGDP terms has negative coefficient and statistically significant; this clearly indicates premature deindustrialization exists. The other control variables like net inflow of foreign direct investment, fixed capital formation, trade openness, tax revenue, energy intensity level, currency exchange rate and misery index (indicating unemployment rate and inflation rate) clearly explain that they have indirect relationship with manufacturing share output and also the support factors of the deindustrialization. The value of adjusted R(adj)= 89.9 indicating that model is strong and 90% data reside around the line.

S = 0.0446063   R-Sq = 92.4%   R-Sq(adj) = 89.9%

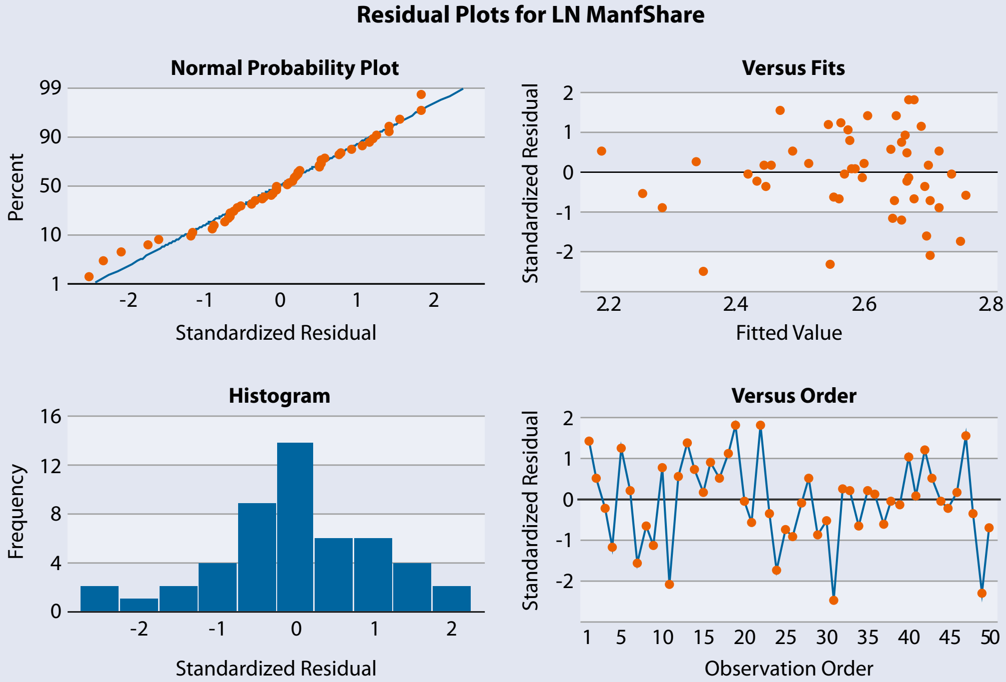
PRESS = 0.152347   R-Sq(pred) = 84.19%

4.2.1 Analysis of Variance

Source	DF	SS	MS	F	P
Regression	12	0.889815	0.074151	37.27	0.000
Residual Error	37	0.073620	0.001990		
Total	49	0.963435			

FIGURE 15

ASSUMPTIONS FOR RESIDUAL ANALYSIS



4.2.2 Residual Analysis

Residual analysis validates the assumptions for regression analysis. The first assumption is Normally Distributed Response to check the normality of the data. The normality probability plot indicates that except one or two outliers, the complete data set is normal and data points lay near the straight line. It shows that residuals are normally distributed. The second assumption is equal variance, showing the plot between residuals and fitted values. This plot indicates the equal variance shows the data points are randomly scattered with no patterns. The third assumption is independence concerning the plot between residuals and observation order (order of data). This plot shows no trend either up or down and has approximately same number of points above and below the line. All assumptions are fulfilled and validated.

4.3 Issues Posed by the Premature Deindustrialization

- Trade Imbalance
- Skill mismatch
- Offshoring
- Income Inequality
- Increased Unemployment
- Productivity Challenges / slowdown
- Dependency on Low-level talent services
- Labor Market Dynamics (Job Hunting and jobs switching)
- Reduced innovation and technological progress

4.4 Productivity Performance Indicators

1. Shrinking share of Industrial Sector in GDP (see Figure 6 & Figure 7)
2. Trade Deficit increased (see Figure 21 & 22)
3. Gap between Low Productivity Activities and High Productivity Activities (see in Figure 10)
4. Increase in Services Sector (see Figure 3)
5. Decreasing employment share in manufacturing (see in Figure 7)
6. Gap between employed and unemployed civilian labor (see Figure 19)
7. Gap between Civilian and Not in Civilian Employment (see Figure 27 & 28)
8. Increase in Imports (see Figure 11)
9. Decline in Per capita income (see Figure 1)
10. GDP and GDP Growth Rate (see Figure 2)

4.5 Impact of Premature Deindustrialization related on Labor Productivity and Economic Growth: An Empirical Analysis

Labor productivity in the manufacturing sector is influenced by multiple variables like manufacturing share output, technology adoption proxy as a total factor productivity, education attainment at least up to college level (upper secondary), wage package per person to attract the workforce to work in manufacturing sector, and liberalization to involve the workforce in services sector like wholesale and retail sector, transport sector etc. (low talent activities). Brynjolfsson [6] and Acemoglu, Autor, Dorn, et al. [2] have pointed that the deindustrialization process was accompanied by a decline in productivity growth in the manufacturing sector.

To ascertain the impact of premature deindustrialization on labor productivity in the manufacturing sector, we used a multiple regression equation. My pre-simulation prediction on the basis of circular analysis mentioned in Appendix B was that except for liberalization, all other factors directly influence the growth in labor productivity of the manufacturing sector and the relationship between dependent variables and independent variables must be positive because their intercepts and coefficients will show the positive value that leads; if industrialization increases then labor productivity in the manufacturing sector will also increase, whereas if the coefficient of the liberalization is correlated negatively, that indicates liberalization (deindustrialization i.e. reversal of industrialization) increases then labor productivity will decline. The details of the variables are given below in Table 5. To have the empirical evidence of the pre-simulation prediction we used the statistical technique multiple regression. The labor productivity in manufacturing sector has been taken as dependent variable and all other variables have been taken as independent variables. **MINITAB™** software for statistics is used for multiple regression purpose and the result are as under along with the regression equation.

The regression equation is

lprodmanuf = 87528 + 1624 manufout + 1122 TFP + 1.98 wage/per + 4506 edu
+ 120 misry - 169124 LIB...(Y)

S = 33643.1   R-Sq = 95.9%   R-Sq(adj) = 95.3%

The value of adjusted R is 95.3 % indicating the model is strong

Predictor	Coef	SE Coef	T	P	VIF
Constant	87,528	72939	1.20	0.237	
manufout	1,624	3,350	0.48	0.630	1.435
TFP	1,122	2,045	0.55	0.586	1.155
wage/per	1.9845	0.1067	18.60	0.000	1.909
edu	4,506.5	575.8	7.83	0.000	1.467
misry	120	1,238	0.10	0.923	1.466
LIB	-169,124	103,988	-1.63	0.112	1.336

S = 33643.1   R-Sq = 95.9%   R-Sq(adj) = 95.3%   Variance Inflation Factor (VIF) detects correlation among predictors [1]. VIF=1 indicates no relation among predictors. VIF>1 and less than 4 indicates predictors are correlated to some degree.

The co-efficient 1624 related with manufacturing share output is positive in nature and it is a good indicator that industrialization leads to growth in labor productivity related to the manufacturing sector. All control variables, like TFP as a technology proxy, wage/per as a salary package incentive, educ. as a proxy to higher level education, misery index (summation of unemployment and inflation rate), are expected to show positive impact and their role is enhancement in labor productivity.

Liberalization is expected to show negative, because import of manufactured items from low-cost producers reduces labor productivity in the manufacturing sector as it pushes the country towards trading hub. 1624,1122,1.98, 4506, 120 and 169124 are the partial regression coefficients; the amount by which the response variable changes when the corresponding Xi changes by one unit with the other input variables remains constant.

Plot graph depicts the analysis of residuals shown in Figure 16 satisfy the assumption of the normality of data and validate the regression model.

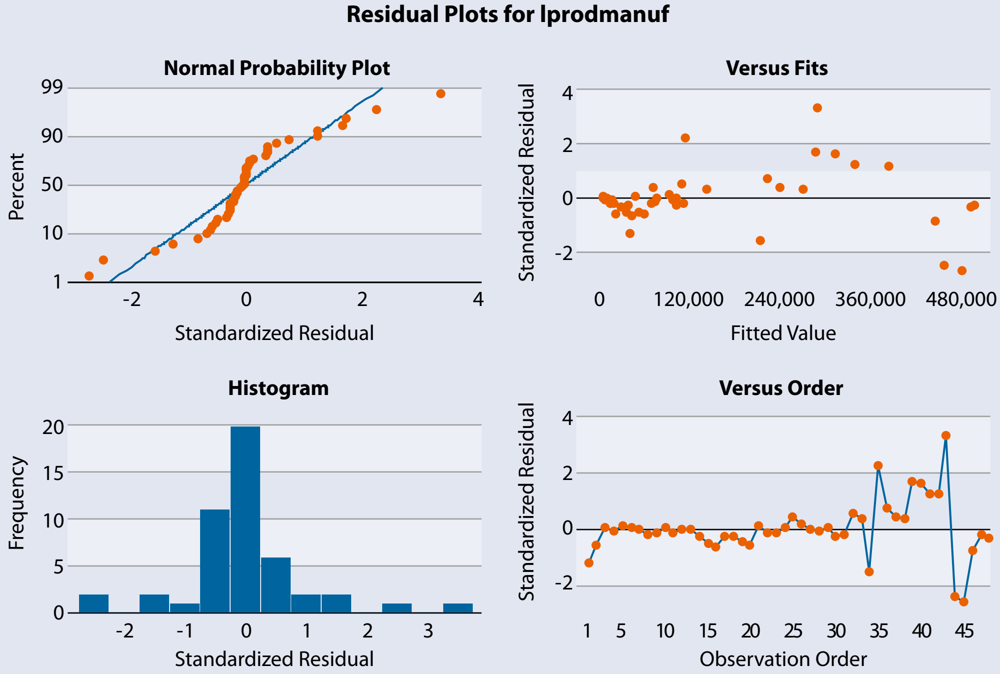
TABLE 5

LIST OF VARIABLES, DESCRIPTIONS AND DATA SOURCES

Variables	Description	Unit of Measure	Data Sources	Remarks
Iprodmanuf	Labor Productivity involved in manufacturing	Rs /person	APO Database	Millions of PKR per thousand persons
Manfshare	Manufacturing Share	% of GDP	WDI	Percentage share of manufacturing output
Tech	Technology proxy as a Total Factor Productivity	Dimensionless	APO Database	Ratio TFP as technology adoption proxy
Lib	Trade liberalization	Dimensionless	WDI	(Import+ Export) (% of GDP)/ Import (%of GDP)
Wage/per	Wage package per person	Rs / person	APO Database	Labor income package Millions of PKR / no of workers (Thousand persons)
edu	Educational attainment, at least completed upper secondary, population 25+, total (%) (cumulative)	% of total population	WDI	College level education
Miser	Misery Index	% of GDP	WDI	(Summation of Unemployment rate and Inflation rate %)

FIGURE 16

ASSUMPTIONS FOR RESIDUAL ANALYSIS (OUTPUT OF THE MINITAB™)



5. Self-Comparison Before and After the Observation Time

The data set used to examine the evidence of deindustrialization from 1970 onward depicts the gloomy picture leading economic collapse. Data from the last five decades clearly indicates decline in agricultural sector share to GDP, growth in services sector and stagnation in the manufacturing sector ensuring that Pakistan is on the deindustrialization track. This happening is not one's in a blue moon, it is gradual, consistent and ongoing process coming from year after year, outcome of inadequate industrial policies. There was no concrete plan for structural, long term, balanced economic policies to mitigate the trade deficit, lower the IMF loan and to protect the local industry. Efforts to reduce energy costs, enhanced educational budget, attract investors and to bring the political stability in the country were not the priority item on the agenda of any government.

Let's take a look on the economic condition before 1970, Pakistan came into being in August 14, 1947. The founder of Pakistan was of the opinion that Pakistan would maintain the bilateral relationship with the neighboring countries and would have a balanced foreign policy. Pakistan is a strategically located nuclear state and the fifth most populous country. It attracts superpowers and international agencies to use Pakistan for their own interest in multiple ways. One border is linked with India, the second most populous country and worst enemy of Pakistan. The other border is attached to Afghanistan, which has never been colonized in history. Most invaders came from this side to invade the sub-continent. In the 1980's, Russia, being a superpower, wanted access to hot water using the passage of Afghanistan that is linked with Pakistan. The U.S., being another superpower, wanted first to stop Russia and second to curtail the emerging superpower, China. The U.S. wants to stop the expansion of China using Indian forces and the Indian relationship.

Pakistan started its journey with a net outflow of human capital as skilled Hindu businessmen and technical workers migrated to India [14]. During the first economic decade from 1947–58, influx of the refugees/migrants from India, lack of industrial base, non-availability of entrepreneurial class, unskilled labor and changes in the demographics makeup, political turmoil, social unrest rising, frequent changes in governments hamper economic growth. In spite of all odds, Pakistan did manage the growth rates of GDP of more than 3% per annum in earlier years [43]. Even being an agrarian economy, the agricultural sector was growing only 2.8%. However, manufacturing grew at an impressive 9.6% and construction at a strong 6.8% [16]. This was the outcome of successful implementation of import substituting industrialization (ISI) policy. Trade policy regime was introduced in 1953 based on three key principles

1) Overvaluation of PKR relative to other countries

2) Use of quantitative controls on imports to regulate the level and composition of imported goods

3) Highly differentiated structure of tariffs on imports and export taxes on the two principal agricultural exports: jute and cotton [43]

During the second decade from 1958–69, military ruler Ayub Khan established political stability, because of authoritarianism and bureaucratic control. The hallmark of Ayub's economic strategy was a commitment to rapid industrialization. All economic indicators are extremely impressive. Agricultural grew at a respectable rate of 4.1%, manufacturing rate was 9.1%, and trade was 7.3%. GNP. Growth rate was around 6% during this period.

In 1960, Pakistan enjoyed 6.7% GDP growth rate grabbing positive industrialization in high-tech large-scale manufacturing sector [43]. It is usually claimed that the 1965 war with India disrupted the economic spur as foreign aid inflows were drastically reduced, but its contribution and affect was nominal.

Ayub Khan was the only military ruler who had constructed dams for cheaper electricity, which were a major contributor for industrialization, rather than the political government's Independent Power Plants (IPPs) for diesel and coal-based energy projects, which polluted the environment and rose the cost of energy.

To accelerate the process of industrialization, economic experts of Ayub Khan's regime had implemented marvelous policies which are as below:

1) Import substituting industrialization

2) Overvalued Exchange Rate

3) Fiscal incentives to local manufacturers

4) Heavy protection

5) Preferential access to foreign exchange allocation for import of capital goods

6) Credit at low controlled interest rate.

7) Controlled liberalization strategy and import licensing

8) Strengthen the administrative capacity and established political stability.

9) Private sector led industrialization instead of Indian model public sector led industrialization

10) Promote industrial investment and procedure for investment licensing and credit dispersal

11) Opportunity to invest profits in new businesses

12) Export Bonus System with multiple exchange rates [43]

Export Bonus Scheme with multiple exchange rates was considered to be an innovative device helping both for import substituting and export growth. In 1965, Pakistan's manufactured exports were greater than the combined manufactured exports of the Republic of Korea, Turkiye, Thailand and Indonesia [43]. During that period total factor productivity was 5.06% [16], far higher than many comparable economies, indicating both technological dynamism and dynamic allocative efficiency. If we apply these policies which we had implemented in first two decades from 1947–68, we can revert the damage which we got over five decades 1970–2020.

In 1971, after the fall of Dhaka, Zulfiqar Ali Bhutto took charge of the country for restructuring of the major industrial and agricultural policies. The period from 1971–77 was to witness the most ambitious socialist oriented reforms in Pakistan's history, pushing away the strongest grip of army and bureaucracy. That was the starting point of premature deindustrialization.

6. Policy Approach

Multiple policies are suggested to mitigate the risks of premature industrialization [26]. Industrial and Productivity Policies are proposed on the basis of experiential information while developing causal loop diagrams that represent the model structure in the form of positive and negative loops of systems dynamics.

6.1 Best-Proven and Tested Policies

Best-proven policies in the first two decades, 1947–57 and 1958–68, are given below:

1) Import substituting industrialization
2) Stable currency exchange rate (in Sep. 1949, when pound sterling was devalued, Pakistan did not devalue its currency)
3) Fiscal incentives to local manufacturers
4) Heavy protection
5) Preferential access to foreign exchange allocation for import of capital goods
6) Credit at low controlled interest rate.
7) Controlled liberalization strategy and import licensing
8) Strengthen the administrative capacity and established political stability.
9) Private-sector led industrialization instead of Indian model public sector led industrialization
10) Promote industrial investment and procedure for investment licensing and credit dispersal
11) Opportunity to invest profits in new businesses
12) Overvalued Exchange Rate
13) Export Bonus System with multiple exchange rates

6.2 Proposed Industrial & Economic Policies

TABLE 6

ONE-ONE CORRESPONDENCE BETWEEN CAUSES AND POLICIES

Causes of Premature Deindustrialization	Policies	Priority Order	Nature of Policy	Strategies	Description
Cause 1	Policy 1 (a)	23	*Long term*	Environmental Side	*Stabilize the currency exchange rate strengthening government institutions and rule of Law*
	Policy 1 (b)	1	*Short Term*	Supply Side	*Banning the sale and purchase of USD openly.*
	Policy 1 (c)	13	*Medium term*	Demand Side	*Overvalued Exchange Rate*
Cause 2	Policy 2 (a)	2	*Short Term*	Environmental Side	*Legalizing the good salary package along with perks in the manufacturing sector to reduce the job switching from manufacturing to services sector*
	Policy 2 (b)	18	*Long Term*	Environmental Side	*Higher tax on services, performance and production bonus in manufacturing sector, conducive work environment and opportunities in government sector with high pay scale to stop brain drain.*
Cause 3	Policy 3 (a)	22	*Long Term*	Environmental Side	*Have a hydel power plant*
	Policy 3 (b)	3	*Short Term*	Supply Side	*Encourage renewable energy projects like solar and wind while reducing the zero duties on import.*
	Policy 3 (c)	4	*Short Term*	Supply Side	*Energy rebate should be given to diversified manufacturing sector instead of only the textile sector.*
Cause 4	Policy 4 (a)	6	*Short Term*	Demand Side	*Encourage import substitution and limiting imports through licensing and quota system to boost local manufacturing.*
	Policy 4 (b)	5	*Short Term*	Demand Side	*Ban on export of commodities like rice, wheat to control hyperinflation and ban on import of luxury consumer items and auto sector*
	Policy 4 (c)	7	*Short Term*	Demand Side	*Credit at low controlled interest rate.*
Cause 5	Policy 5 (a)	19	*Long Term*	Supply Side	*Encourage technical, skilled and competency-based education and promote the environment of technopreneurs*
	Policy 5 (b)	8	*Short Term*	Supply Side	*Enhance education budget and invest in skill-based education and training*
	Policy 5 (c)	9	*Short Term*	Supply Side	*Establish IT city to promote the information technology and technology adoption.*
Cause 6	Policy 6 (a)	12	*Medium Term*	Demand Side Environmental Side	*Promote and facilitate the export items linking small and medium scale enterprises (SMEs) with global value chains giving tax incentives and trade benefits*

Causes of Premature Deindustrialization	Policies	Priority Order	Nature of Policy	Strategies	Description
	Policy 6 (b)	20	*Long Term*	Environmental Side	*China effect cannot be ignored; there is a need to gradually develop the local industry with the alliances and mergers of Chinese investors and local partners simplifying new business opening process.*
	Policy 6 (c)	14	*Medium Term*	Demand Side	*Export Bonus System with multiple exchange rates*
	Policy 6 (d)	10	*Short Term*	Demand Side	*Export Facilitation Scheme to reduce the duties on those imported raw material which are used for the export items*
Cause 7	Policy 7 (a)	16	*Medium Term*	Supply Side	*Adoption of Technology and Industry 4.0 implementation in manufacturing*
	Policy 7 (b)	21	*Long Term*	Environmental Side	*Attract foreign and local investors to establish the research laboratories and inspection and testing bodies with latest machinery and equipment*
	Policy 7 (c)	15	*Long Term*	Environmental Side	Strengthen the administrative capacity and safety for market access
Cause 8	Policy 8 (a)	11	*Short Term*	Environmental Side	*After the property transaction, no one can sale or purchase within next five years.*
	Policy 8 (b)	17	*Long Term*	Environmental Side	*File mechanism in real estate sector must be banned and complete property documents should have to prepare.*

Note: *Priority order is decided on the basis of ease of implementation, low budget, quick decision making & less complexity. Priority order 1 means most easy to implement, no budget is required, quick decision making and least complex and as the priority order increases in ascending order the difficulty in implementation, budgeted amount, slow decision making and complexity increases.*

6.3 Macro Level Policies

Stability in Currency Exchange Rate

Detailed Sub Policies are as under:

a) Banning the sale and purchase of USD openly

b) Strengthening the institutions using people power

c) Establish rule of law

d) Overvalue the currency exchange rate

Job Shifts

Detailed Sub Policies are as under:

a) Legalizing the good salary package along with perks in the manufacturing sector to reduce the job switching from manufacturing to services sector.

b) Higher tax on services to discourage the people from being involved in service sector.

c) Performance and production bonus in manufacturing sector

d) Conducive work environment and opportunities in government and private sector with high pay structure to stop brain drain.

Energy Crisis

Detailed Sub Policies are as under:

a) Involve the political leadership and develop consensus for hydel power projects to provide low-cost energy to industrial units.

b) Encourage renewable energy project like solar and wind while reducing the zero duties on import.

c) Energy rebate/subsidy should be given to diversified manufacturing sectors instead of only textile sector to reduce cost of production

Implement Adequate Industrial Policies

Detailed Sub Policies are as under:

a) Promote import substitution while encouraging innovation and research and development activities

b) and limiting imports through licensing and quota system to boost local manufacturing.

c) Restrict the export of commodities like rice, wheat to control hyperinflation and impose high tariff and duty on import of luxury consumer items and auto sector to discourage the outflow of USD and bring the stability in the currency exchange rate

d) Give incentive and credit to export-oriented industries at low controlled interest rate.

Promote Technical and Skill-Based Education

Detailed Sub Policies are as follows:

a) Encourage technical, skilled and competency-based education and promote the environment of technopreneurs

b) Enhance education budget and invest in skill-based education and training.

c) Establish IT city to promote the information technology and technology adoption.

Trade Openness and Globalization

Detailed Sub Policies are as under:

a) Promote and facilitate the export items linking small and medium scale enterprises (SMEs) with global value chains, giving tax incentives and trade benefits.

b) China effect cannot be ignored; there is a need to gradually develop the local industry with the alliances and mergers of Chinese investors and local partners, simplifying new business opening process.

c) Export Bonus System with multiple exchange rates

d) Export Facilitation Scheme to reduce the duties on those imported raw material which are used for the export items

Poor Infrastructure and Technology Adoption

Detailed Sub Policies are as under:

a) Adoption of Technology and Industry 4.0 implementation in manufacturing

b) Attract foreign and local investors to establish the research laboratories and inspection and testing bodies with latest machinery and equipment

c) Strengthen the administrative capacity for security and safe access to markets to promote exports

Real Estate and Service Sector

Detailed Sub Policies are as follows:

a) After the property transaction, no one can sell or purchase within the next five years.

b) File mechanism in real estate sector to create artificial rise in property must be banned and complete property documents should have to be prepared with all related taxation.

6.4 Impact of Youth Population

Pakistan's demographic transition projects the young population as it enters adulthood. The demographic dividend can be achieved with adequate investments in education and skills of youth and how effective transformative policies we opt to drive the youth for national growth. 54% population of the country falls in the range of the 10 to 39 years old group. They need education, skills, and job opportunities. Pakistan's youth is perhaps the largest talent-pool of the world in this age group, especially when developed economies had effective population control mechanisms. To generate sufficient employment opportunities for such a large labor force is a huge challenge. Harnessing the youth potential and skill-up for young ones is a multi-faceted and complex task that requires government support, industry collaboration, and strong commitment of educational institutions. Pakistan's government has taken multiple initiatives to skill up youth: distributing laptops to talented students, Kamyab Jawan Markaz, Skill up Pakistan Initiative, Youth Entrepreneurship Scheme, National Youth Council, Hunermand Pakistan, Productivity Specialist Certificate, Technical Vocational Education and Training (TVET), National Youth Development Framework, Competency based Training and Assessment, National Skills Strategy and Woman Empowerment. It is a long-term government investment for human capital development. These skilled and competent young people, wherever they serve within or outside the country, in both cases will contribute to national economic growth as well as global economic growth. Political stability, industrialization and adequate industrial policies are the key factors that will encourage youth to work for balanced growth and improve national productivity. Pakistan's industries are open to share the data for analysis purpose, industrial projects, internship programs, guest speaker's talks, factory tours and industrial based research projects; these are the few areas that show the industry-academia linkages. Higher Education Commission (HEC) has kept on improving the education standards to deliver the outcome-based education and to bridge the gap between job requirements and the abilities a participant has to perform specific task assigned. Rest assured, soon Pakistan will emerge as one of the developed economies using the human potential and contribute to achieving the sustainability goal of poverty alleviation.

Nine economic zones have been established in the country with respect to China Pakistan Economic Corridor (CPEC), along with various industrial zones in most of the cities.

Hunermand Program and Kamyab Jawan Markaz are especially for the rural areas. The other programs are equally promoted all over Pakistan. The government is well-informed about the youth challenge and is serious to use this potential for national economic growth. The government has no choice except to take this issue very seriously and provide entrepreneurial opportunities and employability while implementing the adequate industrial policies for industrialization.

6.5 Balance between Service and Manufacturing Industries

The importance of maintaining the balance between service and manufacturing industries in job creation and economic development is often debated. Both sectors have their own merits and demerits and contribute to the growth of the national economy. There is no doubt that the service sector creates employability, more jobs for low-talent as well as high-talent workforce and absorbs the labor when they are in the transition phase from the manufacturing industry to the service industry. While service jobs are valuable, they often lack the same level of specialization and remuneration as those in the manufacturing industry. The 2 X 2 matrix indicates the clear picture of merits and demerits of both sectors

Low Tech Manufacturing Industry (Merits and Demerits)	Low-Talent Service Industry (Merits and Demerits)
1. Job Security 2. Guaranteed Income 3. Sustainability and continuity in the Job 4. Linking with global value chain 5. Export opportunities 6. Low Salary Package	1. No Job Security 2. Job nature is highly volatile 3. Low paid 4. Impeded in provincial and national level 5. No Guaranteed Income
High Tech Manufacturing Industry (Merits and Demerits)	**High-Talent Service Industry (Merits and Demerits)**
1. Job Security 2. High Salary Package 3. Sustainable and permanent 4. Guaranteed Income 5. Sustainability 6. Linking with global value chain 7. Lot of growth and export potential in global market. 8. There is no risk from the superpowers to ban your quality products.	1. High Income Level 2. No Guaranteed Income 3. No Job Security 4. Dependent on the foreign orders 5. Highly volatile in nature 6. High risk of not getting the orders from foreign companies (In past, after 9/11, total foreign projects are stopped for Pakistani software-oriented companies from USA and European market.)

Low-Talent Service Industry comprises wholesale trade, transport sector, retail outlets, real estate sector and low talent jobs like working as packer, janitorial staff member, peon, order taker, dispatcher and delivery boy. (No job security no guaranteed income and no surety in the job continuity)

High-Talent Service Industry comprises software development, IT projects, online teaching, research projects, consultancy and training. Using digital platform like LinkedIn, Upwork, Fiverr, Preply, etc. (No job security, no guaranteed income, and no certainty in job continuity)

The major drawback of the service sector is job opportunities depend upon global clients and there is a lot of risk for the discontinuity of orders at any point in time. Multiple factors may disrupt the supply of orders. Job nature is highly volatile, and an economy based on only a service sector is weak. No job security means you may have the project this month or may not in next month, so income is not guaranteed.

Low-Tech Manufacturing Sector comprises manufacturing plants where the degree of automation is low. Most of the work is labor intensive and a degree of sophistication of the technology in machinery and equipment is outdated. In spite of all odds, the production output of every industry has sellable units generating lot of revenue for the investors, ensuring the job security of the staff, guaranteed payments and continuity in the jobs this month and next month. There are no ups and downs in workforce employability.

High-Tech Manufacturing Sector comprises manufacturing plants where the degree of automation is at a high level. The workforce is highly educated and well conversant with the IT applications. Labor productivity is high, output is high, and the manufacturing share to GDP is high with low qualified staff showing positive deindustrialization. This is the real backbone of the national economy. The job of the staff is sure; income level is quite high, and sustainability and continuity are ongoing, linking with global value chains and capturing the export opportunities. The workforce is highly motivated, service-oriented and committed to create more value in products and services to meet and exceed the requirements of the customers.

Manufacturing industries operate with higher degree of division of labor, leading to the creation of more technical and sophisticated jobs with a high pay package. Technology deployment in the manufacturing sector necessitates specialized skills, driving up wages and contributing to a more robust middle class. These jobs are indigenous in nature, provide job security, financial stability and more opportunities for the career progression and skill development.

Service industry plays a vital role in creating jobs and absorbing labor to overcome unemployability, but lack of education and IT infrastructure most of the service sector jobs are low-productivity and low-talents. Highly volatile in nature ensuring no job security no consistency and reliability in continuity of the jobs and salary packages are also oscillatory in nature depending upon the job nature and service sector whether it is transport or retail outlet or wholesale trade or real estate.

A balanced and stable economy is an uphill task for policymakers and stakeholders. Diversity in job opportunities, resilience against economic shocks, due to global political instability and price hike in global products oil and gold, and a sustainable growth are the building blocks for dynamic and equitable economy and are only possible with prioritization and growth of the manufacturing sector.

Thus, I am strongly in favor of growth of the manufacturing sector because it really supports the country's economic growth and is a true indicator of industrialization. The workforce involved in the manufacturing sector has more job security, regular salary packages with performance and production incentives, and surety in employability as compared to the service sector.

7. Conclusion

Causal loop diagrams (circular analysis) were the initial thought process to unveil the underlying structures of the premature deindustrialization in Pakistan. Each loop clearly depicts how the economy has gone for negative industrialization. The variables mentioned in the multiple loops are interlinked, interdependent, and interconnected [42]. The behavioral pattern emerging from the loops clearly portraits the causes and risks of the premature deindustrialization.

Many factors played a vital role in pushing the country for the import of household and manufactured items of daily use and killing the local manufacturing sector under the IMF program structural reforms, which started in 1988–91 (Structural Adjustment Program- SAP), and trade liberalization. Loan amount was linked with imposing heavy duties on the machinery and low duties on the finished products [16]. That was the serious blow to the national economy and the starting point of premature de-industrialization.

Analysis of the last five decades has shown a gradual increase in the per capita GDP. Apart from the national and global crisis economic or natural disasters, there is an average increase in GDP in USD and in millions of PKR, but so far as the growth percentage is concerned, there is a significant decline from 6% to 3.4%. Being an agricultural economy, Pakistan has potential for employability in the agricultural sector and the number is higher than any other sector, but unfortunately the agriculture share to GDP is declining every year. The manufacturing share to GDP is almost the same from the last fifty years, showing the job shifts from manufacturing sector to service sector of low-level talent areas like retail and wholesale trade, transport, tourism, hospitability and real estate sector. The is a clear indication of the premature deindustrialization in Pakistan (see the Figure 13 scatter diagram and U-shaped inverted relationship as empirical evidence of premature deindustrialization [11], and results of the regression equation shown in equation (X) further validate and document the premature deindustrialization in Pakistan).

Volatility in currency exchange due to political instability, job shifts from agricultural to industrial and from industrial to services, energy crises, trade openness and globalization, short-sighted and inadequate industrial policies, lack of technical and unskilled labor, poor infrastructure, and real estate sectors are the few key causes of premature deindustrialization. The widening gap of trade imbalance, skill mismatch, industry shifting to outside countries from local investors, stagnation in manufacturing’s output to GDP, productivity slowing down, dependency on low-level talent services and volatile labor market dynamics (job hunting and jobs switching), reduced innovation, and technological progress are the possible impacts of deindustrialization.

There is a need to have strategic, well-designed industrial policies to protect the local industry and also go for the diversification of the manufacturing sector. There is dire need to take steps for self-reliance and gradually get rid of the IMF and world bank borrowing. Technical collaboration with foreign investors or foreign companies must be encouraged and facilitated by the government for technology transfer and technology adoption. Conducive work environments, performance bonuses, and good salary packages with perks will be the motivating factors for youth to join the manufacturing sector. New startups and technopreneurs must be encouraged with certain rebates. Inflow of the WAR economy must be curtailed at its lowest level. Strengthen the weak institutions and improve good governance; strengthen the judiciary and justice system. Export led policies must be encouraged. Impose heavy duties on luxury items and finished products to protect the local manufacturer. Ensure legal and financial protection to the foreign investors and one window operation for quick support and facilitation.

The future economic prospects of Pakistan look promising, but their actual realization would depend upon a number of critical factors: the sitting economists in the planning commission, long term industrial policies linking with global economy, sound macroeconomic policies like carefully designed import substitution policy, controlled liberalization and facilitation with infrastructure lowering energy costs. Another most important point resides in the country's large population, which should be educated and trained to become an asset rather than a burden on the economy. Bringing women into the workforce and reducing interpersonal and interregional income disparities among the people of different walks of life; providing job opportunities and new startups is a medium-term growth strategy. The agriculture sector, long neglected by the federal government's policies in favor of some other parts of the economy, should be given a very high priority. The sector should lead the rest of the economy, provide jobs in both rural and urban areas, and increase exports. If we did this with political stability, a strong institutional and governance framework, then it should be possible to add 2–2.5 percentage points to the current trend growth rate whereby per-capita income would double to USD2,600.00 by 2030.

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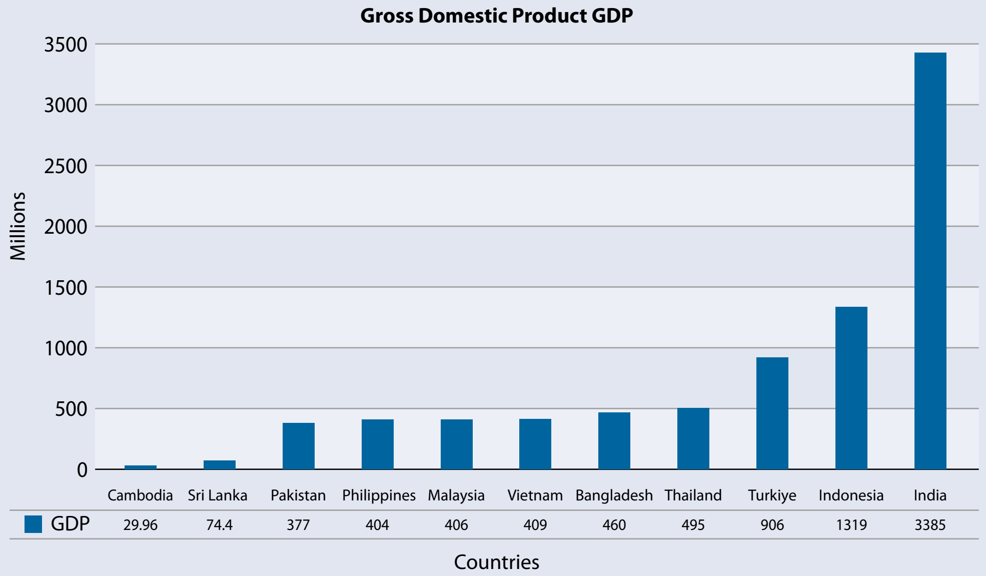
Appendices

Appendix A

FIGURE 17

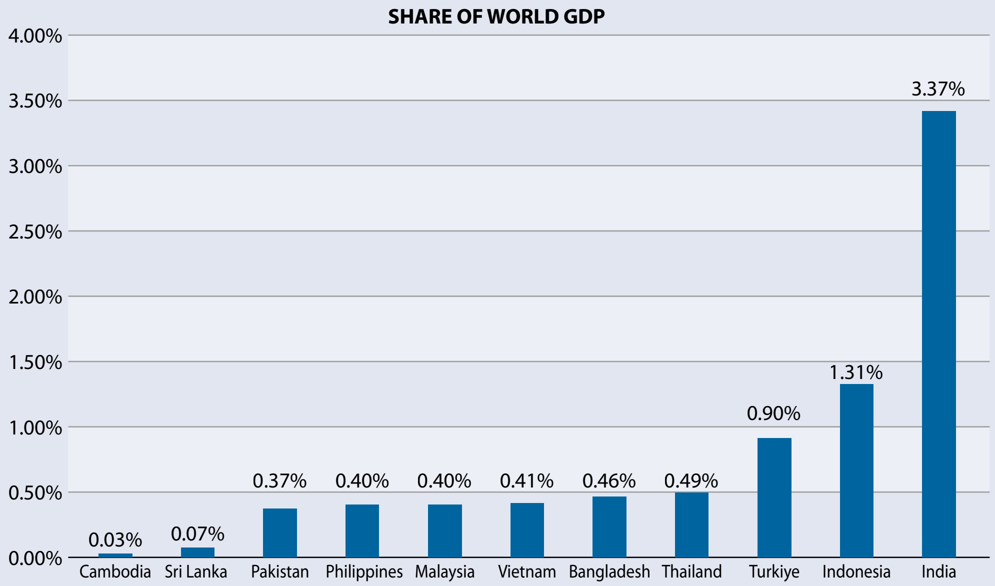
GDP COUNTRY'S COMPARISON AMONG APO MEMBERS



Source: https://www.worldometers.info/gdp/gdp-by-country (Author's own elaboration)

FIGURE 18

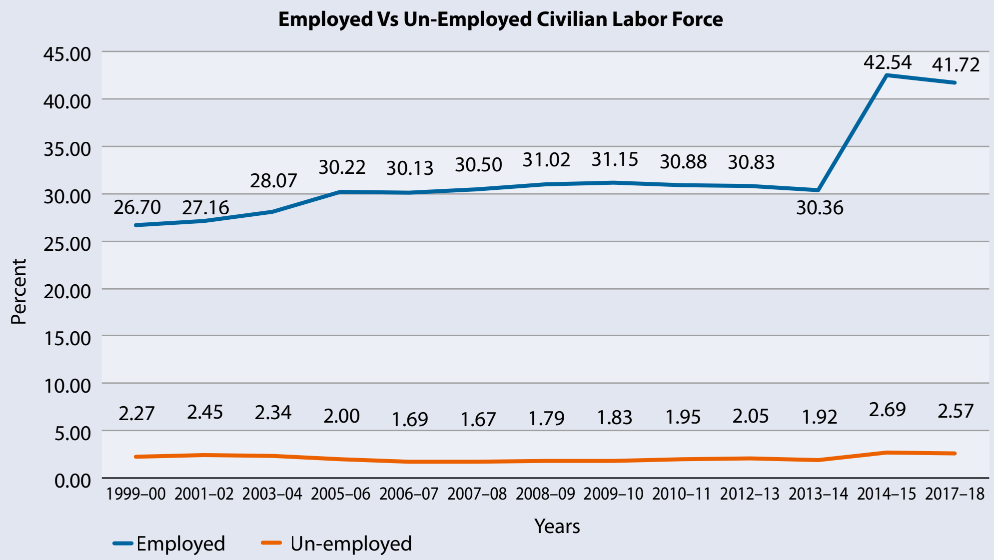
SHARE OF APO MEMBER COUNTRIES IN WORLD GDP



Source: https://www.worldometers.info/gdp/gdp-by-country (Author's own elaboration)

FIGURE 19

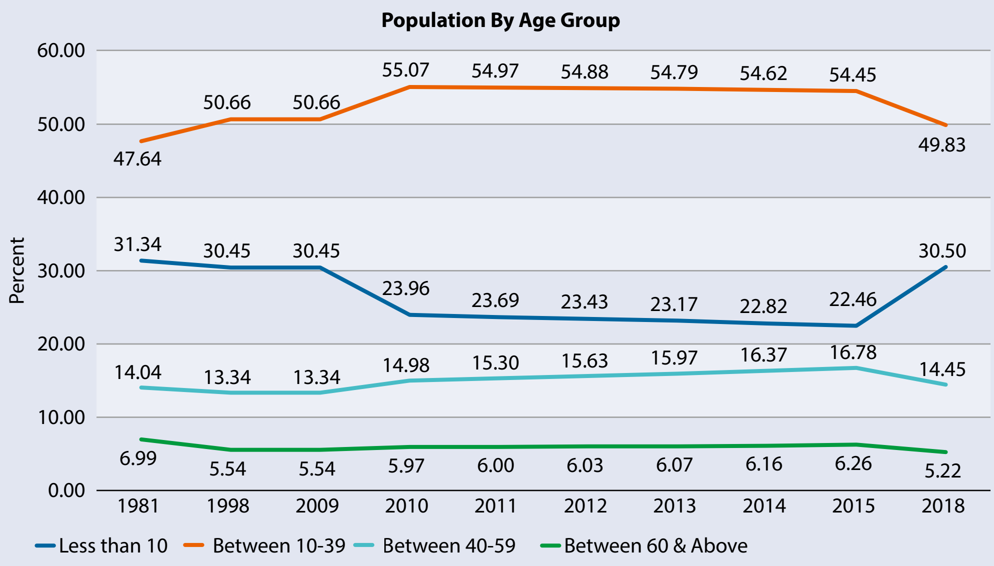
EMPLOYED VERSUS BY UN-EMPLOYED CIVILIAN LABOR FORCE (AUTHOR'S OWN ELABORATION)



Source: 50 Years of Pakistan in Statistics (Vol2 & Vol4), Pakistan Statistical Year Book, Labor force Survey. Pakistan Bureau of Statistics

FIGURE 20

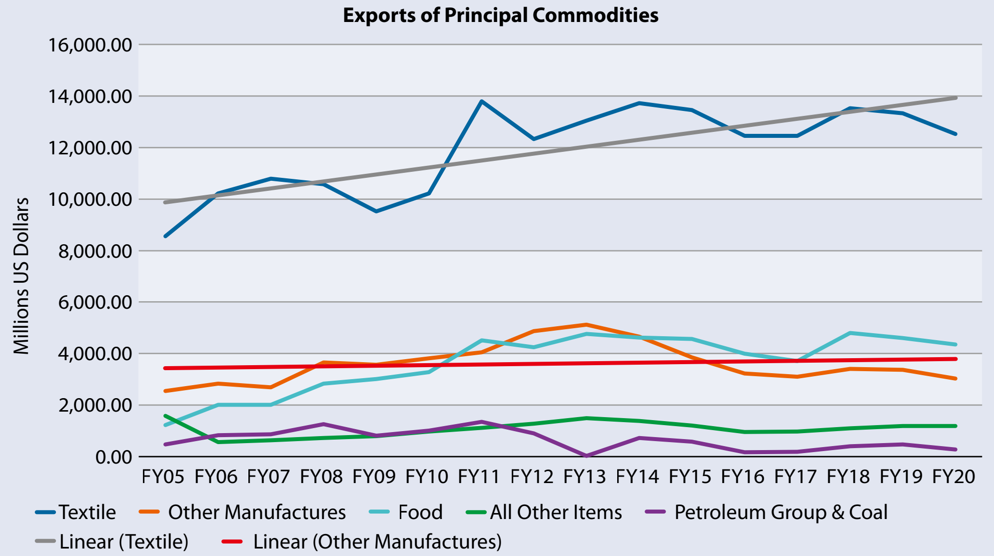
POPULATION BY AGE GROUP (AUTHOR'S OWN ELABORATION)



Source: Population Census Organization, National Institute of Population Studies

FIGURE 21

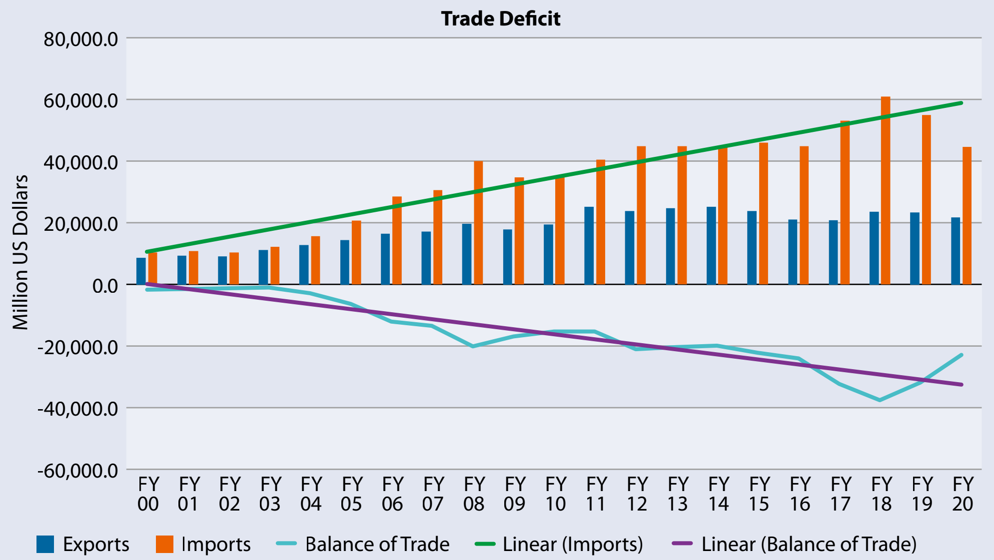
EXPORTS OF PRINCIPAL COMMODITIES (AUTHOR'S OWN ELABORATION)



Source: 50 Years of Pakistan in Statistics (Vol2 & Vol4), Pakistan Statistical Year Book, Labor force Survey. Pakistan Bureau of Statistics

FIGURE 22

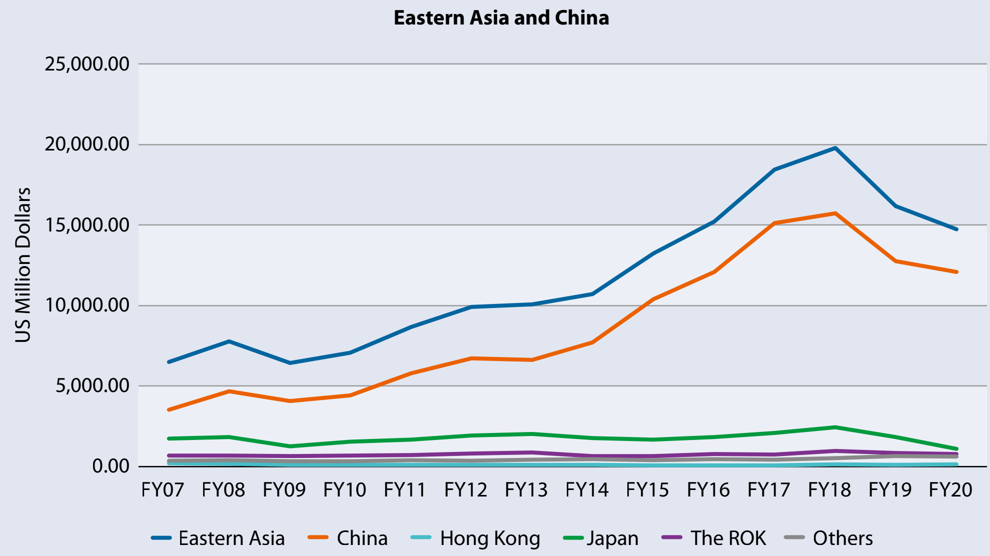
TRADE DEFICIT (AUTHOR'S OWN ELABORATION)



Source: Pakistan Bureau of Statistics

FIGURE 23

IMPORTS FROM CHINA AND EASTERN ASIA (AUTHOR'S OWN ELABORATION)



Source: Pakistan Bureau of Statistics

Appendix B

Sterman [28] in his debate about System Dynamics Paradigm states the world is composed of high order, non-linear, time-delayed, feedback-dominant structures, and dynamic variables, and their interactions cause complexity to form a world (ontological frame), whereas in causal loop diagrams, positive and negative loops enhance the understanding of the world (epistemological frame) and how the interactions of the dynamics variables generate the behavior that describes the real world setting (methodology).

Reference Mode and Dynamic Hypothesis

Graphing important variables and inferring graphs of others significantly produces the problem focus for system dynamics study [19]. Graphs over time (shown in Figure 15 to Figure 36) are the reference mode characterizing the problem under study and lead to model conceptualization. Dynamic hypothesis is a body of knowledge that discusses structure [27] and how structure generates observed behavior over time [20]. During the conceptual phase of systems thinking, causal loop diagrams capture the model structure in the form of positive (reinforcing) and negative (balancing) feedback loops [20] and during the technical phase, a model has been formulated in the block diagram of simulated system dynamics model.

Causal Feedback Control Loops

Causal loops lead to conceptualization [44] of real-life scenarios of premature deindustrialization and its underlying structures. Behavior of the economic system is the result of interaction of positive and negative feedback control loops [18]. The causal diagram [33] consists of variables connected by the arrows denoting the causal influences among the variables. A positive link means that if the cause increases, the effect increases (direct relationship) and a negative link means that if the cause (independent variable) increases, the effect (dependent variable) decreases (indirect relationship). Each causal link is assigned a polarity, either positive (+) or negative (-) to indicate how the dependent variable (effect) changes when the independent variable (cause) changes. To determine the loop polarity, count the number of negative links in the loop if the number of negative links is even the loop is positive and if the number of negative links is odd the loop is negative.

A positive or reinforcing loop deals with the amplification and generates run-away growth or collapse behavior that creates virtuous or vicious cycles: a change in one variable brings change in the next variable. Negative or balancing feedback loop is a goal-seeking loop that maintains the status quo and generates honing in behavior. Negative loops resist the change, push them one way and they come back while maintaining the equilibrium state [31]

The Positive and Negative Loops To understand the dynamics of the premature deindustrialization of Pakistan and productivity performance, mental models are developed in the form of positive and negative loops, which are as follows:

In Figure 24 Geopolitical position is the exogenous variable [32] that is instrumental for the loop operation. There is one major positive and reinforcing loop. Involvement of international agencies and superpowers focus to have the corrupt elite in power so that they can control and manage them as per their own nefarious designs. Corrupt people in power creates political instability and makes weak the institutions like judiciary, parliament and assembly. As a result, corruption in upper level and in society increases that encouragement for power groups or mafias to be in touch with agents of international agencies and representatives of superpowers.

FIGURE 24

SUPER POWER AND POLITICAL INSTABILITY LOOP

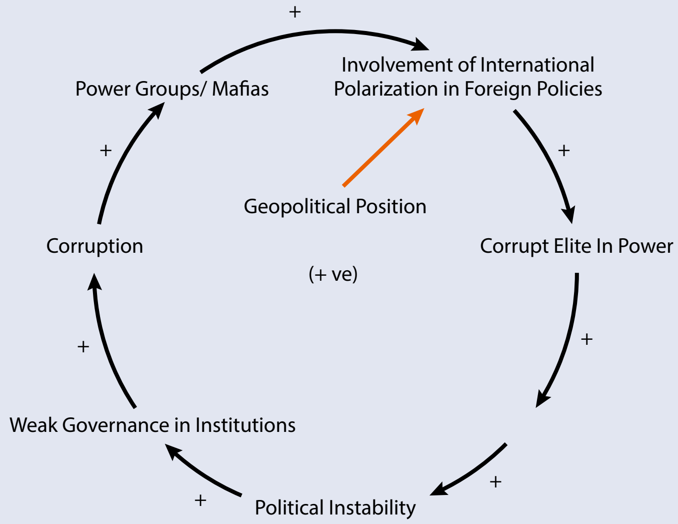
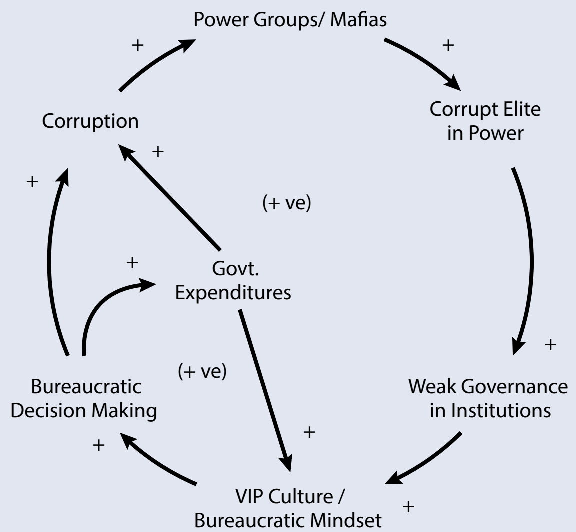


FIGURE 25

WEAK INSTITUTIONS AND BUREAUCRATIC MINDSET LOOP



In Figure 25 there is one major positive loop and two minor positive loops that reflect the whole picture. Power groups need corrupt elite in power to gain their own benefits that end up as a weak governance in institutions. Weak governance demands a very important person (VIP) culture and bureaucratic mindset that leads to bureaucratic decision making [32]. Consequently, corruption prevails in society and encourages them to have more power groups in all walks of life. Another minor positive loop discusses bureaucratic decision-making increases government expenditures for VIP culture, and the vicious cycle goes on. A second minor positive loop explains that the bureaucratic mindset increases bureaucratic decision making as a result buying for government expenditure increases and there is possible element of corruption that further increases the growth in Power Groups or Mafias.

FIGURE 26

POWER GROUPS, HOARDING AND INFLATION LOOP

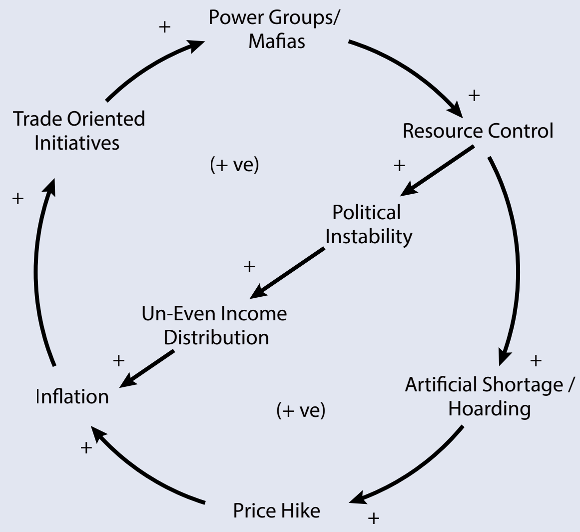


FIGURE 27

FOREIGN DIRECT INVESTMENTS (FDIS) AND LOAN APPROVAL LOOP

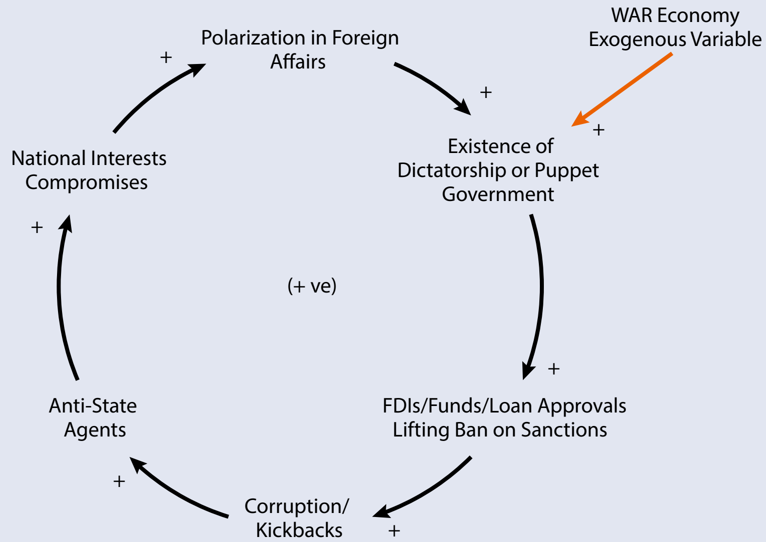
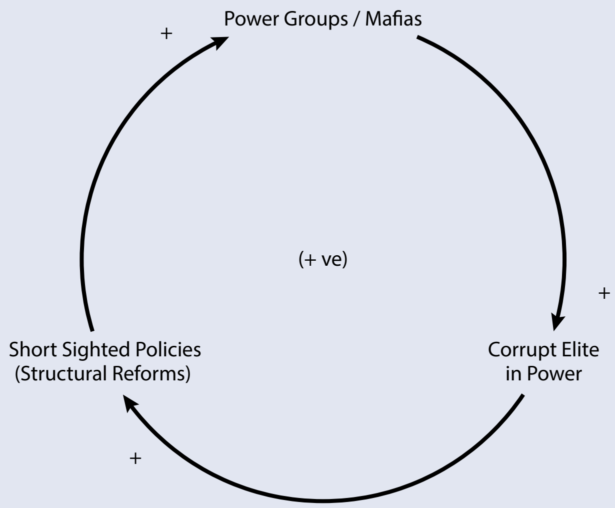


Figure 26 explains one major reinforcing and one minor reinforcing loop. Power groups or Mafias have the control over resources [2]. They create the artificial shortage or hoarding of the commodity product. Playing with the simple mechanism of demand and supply, they increase the prices of daily consumables and other household and manufactured items [29]. As a result, inflation becomes hyperinflation [4] in the society and compels the people to opt for trade-oriented initiatives for quick money to negate the effect of hyperinflation (going for short term and low productivity activities like being a salesman, order taker, delivery boy and opening a shop of imported products due to a decline in the manufacturing sector). Consequently, power groups gain more control on resources for decline of the manufacturing sector.

FIGURE 28

CORRUPT ELITE AND SHORT-SIGHTED POLICIES



In Figure 27, War economy is the exogenous variable that played the vital role in Pakistan economy and one of the major reasons that cause the negative industrialization and created the premature deindustrialization in Pakistan. Dictatorship and string-puppet governments are favorable for super powers and they use the dictators in their favor. Since August 1947 over a period of 76 years 30 years directly dictators ruled the country and almost 13 years string-puppet governments or interim governments controlled by the military establishment ruled the country. Lot of money inflow is the during the rule of dictators [30]. Highest FDI around USD5 billion came in Pakistan during the regime of Dictator General Pervez Musharraf and IMF loan is around USD4 billion [17]. Again, the in regime of General Zia the IMF loan approval of SDR (Special drawing request) was USD2 billion, the ever-highest IMF loan approval first time in the history of Pakistan. No doubt General Zial used USD1 billion loan. UNDP funds and lifting the ban on sanctions are the multiple opportunities that has increased inflow of illicit money. Consequently, corruption and Kickback are on the higher side encouraging the anti-state agents to compromise the national interests and create more polarization in the foreign affairs/policies.

Figure 28 describes how the power groups in collaboration with the corrupt elite in power formulate and design the short-sighted/distorted policies to kill the manufacturing sector and push the country to appear as a trading country. Power groups represent the military dictatorship and in the democratic period go for political horse trading, bribe the politicians for floor crossing, and establish the government of their own interest while involved in the sale and purchase of elected members. Consequently, corrupt elite appear in power and formulate the short-sighted /distorted policies. Short sighted/distorted policies restrict the long-term industry or manufacturing-oriented policies. Corrupt elite instruct the bureaucrats and ministers to make policies that are in favor of import of household products and manufactured items linking with commissions and kickback making the deals with importing countries. Figure 6 depicts the reinforcing loop in which each change in one variable reinforces the change in other variables, amplifying the change. This vicious cycle continues till the collapse causing early negative industrialization.

FIGURE 29

LOW PRODUCTIVITY AND TRADE ORIENTED INITIATIVES LOOP

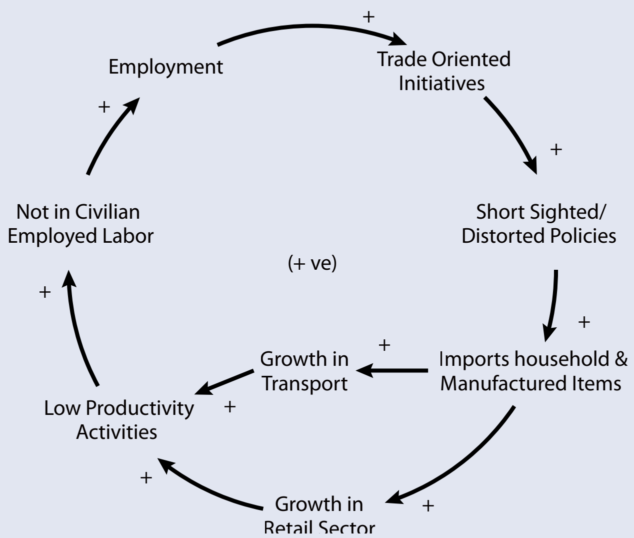


Figure 29 indicates that short sighted or distorted policies are the result of trade-oriented initiatives intentionally pushing the country to be a trading hub. Being the signatory of WTO, import duties on finished products are quite low, encouraging the import of household and manufactured items. A flood of foreign products brings growth in the retail sector and movement of goods growth in the transport sector. People working in both sectors are mostly uneducated and involved in low productivity activities (like vehicle drivers, support staff, shop keepers, order takers, delivery boys, house keepers, salesmen and in a few cases, they are the shop owners). Employability increases, not in civilian labor force, temporarily solves the issue of job placement and employability. Involvement of people, especially youth in low productivity activities, seems to be trade oriented initiatives with a positive dimension that brings premature deindustrialization and low productivity of the workforce.

Figure 30 indicates the positive loop of industrial growth, restriction in the trade-oriented initiatives, and reduction in the short sighted and distorted policies can create positive industrialization and removes the shrinkage of manufacturing sector. Otherwise, the trade-oriented initiatives and import oriented policies will end up increase in imports, widening the gap between imports and exports and increasing trade imbalance.

Figure 31 depicts the trade imbalance, borrowing and deindustrialization loop. Increase in trade deficit, there is risk that country is going to be defaulter, so borrowing and IMF loans [5] are encouraged, easy money flow increases corruption and to justify the utilization of that amount various non-valued added project (like rebuilding the bridges, road construction of already paved roads, construction of streets, lighting up the road etc.) have been started. Borrowed money does not appear in some industrial loans and policies that facilitate businessmen to strengthen the industrial sector, so deindustrialization is the outcome and shortage of household products and manufactured items enhances the imports that further increases the gap between imports and exports. This reinforcing loop amplifies the spiral of trade deficit. There is another minor positive loop: temptation for corruption increases the start-ups of the non-value-added projects; consequently, there is more (possibility of) commissions and kickbacks that further increases the corruption in the system.

FIGURE 30

GROWTH IN INDUSTRIAL SECTOR LOOP

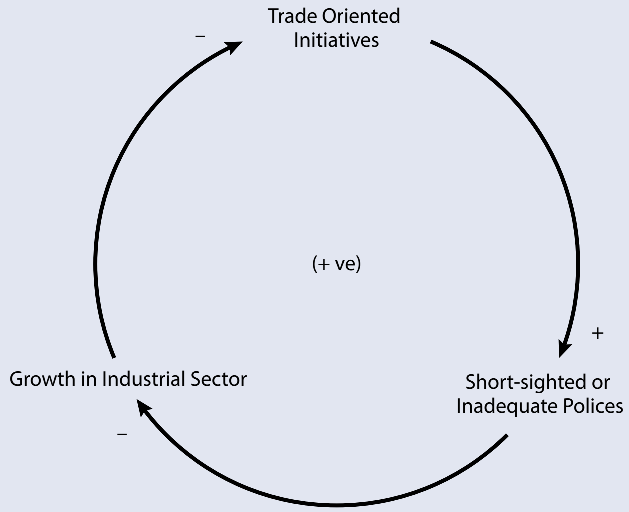


FIGURE 31

BORROWING AND DEINDUSTRIALIZATION LOOP

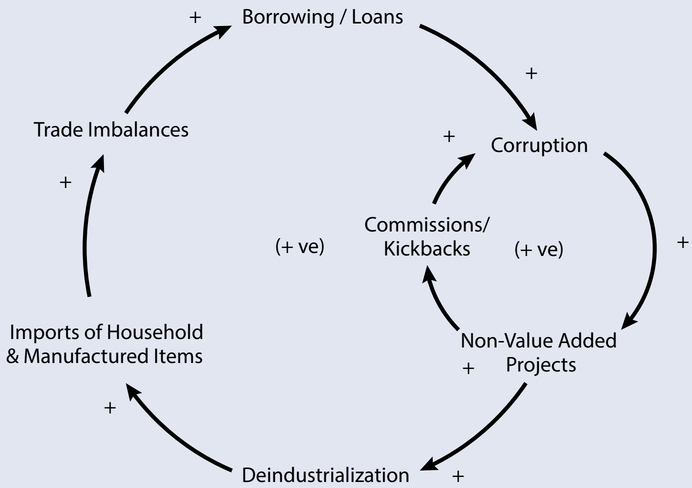


Figure 32 shows that money associated with trade oriented initiatives encourage corrupt people in power to have short-sighted/distorted policies that cause shrinkage in the manufacturing sector and premature de industrialization occur that reduce the job opportunities of the educated (civilian) labor that lowers the employability [21] and there is a need to have more trade oriented initiatives and imported manufactured items so that people may generate their livelihood from the trade activities instead of hard core manufacturing units. There are two positive loops.

FIGURE 32

SHORT-SIGHTED/DISTORTED POLICIES AND PREMATURE DEINDUSTRIALIZATION LOOP

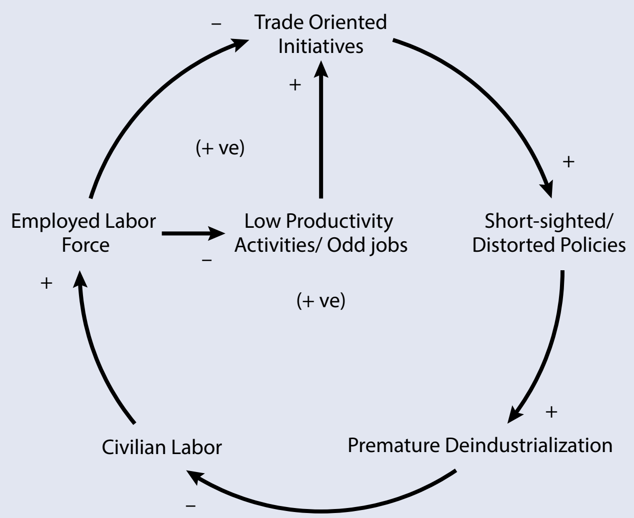


FIGURE 33

PREMATURE DEINDUSTRIALIZATION AND INNOVATION LOOP

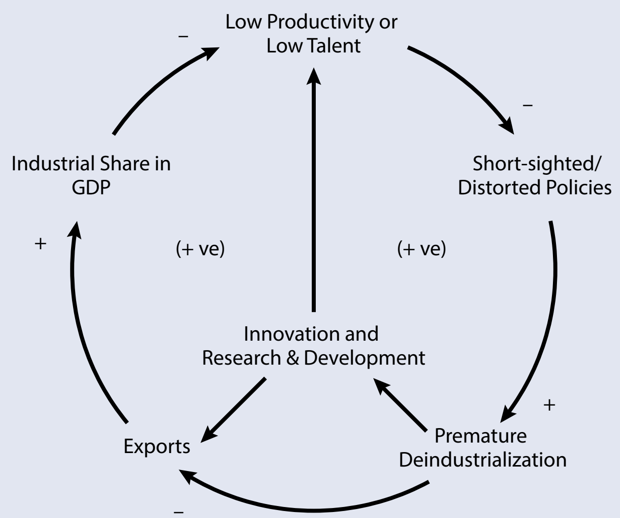


Figure 33 depicts this reality that premature deindustrialization restricted the innovative and creative activities. Poor research and development activities [3] reduces the new product development and lowers the exports opportunity as a result there is a decline in the industrial sector and labor productivity is low. Figure 33 shows the one major loop and two minor positive loops.

FIGURE 34

BORROWING AND EXPORT LOOP

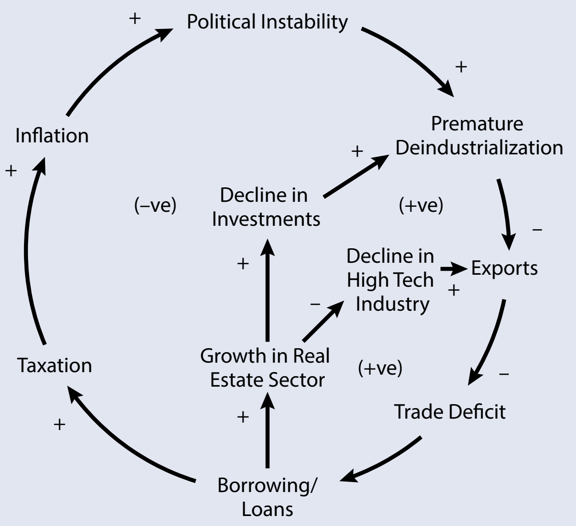


FIGURE 35

CURRENCY EXCHANGE RATE AND USD FLIGHT LOOP

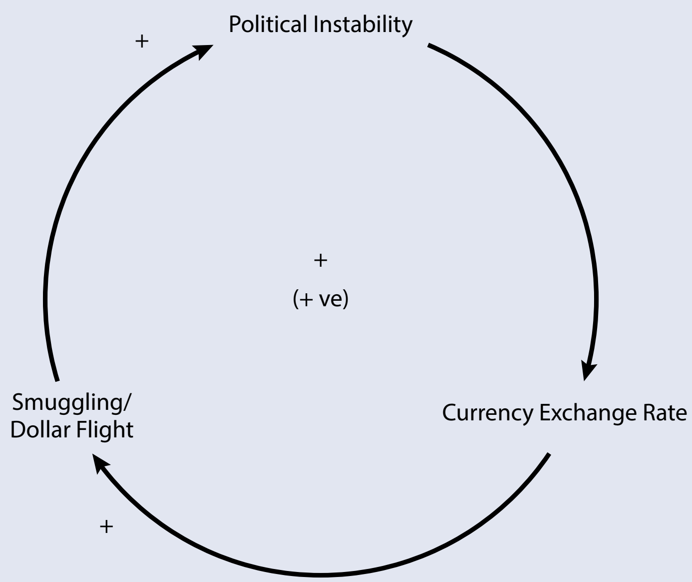


Figure 34 shows that international financial institutions link the borrowing and loans with taxation, increase in electricity, and that makes the life of the common man miserable. Due to inflation, political instability prevails in society and people are inclined to go for odd jobs for quick money, resulting in premature deindustrialization and people who are involved in odd jobs causing low productivity. Figure 34 shows one major negative loop and 2 minor positive loops [10].

FIGURE 36

PER CAPITA INCOME AND ENTREPRENEURIAL LOOP

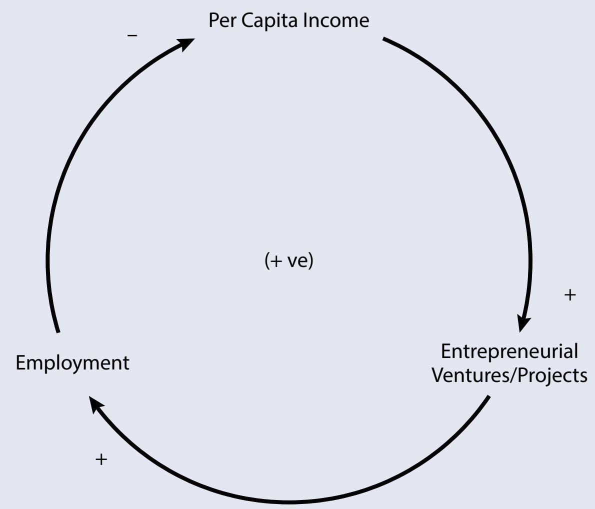


Figure 35 indicates that political instability causes increases in currency exchange rate. Depreciation in the country currency [26] and non-availability of the USD from the state bank of Pakistan compels the people to become involved in the smuggling of the manufactured items and raw materials. As a result, there is a USD flight, causing further depreciation in the currency.

Figure 36 This loop brings the positivity in the system; if the per capita income is high, people will start new entrepreneurial ventures and new business startups. This will not only contribute to the growth of the manufacturing sector, but will also create employability of civilian labor. But if the per capita income is low, as in the case of Pakistan, there are no new projects; negative industrialization and unemployment in the civilian labor will escalate.

Appendix C

TABLE 7

MEANING OF POWER GROUPS/MAFIAS

Term	Definitions	Effect	Impact on Deindustrialization
Power Groups	Corrupt politicians	Political instability, commissions, Not value added projects	Negative Industrialization
	Money oriented Businessman	Price Hike	Industry shifting Import of
	Real estate tycoons	Growth in service sector, Price Hike	Negative Industrialization
	Corrupt ministers in power	Shrinkage in manufacturing sector, Distorted Policies	Negative Industrialization
	Religious pressure groups	Political Instability	Negative Industrialization
	Corrupt bureaucrats	Short-sighted / Distorted Policies	Negative Industrialization
	Agents of anti-state groups	Short-sighted / Distorted Policies, Political Instability,	Negative Industrialization
	Ethnic leaders	Political Instability	Negative Industrialization
	Pressure group of minorities	Political Instability	Negative Industrialization
	Associations of industrial sectors to have skewed industrial policies	Skewed policies for industrial sectors	Negative Industrialization
	Traitors in establishment	Political Instability, Polarization in Foreign Affairs	Negative Industrialization
	Purchasable media groups	Political Polarization, Division of community in groups	Negative Industrialization
	Short-sighted opposition leaders	Political Polarization,	Negative Industrialization
	Land owners and commodity product handler	Inflation	Negative Industrialization

TABLE 8

MEANING OF TRADE ORIENTED INITIATIVES POWER GROUPS/MAFIAS

Term	Definitions	Effect	Impact on Deindustrialization	Productivity Performance
Trade-Oriented Initiatives	Retail Outlets/Small Shops	Shrinkage in Manufacturing	Negative Industrialization	Low Productivity
	Transport Sector	Shrinkage in Manufacturing	Industry shifting Import of	Low Productivity
	Contractor in waste collection, labor, janitorial staff	Shrinkage in Manufacturing	Negative Industrialization	Low Productivity
	Real Estate	Shrinkage in Manufacturing	Negative Industrialization	Low Productivity
	Hoarding/Commodity Trading	Shrinkage in Manufacturing	Negative Industrialization	Low Productivity
	Reduction in import duties on finished products	Shrinkage in Manufacturing	Negative Industrialization	Low Productivity
	Education Sector (Private Sector-Online education especially)	Shrinkage in Manufacturing	Negative Industrialization	High Talent / High Productivity
	Health Care Sector	Shrinkage in Manufacturing	Negative Industrialization	Hight Talent / High Productivity
	Freelancing/Digital Platform	Shrinkage in Manufacturing	Negative Industrialization	Hight Talent / High Productivity
	Information Technology, Software Development	Shrinkage in Manufacturing	Negative Industrialization	Hight Talent / High Productivity
	Automation, Industry 4.0 / Mechatronics	Growth in output	Negative Industrialization	Hight Talent / High Productivity
	Imposing the ban on manufacturing Industry Quota for	Shrinkage in Manufacturing	Negative Industrialization	Hight Talent / High Productivity

TABLE 9

MEANING OF SHORT-SIGHTED / DISTORTED POLICIES

Term	Definitions	Effect	Impact on Deindustrialization	Productivity Performance
Short-Sighted / Inadequate Policies	Low Import duties on finished products	Flood of Manufactured Items	Killing Industrial Sector	Low Productivity
	Ban or high import duties on raw material	Stopping the production of local industry	Making production difficult	Low Productivity
	Complexity in cross border trade	Export restriction	Negative Industrialization	Low Productivity
	High Energy Cost	Shrinkage in Manufacturing	Negative Industrialization	Low Productivity
	Banning the new manufacturing businesses	Shrinkage in Manufacturing	Negative Industrialization	Low Productivity
	Long list of WTO Items	Cut throat competition to local manufacturer	Negative Industrialization	Low Productivity
	Stoppage of USD issuance from state bank for import of raw material	Closure of Manufacturing Units	Negative Industrialization	High Talent / High Productivity
	Encouraging smuggling from the neighboring countries	Closure of local products due to high costs	Negative Industrialization	Hight Talent / High Productivity
	Closure of Manufacturing plant under the title of Environmental pollution	Creating hurdles & Shrinkage in Manufacturing	Negative Industrialization	Hight Talent / High Productivity

TABLE 10

MEANING OF WAR ECONOMY

Term	Definitions	Effect	Impact on Deindustrialization	Productivity Performance
WAR Economy	IMF Loan approval	Non-Value-Added Projects, Govt Expenditures	Shrinking manufacturing sector	Low Productivity
	UNDP Funds	Corruption	Making production difficult	Low Productivity
	Foreign Direct Investment (FDIs)	Nepotism, Black Money, resource wastage	Negative Industrialization	Low Productivity
	Commissions	Corruption	Negative Industrialization	Low Productivity
	Kickbacks	Deals for non-value-added projects	Negative Industrialization	Low Productivity
	Weapons, Bullets, Missiles, Fighter planes	Money selling weapons	Negative Industrialization	Low Productivity
	Financial supports, scholarships for kids' education, residential villas etc. in exchange of kidnapping of own people	Corruption	Negative Industrialization	Low Productivity
	Encouraging Drone attacks, bomb blasts	corruption	Negative Industrialization	Low Productivity
	Undocumented money for spying activities	Inflow of black money	Real estate sector	Low Productivity
	Financial support from the allied countries	Inflow of black money	Real estate sector	Low Productivity
	Provision of military bases	Creating hurdles & Shrinkage in Manufacturing	Real estate sector	Low Productivity

PHILIPPINES

Executive Summary

Like many developing countries, the Philippines pursued an import substitution strategy after the Second World War. Protectionist measures like high tariffs, import quotas, and nontariff barriers were put in place to protect domestic industries. In the 1970s, the government directly engaged in several industrial projects including an integrated steel mill, copper smelter, among others. Nevertheless, gross value added as a share of GDP for both industry and manufacturing, has declined since 1982. This was followed by a trade liberalization and export promotion phase, beginning with a tariff reform program in the mid-1980s that reduced trade barriers. Under the administration of President Fidel Ramos in the mid-1990s, key industries like the petroleum, banking, and telecommunications were liberalized.

Meanwhile, the assassination of Sen. Benigno Aquino Jr. in 1983 aggravated the political uncertainty of the time, setting off capital flight and an economic depression. This also discouraged foreign investors who were considering locating in the Philippines. Other factors like poor infrastructure (including high power and logistics costs) and difficulties in doing business (e.g., corruption, bureaucracy) further diminished the country's investment environment. The poor investment climate is the likely culprit behind the decline of both the economy and manufacturing after 1980, which was especially dependent on foreign investment.

Fortunately, there remained some key foreign investors in the electronics industries that entered the country and paved the way for the country to insert itself into the electronics global value chain. Today, electronics exports remain a significant contributor to the manufacturing sector and the country's exports.

Several policy reforms have been passed that will hopefully improve the country's investment climate. Amendments were made to the Foreign Investments Act, Public Service Act, Retail Trade Liberalization Act, among other legislation, to lower barriers to foreign participation in the economy.

The Philippines also revamped its national industrial policy to prepare for the advent of AI and the Fourth Industrial Revolution (FIRE), but manufacturing remains a priority sector. It also recognizes the need to continue improving the investment climate and upgrading human capital and the supply of skilled labor to encourage more foreign direct investment (FDI).

1. Introduction

After suffering a near double-digit economic contraction of -9.5% in GDP (in 2018 market prices) in 2021 during the depth of the pandemic, the Philippine economy has been recovering, posting a 7.6% real GDP growth rate in 2022 and as of the third quarter of 2023, 5.5%.

The Philippine economy is often characterized as a service economy because the service sector dominates by share of GDP (61.4% in 2022 in 2018 prices). The industrial sector, in contrast, peaked below a 40% share around 1980 and has declined since. Some prominent local economists had expressed concern over this development, describing it as a form of "development progeria." The phrase "hollowed out economy" had also been used to describe the Philippine economy, as it was regarded as lacking a significant industrial and manufacturing sector.

The usual growth pattern observed of advanced countries had been that industry first develops and as this sector's productivity improves, the excess labor is then absorbed by the service sector. Rodrik [1] had observed that many developing countries seem to have reached this phase where the service sector led growth at lower income per capita levels.

But the Philippine industrial sector has not always been a laggard. De Dios and Williamson [2] estimated that Philippine industrial growth averaged 6.3% per annum in the decade leading up to 1913. They reckoned that the Philippines was the third to join the 5% industrial growth in the region after Japan in 1899 and China in 1900. They included the Philippines in the Top Ten Performers Asia category for the periods 1890–1913 and 1920–38 but did not include it anymore thereafter.

They described the economy as being in an "industrial catch-up" phase from 1920–38 and which continued from 1950–72, a period they referred to as the "import-substitution-industrialization" (ISI) phase. De Dios and Williamson considered the Philippines to have exited the "industrial catching-up club" in 1982. It seems industrialization has not recovered since.

This paper will analyze historical economic data of the Philippines to gauge whether and when the country slipped into the deindustrialization phase. Analyzing the policy and political history of the country in recent decades, the paper will seek to understand what factors and events pushed the Philippine economy into this phase. With this understanding, policymakers can be better informed on what measures may be undertaken to reverse the trend, or how to manage this transition if it is inevitable.

1.1 Background and Overview of Philippine Economy

Like many neighboring countries, the Philippines had embarked on an ISI strategy in the 1950s after the Second World War. High tariffs were put in place with the objective of protecting domestic companies so that they could develop. During the administration of President Ferdinand Marcos Sr., the country embarked on an industrialization strategy and in 1980 announced its Major Industrial Projects (MIP) program, with select large industrial projects that included: a copper smelter from the Philippine Associated Smelting and Refining Corporation (PASAR); a phosphate fertilizer plant from the Philippine Phosphate Fertilizer Corporation; an integrated steel mill from the National Steel Corporation, among others.

Meanwhile the government sought to develop specific industries like the automotive industry with targeted programs such as the Progressive Car Manufacturing Program (PCMP), which provided for high import tariffs and sought to control the number of industry players for economy of scale reasons. Thus, it can be said that the Philippines had earnestly sought to industrialize its economy.

The country undertook a tariff reform program from 1980 to 1985 which reduced the range of tariffs from 0% to 100% in 1980 to 0% to 50% in 1985. The tariff reform was tied to a structural adjustment loan from the IMF and WB. This brought Philippine tariffs more in line with some neighbors like Indonesia, the Republic of Korea (ROK) and Malaysia, though Thailand had marginally higher tariff rates (Table 3.2 p. 27 of WB 1987). This was the beginning of the decline in tariff protection, which was continued by the country's participation in WTO and the ASEAN Free Trade Agreement (AFTA).

After the ouster of President Marcos Sr. in 1986, the Corazon Aquino administration was marked by several coup attempts by disgruntled military officers. The perceived political instability likely deterred foreign investments in the Philippines.

The 1987 World Bank report noted that many firms experienced financial difficulties originating in the debt crisis as they were saddled with foreign exchange losses due to their foreign currency denominated debt, compounded with the high interest rates of the time and depressed demand.

The 1987 World Bank report characterized the Philippine industrial base as "brittle and largely uncompetitive," pointing to the limited manufacturing export product mix (semiconductors and garments at that time) sold primarily to the USA. Meanwhile, the export structure was described as an "enclave" in nature with limited links to the rest of the economy. This is a downside of industrial zones. To overcome poor supply linkages, Japanese automotive conglomerates like Toyota bring along their suppliers from their keiretsu network. Ironically, this could have limited development links with domestic companies.

President Fidel Ramos succeeded President Corazon Aquino in 1992 and inherited an electric power crisis. Aquino had mothballed the 600 MW Bataan Nuclear Power Plant (BNPP) that Marcos Sr. had started, nearing completion at the time. However, with no alternative plants taking its place, the country fell into an electric power crisis. The BNPP would have been the country's first, and up to now, only nuclear plant. With no replacement for the mothballed capacity of 600 MW, and the economy recently recovering from the balance of payment crisis of the Marcos administration, electricity demand caught up with generating capacity: a power crisis ensued that saw daily brownouts lasting hours.

The power shortage curtailed economic activity as there were rotating brownouts lasting several hours daily. It also set the stage for high electricity rates. This likely further discouraged investments in the country, especially those in power-intensive industries.

To remedy the situation, the Ramos administration contracted with Independent Power Producers (IPP) to supply additional capacity. However, many of these contracts contained "take or pay" provisions, which meant the country had to pay for capacity even if it was not used. This raised power rates and posed a further deterrent to foreign (as well as local) investors.

Since the turn of the millennium, the Philippine per capita income (GDP per capita and GNI per capita) has grown steadily. As with many other countries, growth dipped in the pandemic years of 2020 to 2022.

In Figure 1, the GNI per capita is noticeably consistently higher than the GDP per capita. This reflects the phenomenon of Filipino migrant worker remittances, which is included in the Net Primary Income from the Rest of the World account.

The figure also suggests that income per capita has not recovered to the pre-pandemic levels. The onset of the COVID-19 pandemic and the subsequent lockdown had taken a toll on employment as many workers were laid off, especially in the sectors that were not considered vital, and thus those businesses had to shut down. The Philippines has been characterized as having one of the most stringent and longest lockdowns. For example, most Philippine schools did not resume in-face classes until 2022, one of the last globally to do so.

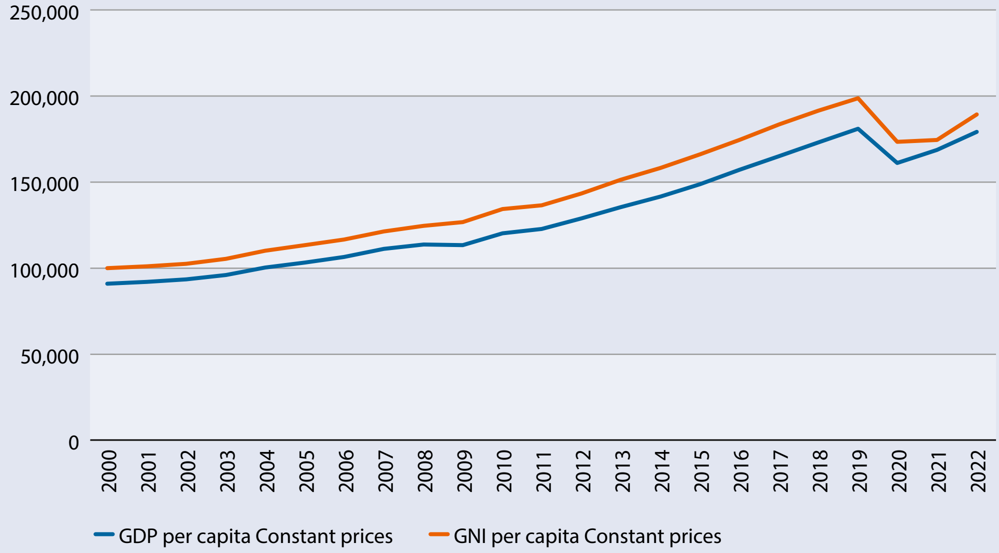
1.2 Sectoral Trends and Analysis

The Philippine economy has been described as a service economy and historically, the share of its gross value added (GVA) to GDP (in constant 2018 prices) accounted for by the service sector has been the largest share of the economy since the Second World War (see Figure 2). Except for the decade of the 1970s, when it was on a slight downtrend, the share of the service sector bottomed in 1981 and has been on an uptrend since. The service sector has not looked back and by 2022, has accounted for 61.4% of the economy's GDP.

In contrast, the share of the industrial sector to GDP has been stagnant since 1985. Indeed, its share of the economy has been on a slow decline since then, hovering at about 30% since 2004. The share of GDP of the industrial sector peaked at 39% in 1981, while the share of GDP of manufacturing peaked at 26.7% in 1982, making that year a candidate for marking the start of deindustrialization in the Philippines. Manufacturing is the largest subsector of industrialization and its share of industry value added averaged 67% from 2000 to 2022. Currently its share is 64%.

FIGURE 1

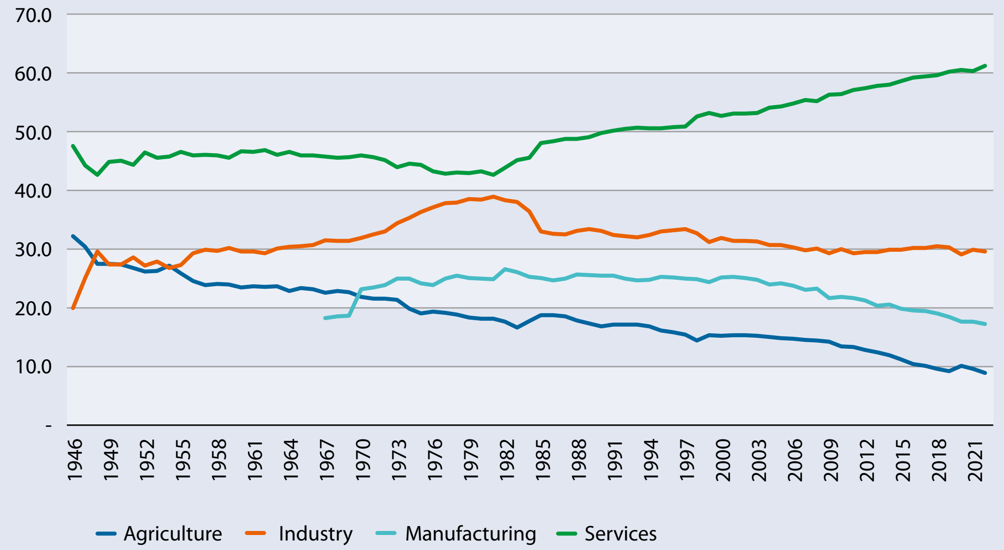
PHILIPPINE GNI AND GDP PER CAPITA (PHP AT 2018 MARKET PRICES)



Source: ADB Key Indicators, Philippine Statistical Authority

FIGURE 2

SECTORAL SHARE OF GDP (%)



Source: Philippine Statistics Authority, World Bank Development Indicators[1]

Meanwhile, from a high of 32.3% in 1946, the share of the agricultural sector (including fisheries and forestry) has been on a steady declining secular trend. It now hovers at 10% with the 2022 share of 8.9% being the lowest on record.

In terms of contribution to growth GDP growth, the service sector is the dominant contributor from 2001 to the present. Even during the pandemic years, it contributed most to the growth of the economy.

Manufacturing

The industry account is further broken down into the following: mining and quarrying; manufacturing; electricity, steam, water, and waste management; and construction. Manufacturing has traditionally been the largest component of industry. See the following table:

TABLE 1

TOP 5 LARGEST MANUFACTURING SUBSECTORS (% SHARE OF MANUFACTURING)

Industry	2000–04	2005–09	2010–14	2015–19	2020–22
Food products	44.5	48.1	49.8	47.1	48.3
Chemicals and chemical products	4.6	5.4	7.5	9.9	12.1
Computer, electronic and optical products	12.4	12.2	10.5	11.1	11.1
Beverages	4.2	4.0	4.6	4.7	4.2
Coke and refined petroleum products	8.4	7.9	6.2	5.3	2.8

Source: Philippine Statistics Authority

1 Note on data for manufacturing value added share of GDP: For 2000–22 the data is from World Bank Development Indicators. For the years 1967–99, the shares were computed from GDP and Manufacturing gross value added from various issues of the Philippine Statistical Yearbook.

The manufacture of food products is the largest subsector of manufacturing and accounted for 48.3% of the manufacturing value added (in 2018 prices) in the pandemic years (2000 to 2022). It dwarfs the second and third largest subsectors of chemicals and chemical products (12.1%) and of computer, electronic and optical products (11.1%). All the remaining manufacturing subsectors each have less than 3% share of value added individually.

Note that while the chemical products manufacturing sector edged out the computer and electronics sector during the pandemic years, the latter was more consistently the second largest manufacturing subsector.

Meanwhile, the oil industry (manufacture of coke and refined petroleum products) was significantly larger than it is today. However, the closure of the Caltex (Chevron) refinery was announced in 2003, and most recently Shell announced in 2020 that it was closing its refinery as well. The closure of two out of the country's three refineries has cut the sector's value added share to a third of its size at the start of the millennium.

Electronics (semiconductors) are the largest manufacturing export of the country and the reason why the manufacture of computer and electronic products is the third largest manufacturing subsector.

Table 2 below lists the five fastest growing manufacturing subsectors in terms of average annual growth rate over the period from 2000 to 2022. None of the five largest subsectors listed above are included. Except for the oil industry, the largest four manufacturing subsectors still posted above average annual growth rates. For reasons cited earlier, the oil industry showed an average -0.5% average annual growth rate.

TABLE 2

TOP 5 MANUFACTURING SUBSECTORS BY AVERAGE ANNUAL GROWTH RATE (%)

Industry	Average annual growth % (2000–22)
Furniture	13.1
Basic metals	10.7
Chemicals and chemical products	8.9
Wood, bamboo, cane, rattan articles and related products	8.2
Fabricated metal products, except machinery and equipment	7.8
GVA of total manufacturing	4.1

Note: Average annual growth rate is the simple average of the annual growth rates for each year.

Because of the dominance of the food manufacture subsector, Philippine manufacture could be characterized as primarily consumption-related. In 2022, the subsectors that are consumer spending (primarily for final household consumption) constitutes about 55% of manufacturing GVA. This is consistent with the consumption-driven nature of the Philippine economy.

Contribution to Philippine Economic Growth

This dominant share of the service sector, combined with its relatively robust growth, makes it also the primary contributor to the growth of the economy. Table 3 breaks down the sectoral contribution to GDP growth. Each sector's contribution to GDP growth was computed as the product of its share to total GDP and its growth rate following the basic algebraic decomposition:

$$\Delta GDP = \Delta Agri + \Delta Industry + \Delta Services$$

$$\frac{\Delta GDP}{GDP} = \frac{\Delta Agri}{Agri} \cdot \frac{Agri}{GDP} + \frac{\Delta Industry}{Industry} \cdot \frac{Industry}{GDP} + \frac{\Delta Services}{Services} \cdot \frac{Services}{GDP}$$

$$\%\Delta GDP = \%\Delta Agri \cdot Agri\ share\ of\ GDP + \%\Delta Industry \cdot Industry\ share\ of\ GDP$$

$$+ \%\Delta Servicesh \cdot Services\ share\ of\ GDP$$

where "Agri," "Industry," and "Services" represent the GVA of their respective sector.

TABLE 3

AVERAGE CONTRIBUTION BY SECTOR TO GDP GROWTH (%)

	2001 to 2005	2006 to 2010	2011 to 2015	2016 to 2019	2020 to 2022
Agriculture, forestry, and fishing	0.626	0.426	0.313	0.141	-0.001
Industry	1.216	1.348	1.785	2.116	0.153
Services	2.831	3.219	3.943	4.379	1.103
GDP	4.673	4.993	6.040	6.635	1.256

Source: ADB Key Indicators and Philippine Statistics Authority

The dominant contribution to GDP growth by the service sector is striking in the above table. It has been more than double the contribution of the industrial sector (which includes the manufacturing subsector) since the start of the millennium.

In the pandemic year of 2020, the service sector even accounted for almost all of the economic growth, dwarfing the contribution of the industrial sector. Because of the lockdown and quarantine restrictions imposed on the country, many workers in the manufacturing and industrial sector could not report to work. As the nature of industry required onsite work, the output of industry naturally nose-dived. On the other hand, some service sectors could work from home using the internet. Nevertheless, output in the service sector also suffered because many services by their nature could not be delivered online, e.g., personal services like haircuts.

Employment shares

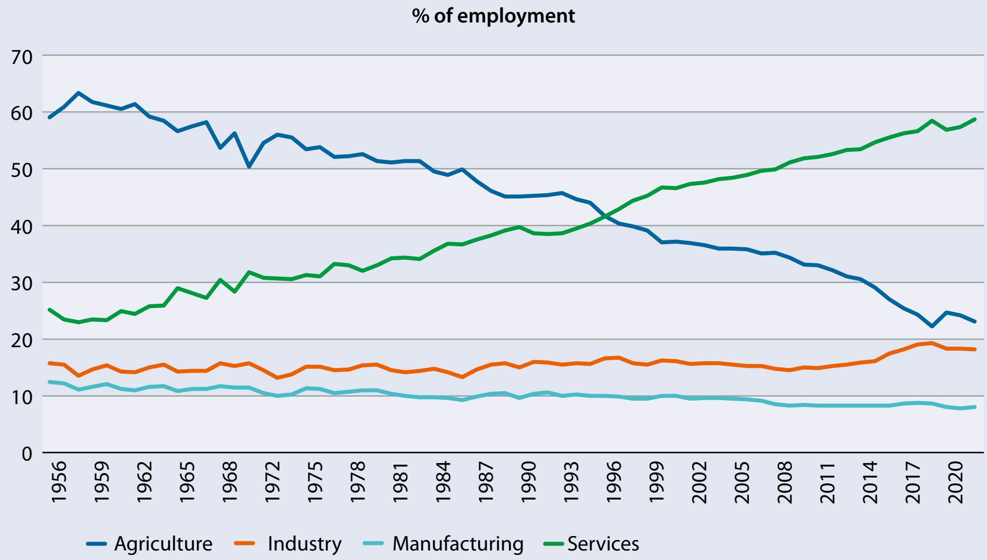
From the employment perspective, the service sector's share of employment has been on a continual uptrend since 1995, except for a dip in 2020 due to the pandemic (see Figure 3 below). By 2021 it accounted for 57% of total employment. The secular trend of the employment share of industry looks flat and registered 18% in 2021. From 43% in 1995, the share of agriculture in employment has steadily declined, reaching 24% in 2021. In 1995 and 1996, agriculture had still accounted for the largest share of employment with 43% versus industry's 41% in both years. Since then, the tables have been reversed and the service sector has far outstripped the other two sectors' shares in employment generation.

The figure below shows the shares of total employment by sector. Consistent with the secular decline in the share of the agricultural sector value added in the economy, agricultural unemployment suffered a continuous decline. Meanwhile, the service sector share of employment overtook that of agriculture in 1997 and looks set to continue its dominance. Industry and manufacturing share of employment has remained relatively flat.

The data for 2000 to 2022 was drawn from the ADB Key Indicators while data for prior years was culled from various issues of the Philippine Statistical Yearbook. Note that data for 1969 was unavailable. For the data from the Philippine Statistical Yearbook, which provides quarterly figures, most were from the 3rd quarter of the year.

FIGURE 3

SECTORAL SHARE OF EMPLOYMENT (%)



Source: ADB Key Indicators, PSA Philippine Statistical Yearbook various issues

2. Analysis of Deindustrialization in the Philippines

Some economists had expressed concern about the decline of Philippine industry. Daway and Fabella [4] used the metaphor "development progeria" to describe how the Philippines had acquired the industry dynamics of an advanced economy where the non-traded goods sector (services) surpasses the traded goods sector (manufacturing), despite being a developing economy. Usui [5] likened the Philippines to a man walking on one leg (services) but must develop industry as well so that it could walk on two legs. He argued that the country should not "leapfrog" industrialization because he believed the country's chronic problems of unemployment, slow poverty reduction and low investment was due to its slow pace of industrialization.

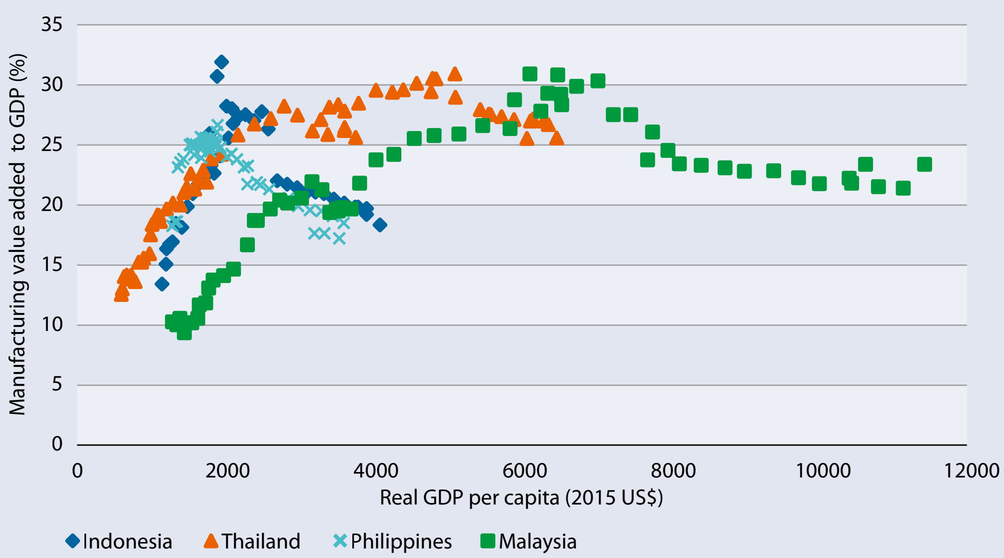
Rodrik [1] had looked at the relationship between the share of manufacturing value added to GDP in an economy in relation to its real GDP per capita as an indicator of premature deindustrialization. Ozcelik and Ozmen [6] cite literature that postulate an inverse U-shaped relationship between the two, with real GDP per capita positively related to the share of industry and manufacturing to GDP, but a negative relationship with deindustrialization. Since an economy's real GDP per capita typically increases over time, this means the ratio of manufacturing GVA to GDP eventually falls.

In Figure 4 below, we plot the scatter diagrams for manufacturing value added share to GDP and real GDP per capita for four ASEAN countries: Indonesia, Malaysia, Philippines, and Thailand. The data was taken from the World Bank Development Indicators database. Except for the Philippines, the other ASEAN countries' data started with 1960 as the earliest data point. The earliest data on manufacturing share of GDP for the Philippines in the database is from 2000. Thus, for the Philippines, data on the share of manufacturing to GDP before 2000 was culled from various years of the annual Philippine Statistical Yearbook.

The figure suggests that the Philippines and Indonesia have peaked in terms of share of manufacturing GVA at around USD2,000.00 (in 2015), declining thereafter. Indonesian

FIGURE 4

SHARE OF MANUFACTURING VALUE ADDED VS REAL GDP PER CAPITA



manufacturing peaked at a higher share of manufacturing value added though (around 32% of GDP) than the Philippines (26.7%). These peaks would have occurred in the years 1978–79 for Indonesia and 1982 for the Philippines. In both cases, their respective trends do not display a recovery for manufacturing share soon.

The share of manufacturing to GDP for the Philippines peaked in the decade of the 1980s and 1990s, hovering around 24 to 25%, when the real GDP per capita hovered around PHP90,000.00 (in 2018 prices). The peak occurred in 1982 at 26.7% and a real GDP per capita of PHP92,411.00. Using the average exchange rate of PHP52.66 per USD in 2018 (sourced from the BSP), this translates to about USD1,754.00 per capita GDP.

The peak in 1982 for the Philippines is almost certainly due to the economic crisis starting in 1983, which subsequently pulled the economy into a depression. Though economic factors were already at play, the assassination of Senator Benigno Aquino Jr. in August 1983 is often pinpointed as the spark for the capital flight that worsened the balance of payments and debt crisis of the economy. With the decline in GDP starting in 1983, manufacturing activity naturally dived. De Dios and Williamson [2] also regarded 1982 as the onset for deindustrialization in the Philippines.

Meanwhile, both Malaysia and Thailand manufacturing shares have also declined from their respective peaks, which occurred at higher per capita real incomes than for the Philippines and Indonesia. For Thailand, the peak was at about USD5,000.00, while for Malaysia it started at about USD6,000.00. The decline from the peak manufacturing share is also noticeably more gradual for Malaysia and Thailand than it is for Indonesia and the Philippines. In Malaysia's case, the trend has been nearly flat with manufacturing value added hovering at around 22%, and slightly lower than Thailand's 26%.

Data for Singapore is also plotted and presented separately below because of its higher per capita income; combining the five countries in one graph would compress the previous four's graphs to the left and obscure their peaks.

Completing the original ASEAN 5, Singapore presents an interesting case as its share of manufacturing value added to GDP seems to be multi-peaked, with the most recent peak occurring between 26–27% and at USD40,000.00 per capita income, during the years 2004 and 2005. Cross-country comparisons (especially in ASEAN) often downplay Singapore's trends as offering limited lessons for other countries due to its status as a small city-state. Interestingly, Singapore is recognized today as a financial and service hub, with a strong tourism sector, rather than known for manufacturing. Nevertheless, it presents an example that, in some cases, the manufacturing sector value added share can rise, decline, and recover.

Ozcelik and Ozmen estimated the peak manufacturing value added share to GDP and the real GDP per capita (in 2005 USD) for various economies. Since the data used for the Figures 4 and 5 and corresponding analysis are in 2015 USD values, the Ozcelik and Ozmen estimates need to be inflated to 2015 USD values. The following table summarizes their findings and adds a column adjusting their estimates in 2005 USD to 2015 USD terms by using the USD deflator from the World Bank World Development Indicator database.

FIGURE 5

SINGAPORE SHARE OF MANUFACTURING VALUE ADDED VS. REAL GDP PER CAPITA

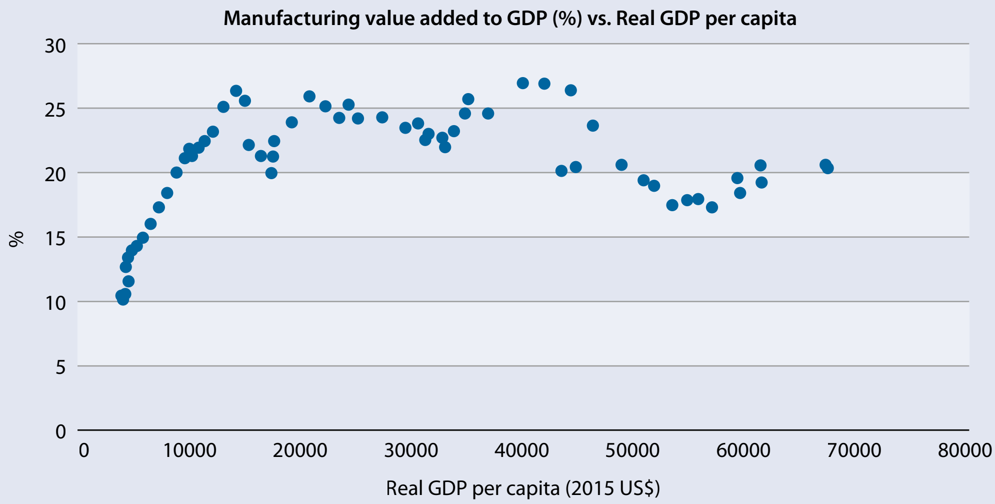


TABLE 4

COMPARISON WITH OZCELIK AND OZMEN PEAK ESTIMATES

	Peak manufacturing VA share (%)	Real GDP per capita (2005 USD)	Real GDP per capita (2015 USD)
Advanced economies	26.9	9,015.00	10,786.00
Emerging market economies or developing economies	19.3	1,225.00	1,466.00
Developing economies	16.3	807.00	966.00
Developing economies excl. Africa	22.8	1,534.00	1.835.00
Emerging market economies	25.0	1,890.00	2.261.00
Latin America	25.3	1,708.00	2,044.00
Developing economies incl. Africa	14.5	470.00	562.00

In Figure 4, Indonesia's and the Philippine's peak manufacturing valued added share to GDP occurred at about USD2,000.00 in 2015 values, which is higher than the average for the "developing economies and for emerging market economies" group in Ozcelik and Ozmen. This is much lower than the average USD10,786.00 when manufacturing value added shares started to decline for advanced economies. This is also the case for Malaysia and Thailand, though their manufacturing value added shares peaked at higher real GDP per capita levels of USD6,400.00 and USD5,000.00, respectively. Thus, these four ASEAN economies (Indonesia, Malaysia, Philippines, and Thailand) could be said to have prematurely de-industrialized.

Among the five original ASEAN countries, Singapore was the only one to not de-industrialize prematurely. Its manufacturing value added share last peaked around USD40,000.00; much higher than the average for advanced economies included in Ozcelik and Ozmen.

The manufacturing value added shares peaked at approximately 31% for Indonesia, Malaysia, and Thailand, and at 26% for the Philippines. These are comparable levels to that reached by the advanced economies and the emerging market economies. For the Philippines, the ratio of manufacturing value added share to GDP still hovers at nearly 18%, which is lower than that of Indonesia's, but nonetheless comparable to the peaks reached by developing economies or emerging market economies cited in Ozcelik and Ozmen.

2.1 Sectoral Labor Productivity and Impact of Premature Deindustrialization

Table 5 below shows the sectoral average productivity computed by dividing the sectoral GVA by the respective employed persons for the period 2012 to 2022. Of the five most productive, the subsectors that had the first, third, and fourth highest average productivity were service subsectors: real estate activities, finance and insurance activities; and information and communication in that order. The second and fifth most productive sectors were electricity, gas and water sector; and manufacturing; both of whom are industrial subsectors.

Agriculture had the second lowest productivity. The lowest productivity sector was the service subsector "other," which is the sum of the following subsectors: professional, scientific and technical activities, administrative and support service activities, public administration and defense, compulsory social security, education, human health and social work, arts, entertainment, and recreational activities.

Development economists generally regard the industrial sector as more productive than services and agriculture. Thus, a concern raised with premature deindustrialization is the lower productivity, and likely lower wages, for workers who leave the manufacturing sector for the service sector.

TABLE 5

AVERAGE PRODUCTIVITY (GVA PER WORKER) BY SECTOR (IN THOUSANDS OF 2018 PHILIPPINE PESOS)

Sector	2012 to 2022 Average Productivity	2012 to 2022 Average Employed Persons	2012 to 2022 % share by employment
Agriculture, forestry, and fishing	160.5	10,811	26.56
Mining and quarrying	711.5	214	0.53
Manufacturing	926.3	3,386	8.32
Electricity, gas, steam, and air-conditioning supply; water supply; sewerage, waste management, and remediation activities	3,472.8	149	0.37
Construction	337.5	3,380	8.30
Wholesale and retail trade; repair of motor vehicles and motorcycles	368.3	8,094	19.88
Transportation and storage	191.9	2,977	7.31
Accommodation and food service activities	183.1	1,678	4.12
Information and communication	1,279.5	390	0.96
Financial and insurance activities	2,632.1	531	1.30
Real estate activities	5,370.8	195	0.48
Others	110.2	8,903	21.87
Overall Productivity (GDP per worker)	404.1	40,708	100.00

Source: ADB Key Indicators

Indeed, some service subsectors are also among the lowest in labor productivity. In 2022, “other services” had the lowest labor productivity of PHP115.8 thousands per worker. Another service sector, transportation and storage, had the third lowest labor productivity, at PHP181.1 thousands per worker. The agricultural sector came in second lowest, with a labor productivity of PHP164.6 thousands. Except for the top six subsectors, all sectors’ productivity were less than the overall economy labor productivity.

In terms of employment share, manufacturing employed 8.3% of workers, more than twice the share of real estate, finance and insurance activities, and information and communication sectors combined. While these service subsectors are among the most productive, they account for a very small proportion of total employment. Meanwhile, the employment share of “other services,” which had the lowest labor productivity, was the second highest at 21.9%. Thus, there is some basis for economists’ fears that while services are absorbing more employment as it grows, the majority may be in lower productivity sectors (and likely lower-wage) jobs.

The difference in average productivity between “manufacturing” and “other services” is about PHP816 thousand. If workers are paid their average product, this would be a staggering loss of income for a manufacturing worker in the lower productivity “other services” sector. In reality, not all workers are paid the average productivity.

The 1985 Philippine Statistical Yearbook estimated the manufacturing sector employed 10% of the workforce. In 2022, this figure went down to 8%. Based on the 46.8 million workers in 2022, the drop of two percentage points would be equivalent to about 3.7 million workers that would have moved from manufacturing into other sectors. Of course, not all would have ended up in the “other services” sector, bearing the largest loss in productivity.

3. Possible Causes of Philippine Deindustrialization

Unattractive investment climate

For the Philippines, deindustrialization may have occurred as early as 1981–82, when the shares of industry and manufacturing GVA to the economy peaked. Since then, the share of industry has been on a flat trend while that of manufacturing is on a slow decline. Researchers speculate the poor investment environment of the economy for manufacturing investment, coupled with the political instability of the 1980s, are the main culprits that deterred investments.

In economic theory, capital formation, or investment, is a critical ingredient for growth and productivity. Yet on the expenditure side, the Philippine economy has usually been driven by consumption spending. In current prices (i.e., nominal terms), consumption spending averaged 73% of GDP while gross capital formation (investments) averaged 20.6% during the period from 2001–22.

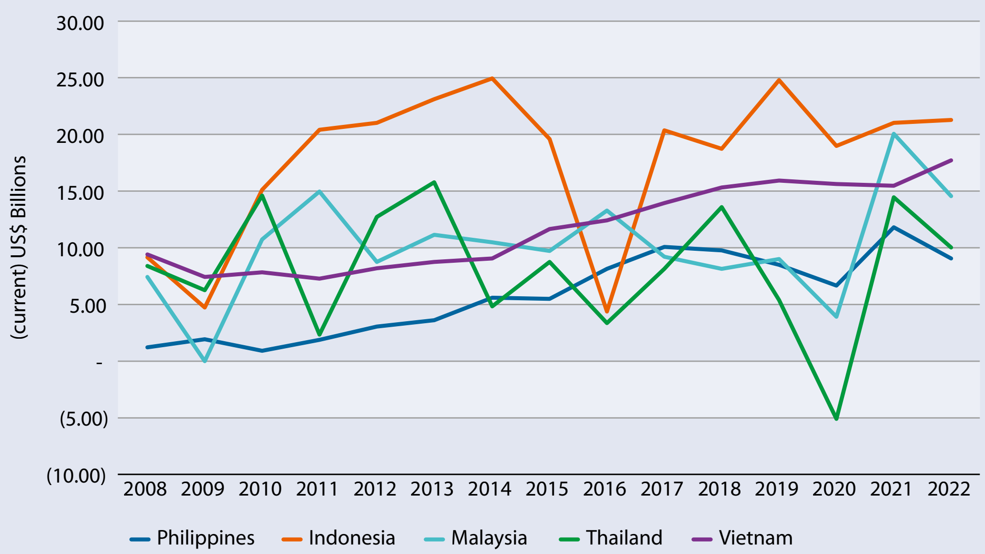
In a more global world, foreign investments are also critical because it offers the Philippines a chance to insert itself into global value chains. In the electronics sector for example, the location by Intel, Texas Instruments and other multinationals have enabled the Philippines to be a part of their respective global value chains.

The relatively unattractive investment environment likely was a factor for the low investment spending in the Philippines. The economy generally attracts less FDI than its ASEAN counterparts (see Figure 6). This is unfavorable because the Philippines is not a significant producer of technology, and therefore needs FDI for access to technology.

Poor infrastructure, which is a term used here to include factors like poor roads, bridges, ports, etc. which increase logistics costs, bureaucracy, high power rates (a frequent investor complaint),

FIGURE 6

COMPARATIVE FDI (IN CURRENT USD BILLIONS)



Source: World Bank Development Indicators corruption, and bureaucracy (including policy instability), has made the Philippines less appealing as an investment target compared to neighboring countries. Since the Philippines is dependent on imported technology, the lukewarm FDI also implies a slower technology influx.

The consequences of these are reflected in the country's poorer performance in the World Bank Ease of Doing Business ranking compared to major neighboring ASEAN countries Indonesia, Malaysia, Thailand, and Vietnam. These countries generally score better in the rankings as demonstrated in the table below.

TABLE 6

WORLD BANK EASE OF DOING BUSINESS RANKING AND SCORES

Country	2019 rank	Score				
		2015	2016	2017	2018	2019
Indonesia	73	62.11	64.66	66.87	68.18	69.58
Malaysia	12	78.61	78.27	78.77	81.33	81.47
Philippines	95	58.23	59.26	59.33	60.87	62.83
Singapore	2	84.89	85.44	85.57	85.84	86.20
Thailand	21	71.94	72.80	78.45	79.52	80.09
Vietnam	70	62.60	65.29	66.98	68.57	69.77

Note: Rank is from 1 to 190 with 1 being the best. Score is from 0 to 100 with 0 being worst.

While the political landscape has been more stable of late, the end of the first Marcos administration and for much of the Corazon Aquino administration, political instability arguably scared away foreign investors. During the appreciation of the Japanese Yen or endaka, which started in the 1970s but picked up speed in the 1980s, Japanese firms sought to move some of their manufacturing overseas, including the Philippines, to lower costs. But the instability that led eventually to Marcos' ouster in the peaceful 1986 EDSA[2] revolution likely scared many Japanese investors off. Unfortunately, after Corazon Aquino took over the reins of government, she had to contend with a series of failed military coups to unseat her, and further discouraged investor confidence.

Economic zones have been an important strategy employed to make up for the country's relatively unattractive investment environment. Economic zones are designated areas where locators can avail of fiscal and non-fiscal incentives. This strategy requires competing with other countries in providing incentives, often tax exemptions. Thus, it carries an opportunity cost of foregone revenue for the government.

On its website,[3] the Philippine Economic Zone Authority lists 419 economic zones as of April 2023, with the following breakdown: 78 manufacturing economic zones, 297 information technology parks and centers, 17 tourism export enterprises, 24 agro-industrial economic zones, and three medical tourism parks and centers.

The large number of information technology parks (especially relative to manufacturing) is striking.

2 EDSA, or Epifanio de los Santos avenue, is a major thoroughfare in Metro Manila that runs by two important military camps where the revolution that eventually overthrew Marcos Sr took place.

3 peza.gov.ph

However, information technology parks are easier to set up than industrial zones as even a floor of an office building could be designated as an information technology park. Undoubtedly, the disparity is also a reflection of the greater number of investors in the IT sector like business process outsourcing.

There were also historically other legal impediments to foreign investments. The Philippine constitution had limited foreign ownership also in several industries like utilities. Periodically, there had been calls to amend the constitution to remove these constraints, but these moves did not prosper politically. Recently the Public Service Act was amended to redefine the term "utility" and allow foreign equity in sectors formerly limited to Filipinos.

Import Liberalization and a More Open Economy

It has been noted above that the Philippines had pursued a trade liberalization path and undertook tariff reform in the 1980s, which was followed by its subsequent participation in the WTO, AFTA, and other trade agreements. Could the more open economy have contributed to deindustrialization through increased imported competition?

One example of this is the Philippine petroleum industry. Before 1998, the industry was dominated by the "Big Three" petroleum companies Caltex, Petron, and Shell, operating their respective oil refineries. But with the free entry of imported oil products, the market share of the three was eroded by the new players. In 1998, the industry was liberalized, and it spawned many new companies to set up shops and import refined petroleum products for sale. In the face of the imported competition, Caltex and Shell eventually closed their respective refineries, now importing all the fuel products they sell. Only Petron operates a refinery locally now.

To give context to the magnitude of the impact, in 1992, the petroleum and coal sector, with a value added of PHP32,313 million (constant 1985 prices), was the second largest manufacturing sector following the food sector, which had a value added of PHP66,595 million. The share of petroleum and coal products to total manufacturing value added was thus at 17.9% in 1992. By 2022, the share fell to just 2.7%.

The automotive industry could also be cited as another example. Today, only Toyota and Mitsubishi locally assemble some of the models offered in the Philippines. All other models, along with other automotive companies' vehicles, are imported, mostly from Thailand and Indonesia. Ford Philippines had shut down its local assembly operations in 2012 in favor of its other facilities in the region, including Thailand. In fact, this was the second time it shut down Philippine assembly operations, the first being in 1983, in the wake of the economic crisis discussed above. In press reports, Ford had cited the lack of economies of scale and a supply base as key reasons in its decision to end operations in the Philippines.

More recently, Honda Cars Philippines, Inc. (HCPI) ended its production operations in March 2020, now importing its vehicle products. On its webpage, it declared: "Honda considered efficient allocation and distribution of resources. As such, after consideration of optimization efforts in the production operations in Asia and Oceania region, Honda decided to close the manufacturing operations of HCPI."[4] Honda's sales had fallen to 23,924 and 20,338 in 2018 and 2019 respectively. The local Honda plant reportedly had a relatively small capacity of 15,000 units only, yet only

4 https://hondaphil.com/news/the-closure-of-automobile-production-in-the-philippines

produced 8,000 units in 2019.[5] The small Philippine automotive market meant low economies of scale, and probably was a key factor in Honda headquarters' decision.

Export Composition: High Technology and Service Exports and the Dutch disease

In its history, the Philippines has evolved from primarily exporting agricultural commodities (coconuts, sugar etc.) to garments, and then to electronics exports. Among merchandise exports, semiconductors still account for the bulk of Philippine merchandise exports.

This highlights a key difference between the electronics and automotive sectors: market size. Though the electronics are mainly used for testing and assembly, the components are exported back out to form part of electronic products that are then sold to the global market. In the automotive case, most of the vehicles were being assembled for the Philippine market. Given the relatively smaller size of the Philippine automotive market, it precluded the economies of scale important to automotive manufacturing.

However, some researchers like Balisacan and Hill [7] have characterized the Philippine semiconductor industry as being low value added. It is primarily engaged in the assembly, testing and packaging activities, and thus the import of semiconductors is also one of the largest imports of the Philippines.

On the service exports side, the phenomenon of the overseas Filipino workers continues today as remittances reached USD31.4 billion in 2021 and USD32.5 billion in 2022. In the early 1970s, Filipino construction workers started to work in the Middle East while Filipino seafarers started to also enter the global shipping manpower industry. Today Filipino seafarers make up a significant percentage of the global shipping manpower requirements. Waves of Filipino nurses, caregivers, IT, and household service workers have also made a name for themselves in the global workplace. Most, if not all, seek employment overseas because the compensation far exceeds what they would earn locally.

It should be noted that exporting manpower is not without its downside. Concerns have been raised about the social impact of parents going overseas for employment and leaving their children behind, usually with the grandparents or other relatives. The overseas worker phenomenon also contributed to the country's "brain drain," especially in the case of skilled workers. Their departure reduces the available labor supply locally. So far, the total fertility rate has been able to make up for the diaspora, but this also assumes that the economy can invest in its education and training sector to keep producing the workers of the next generation.

Meanwhile, the IT sector (including contact centers and business process outsourcing) is now catching up as an export driver, as revenues from IT and business process outsourcing (IT-BPO) reached USD29.5 billion already in 2021. Initially, many foreign companies, especially those in the USA, were attracted by the availability of young, educated and English-speaking Filipino workers. By setting up call centers or contact centers in the Philippines, they could off-shore their customer service operations to Filipino agents to handle calls from their clients.

But is the IT-BPO sector a long-term growth driver for the economy? There is currently concern whether the adoption of AI could displace employment in the IT-BPO sector. Technology adoption is typically difficult to forecast, so it is difficult to anticipate the full range of tasks that AI may

5 https://business.inquirer.net/291216/honda-ph-assembly-plant-closure-too-few-cars

eventually displace. There seems to be broad agreement that simple, repetitive tasks will likely be done in the future with AI. Some contact centers are exploring the use of AI agents to respond or filter client calls. More complicated questions are then left for human agents to handle.

There is indeed a risk that technology adoption may lead to reduction of employment in the future (whether services or manufacturing sector). This will happen if the cost of adopting the technology is less than the cost of labor (i.e., there are cost savings). The profit motive presumably precludes a firm from adopting the technology otherwise. If so, then the technology is efficiency-enhancing, and the savings in adopting the labor-saving technology can reduce prices of goods and services for the consumer.

Competition (both domestic and foreign) will likely compel firms to adopt labor saving technology; otherwise, the firm would be at a competitive disadvantage relative to those that adopt the technology. However, if firms in those industries have market power, it could also redound to increased profits.

In economic history, technological progress may also enhance worker productivity. For example, word processing and spreadsheets have increased productivity of office workers and has probably reduced the number of clerical staff employed today. Thus, while technology may displace some employment, it may enhance the work and productivity of other workers. This makes upgrading skills of workers even more critical so that they can employ the new tools and produce higher value-added output. Social safety nets may need to be in place to help displaced workers while retraining and those who have difficulty transitioning. This strengthens the motive for the Philippines (or any other economy) to improve its education system and, consequently, skills of its human resources. This paper will turn to the challenge regarding the education sector later.

However, it is a bit of a puzzle that the obstacles mentioned above that contributed to the relatively poor investment climate, did not prevent the country from attracting investors in the IT-BPO sector. Here, the young and relatively available English-speaking, college-educated workforce may have appealed to the investors, especially with the Philippines' affinity for Western (especially American) culture. This attraction may have outweighed the deficiencies posed by the country's poor infrastructure.

To address the poor infrastructure, the government offered "cyberparks" or "cyberzones" for IT firms locating there. These zones offered incentives to locators in the same way that the original export zones did to attract export-oriented firms to invest in the Philippines.

While labor attracted IT-BPO investors to the Philippines, it should be noted that it is not without its negative facet. In its Systematic Country Diagnostic of the Philippines, the World Bank [8] pointed to the country's labor market rigidities that diminished the attractiveness of labor. It mentioned that labor regulations made it difficult to hire and fire workers. This resulted in the practice of keeping many workers on a contractual basis rather than being made employees with security of tenure. It also cited Philippine minimum wages as being relatively high when compared to other countries and their labor productivity.

De Dios and Williamson had pointed out that the relative success of manpower (overseas workers) exports and the IT-BPO sector may be the Philippines' version of the "Dutch disease." The foreign currency earnings may have contributed to a stronger peso than otherwise, disadvantaging other export industries and benefiting instead imports, including imported competition. Because of the methodological difficulties of measuring over or undervaluation of the peso, De Dios and Williamson regard the issue of over- or under-valued exchange rate as a mixed one, with respect to deindustrialization.

They do point out though, that the phenomenon of the overseas workers picked up steam after the balance of payments crisis of 1982 (which they also point to as the onset of deindustrialization). Thus, the overseas worker diaspora might be the result of the deep economic recession after 1982 reducing employment opportunity in the Philippines, rather than a cause of deindustrialization.

Nevertheless, if it is argued that the drain of manpower and any appreciation of the Philippine peso due to manpower exports mitigated forces to restore industrialization. The same charges may also be levelled at the semiconductor and electronics exports. Admittedly the latter's imported content is relatively high and thus, net foreign currency inflow would have been smaller than from service or manpower exports.

Still, the semiconductor industry presents an example of success for the economic zone strategy. The major electronics company Intel first entered the country in 1974, locating in Makati City, the Philippines. It subsequently moved to an industrial park in the province of Cavite in 2002. Thus, it was surprising that it would exit so soon after moving to the new facility. High power and labor costs were cited in news reports as two of the factors that may have influenced the decision to leave. While Figure 7 suggests that the departure of Intel in 2009 was the likely culprit in the decline of the proportion of the economy's high technology exports, it also suggests that the industry has made up for Intel's departure.

Another major American chipmaker, Texas Instruments, entered the Philippines in 1979 and located in the Baguio economic zone, 250 km north of Manila. In contrast, Texas Instruments announced in 2007 that it would expand in an industrial zone in the Clark City, Pampanga area, about 70 km north of Manila. The Philippines competed with China to lure the investment.

The World Bank publishes a set of indicators called the World Development Indicators for most nations. Included in this database are the values of "high-technology exports" and its share to the respective nation's manufactured exports. In the database, "high-technology exports" are defined as products with high R&D intensity, such as in aerospace, computers, pharmaceuticals, scientific instruments, and electrical machinery.

While the value of high-tech exports of the Philippines is not relatively high, the Philippines' high-tech exports as a percentage of manufactured exports are among the highest in the last five years in comparison to major ASEAN member states and even China (see Tables 7 and 8 and Figure 7 below). However, the percentage was higher in the past, and the economy is only recovering to those levels in the early years of the millennium.

The significant dip in Figure 7 around 2009 is likely the result of American chipmaker Intel pulling out its operations from the Philippines. Despite its pullout, semiconductors remain the top manufactured exports of the country.

TABLE 7

HIGH-TECHNOLOGY EXPORTS (% OF MANUFACTURED EXPORTS)

	2017	2018	2019	2020	2021
East Asia & Pacific	33.8	34.6	34.1	35.9	33.0
China	30.9	31.5	30.8	31.3	30.0
Indonesia	8.4	8.2	8.1	8.4	7.2
Malaysia	51.1	53.2	51.6	53.8	51.7
Philippines	60.3	61.3	62.2	67.0	64.2
Singapore	53.1	51.6	51.8	55.3	N/A
Thailand	25.1	23.7	23.5	27.7	N/A
Vietnam	41.7	40.8	40.4	41.7	N/A

Source: World Bank World Development Indicators
https://databank.worldbank.org/source/world-development-indicators/preview/on

TABLE 8

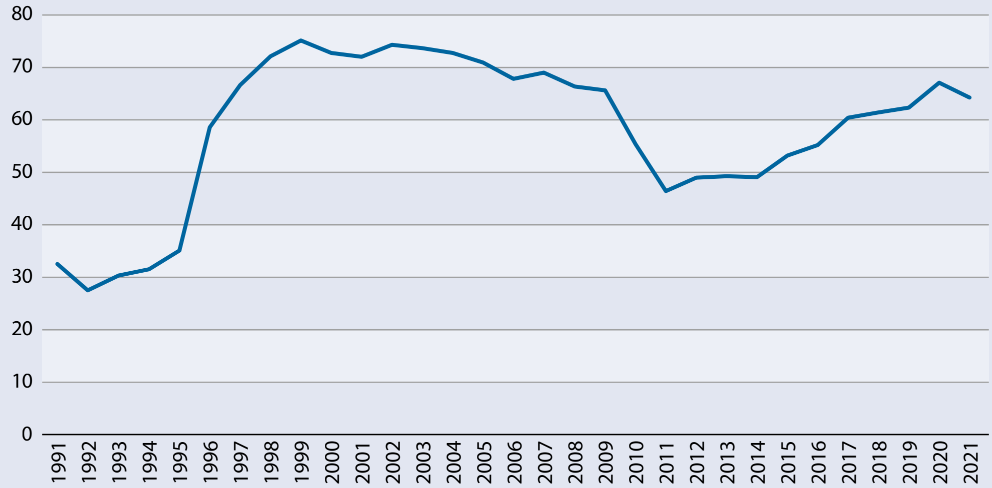
HIGH-TECHNOLOGY EXPORTS (CURRENT USD BILLIONS)

	2017	2018	2019	2020	2021
China	654.16	731.32	715.30	754.46	942.31
Indonesia	5.97	6.38	6.28	6.41	7.49
Malaysia	74.12	90.50	86.90	92.10	108.68
Philippines	33.50	33.90	35.83	34.90	38.19
Singapore	146.75	154.87	150.03	159.93	N/A
Thailand	43.93	44.75	40.14	45.84	N/A
Vietnam	74.11	82.61	90.43	101.53	N/A

Source: World Bank World Development Indicators
https://databank.worldbank.org/source/world-development-indicators/preview/on

FIGURE 7

HIGH-TECHNOLOGY EXPORTS (% OF MANUFACTURED EXPORTS)



Source: World Bank Development Indicators

Nevertheless, the semiconductor industry can be regarded as a success since it continues to account for the bulk of the country's exports. President of the Semiconductor Industries of the Philippines Dan Lachica points to high power, labor, and logistics costs as challenges the industry still faces today. Meanwhile, the sector seems unhappy about the recently passed Corporate Recovery and Tax Incentives for Enterprises Act (CREATE), which, although it lowered corporate income tax rates, also rationalized fiscal incentives.

4. Policy Response and Recommendations

If the relatively poor infrastructure has been the obstacle to more investments that could lead to a more prosperous industrial sector, then it should be remedied. Even the government's Philippine Development Plan (PDP) 2023–2028 [9] admitted "difficulty in attracting foreign investments, restrictions to foreign equity, and lack of advanced science, technology, and engineering skills" hampered the development of industrialization.[6]

Previous administrations have proclaimed improving infrastructure to be their administration's focus. It will continue to be a priority for many more future administrations as the country has a long way to go to catch up in infrastructure, especially as other countries are continuously investing in their own infrastructure.

The previous Duterte administration had coined the slogan "Build, build, build" to describe its infrastructure building program, but the COVID-19 pandemic was an unforeseen roadblock for the administration's plans.

To give the government credit, major infrastructure projects building subways, train stations, roads, ports, and airports are underway to alleviate the infamous congestion in the various modes of transportation. All of these have contributed to higher logistics cost of doing business in the Philippines.

Regarding barriers to foreign equity participation and ownership of land, on several occasions in the past, the idea of amending the constitution to allow 100% foreign ownership of businesses in sectors of the economy still closed to foreigners had been floated. Politically though, the momentum had never progressed enough to convene a body to amend the constitution. There had been resistance to tampering with the constitution so that eventually proposals were narrowed to amending only the economic provisions of the constitution. However, even this "watered down" strategy did not prosper. Nonetheless, there remain disagreements in policy discussions whether some relaxations like allowing foreign ownership of land would substantially spur investments.

Some headway was achieved at least with the amending of the Public Service Act. The law originally limited the ownership of public utilities to Filipinos. The amendment redefined the definition of a public utility so that foreign ownership in certain sectors of infrastructure, e.g., power and telecommunications, could be allowed. The Retail Trade Liberalization Law was also recently amended to lower the minimum required equity for foreigners to invest in the industry.

The Duterte administration had also passed Republic Act (RA) 11534 or CREATE on 26 March 2021. The law reduced corporate income tax from 30% to a range of 25% or 20% depending on the corporation. It also rationalized other fiscal incentives to attract more investments (domestic and foreign).

Given the relative success of the IT-BPO sector and the important role of human capital in it, it behooves the country to improve its education sector. A more educated workforce will benefit other sectors as well, though the skill sets for IT and services work will differ from those required for the shop floor in the electronics and other manufacturing industries.

6 National Economic Development Authority, Philippine Development Plan 2023-2028, p. 141.

Further opening the economy to FDI can be a double-edged sword. It can also increase the competition that local firms face. However, the Philippines is already a relatively open economy as a result of deliberate policies in the past. It already faces import competition in many products. But in the case of FDI, the activity will take place in the economy, albeit possibly under foreign-owned firms. In contrast, when competition from imported goods hurts domestic industries (possibly driving local firms out of business in extreme cases), the economic activity takes place abroad. Moreover, the products of firms in the export processing zones are likely to be exported abroad anyway.

In today's global economic environment, it is more difficult to protect domestic firms or industries, lest the country run afoul of the WTO and its other trade commitments. There are some supports that may be less scrutinized, such as lowering energy taxes. Since high electricity prices are a common complaint of investors and domestic businesses, the government may consider reducing taxes on electricity and other fuels. There is no such thing as a free lunch though, and we must weigh the trade-off in terms of lower government tax revenues, which are also necessary for other development goals. For example, the government needs revenue to finance investments that improve the inadequate national infrastructure.

Certainly, consumers also benefit from lower prices and greater choice from imported competition. This is the textbook argument for free markets and open trade, which motivated the opening of the economy in the past.

There has been a long-standing public concern over the poor performance of Filipino students on international assessment examinations, including in subjects like math, science, and reading. In 2018, the Philippines participated in the Program for International Standard Assessment for the first time. Students scored last in reading and second to the last in mathematics [10]. After a long absence, the Philippines also participated in the 2019 Trends in International Mathematics Science Study (which tested grade four students), where the Philippines scored last among 64 countries in both science and math.[7]

Pacqueo and Orbeta found that while the attendance rate in education is relatively high, even compared to wealthier economies, the quality of education in the Philippines is not up to par. The culprit may lie in the lack of investment in education. They present data (Figure 2.7 on page 9) showing that the Philippine government spends relatively less on education as a percentage of GDP than ASEAN neighbors like Indonesia, Vietnam, Thailand, Malaysia.

In 2013, RA10533 or the Enhanced Basic Education Act of 2013 was passed. With this, the Department of Education implement a K-12 basic education program, which added up to two years of school for most Filipino students to align with global education standards. The education program includes a "technical vocational livelihood" track in secondary school that would allow students to choose a track and acquire an employer-certified skill or trade.

As the PDP quote cited earlier implied, even at the tertiary level of education, the country needs to invest in expanding and upgrading the quality of education, especially in the areas of engineering, science, and technology. Even as early as 1987, a World Bank report noted that the country at that time had one of the lowest ratios of scientists and engineers per million population [3]. It cited that the ratio was only one-fifth of the ROK's, one half of Singapore's, and four-fifths of Malaysia's.

7 Orbeta and Pacqueo 2022 p. 1

The report pointed out the need to review the educational system in this regard.

The following table is presented to summarize the foregoing discussion and match the issues with the policy response.

TABLE 9

ISSUES POLICY ACTIONS

Issue	Nature	Response
Unfavorable investment climate	Poor infrastructure leads to high cost of doing business. Perceived lack of policy stability. Bureaucracy and corruption add to cost of doing business.	Compensate disadvantages with incentives via economic zones Amended Foreign Investments Act, Retail Trade Liberalization Act, and the Public Service Act Passed Ease of Doing Business Act (2018) Passed CREATE (2021)
Trade liberalization	Import competition displaced some domestic manufacturing	
Lack of skilled workers	Early World Bank reports and current PDP admit the economy lacks skilled workers	Department of Education had adopted in 2012 the K-12 basic education program to align with international education standards.
Unreliable electric power supply, uncompetitive power rates, and road and airport congestion.		Passed Electric Power Industry Restructuring Act (EPIRA)

Servicification of the economy and growth prospects

The term servicification has become popular to refer to the increasing use by manufacturing firms of services. With the advent of AI and the Fourth Industrial Revolution (FIRE), it is expected that manufacturing would use more services in its operations. On the other hand, AI and FIRE also pose a threat for possible job losses from the adoption of labor-saving technology. At the same time, not adopting these technologies may put a firm at a disadvantage vis-à-vis firms (possibly foreign or in other countries) that do adopt them.

Many businesses have had to adapt, giving rise to some opportunity for synergy between the service and manufacturing sectors. For example, businesses started to own websites, and today many of them allow purchases online or are present on online platforms (e.g., Lazada, Grab, Amazon etc.). Another example of an avenue for synergy between manufacturing (as well as other sectors) and services is the introduction of digital services for marketing and payment. This trend was accelerated by the COVID-19 pandemic which forced businesses to resort to contactless payment and transactions whenever possible.

However, the PDP 2023–2028 assessed that Philippine business, especially micro, small, and medium enterprises, have low levels of technological utilization and are not likely ready for FIRE. It cited the cost of technologies, and lack of infrastructure, skilled employees, and management knowledge as obstacles. This highlights again the need for investments in infrastructure and human capital.

Recently, the World Bank released its East Asia and Pacific Update October 2023: Services for Development [11]. It suggested that services can be a key contributor to aggregate productivity growth. The report recognized that while productivity in certain services, such as in business services, finance, and communication is higher than in manufacturing, most service jobs are still low-skill, low-productivity jobs like retail trade and transportation. This is consistent with our analysis in section 2.1.

The report also cited evidence that service firms that have adopted digital technologies have higher total factor productivity and value added, as well as higher wages, even as employment declines. In addition, the report cited how the adoption of ICT, financial, and business services may be correlated with higher labor productivity in manufacturing and agriculture [11].

Modern society has different demand structure for goods and services. Households now consume more services, especially IT-related services (e.g., communications, mobile banking, internet, etc.) The World Bank report noted evidence that affluent households in the Philippines consume a greater share of expenditures on services, including health, education, and communication. Thus, as income increases, demand for services is expected to increase.

With the phenomenon of servicification of industry and the ascendency of its service sector for several decades already, can there be a resurgence of manufacturing sector? As the data for Singapore in Figure 5 suggests, it is possible for a economy to witness multiple peaks of manufacturing gross value share to GDP. Therefore, it is not impossible for manufacturing to enter a renaissance period in the Philippines' case.

How can the Philippines nurture the potential for another manufacturing industry?

As argued above, the lack of a conducive investment environment had limited the country's ability to attract FDI, especially when compared to neighboring countries. It is hoped that the policy actions summarized in Table 9 above, if implemented effectively, will address the main negative factors in the Philippines' investment environment. Then there is a chance for manufacturing to recover as manufacturing tends to be capital intensive and it is easier for local firms to participate in global value chains through investments by the mother companies.

Besides capital, the other input to manufacturing is labor. As cited above, there are shortcomings in the Philippine education sector. As technology advances, all industries, including manufacturing, will adopt higher levels of technology. This will require the Philippine labor force to upgrade its skills and capabilities. Ironically, improving the skills of the labor force may take longer than bringing in capital. While reforms have been introduced in the Philippine education sector, they will take time to bear fruit.

Through the Department of Trade and Industry (DTI), the Philippine government announced that it will actively pursue industrial policy. In 2016, the DTI [12], unveiled its Manufacturing Resurgence Program. This evolved into the Comprehensive National Industrial Strategy (CNIS), which identified priority-level industries: manufacturing, tourism, infrastructure and logistics, agribusiness, and IT and business process management (IT-BPM).

The CNIS was further enhanced to become the Inclusive Innovation Industrial Strategy as the economy recognized the rise of the AI and FIRE. Their priority industries: electrical and electronics, aerospace parts, automotive and auto parts, chemicals, shipbuilding, tourism, furniture, garments, creative industries, tool and die making, IT-BPM, e-commerce, agribusiness, construction, transport, and logistics. It is a longer list because manufacturing in the CNIS was disaggregated into specific sectors.

In pursuing these industrial policies, the DTI recognized the need to create a better environment for investment and to develop the human resources for an industrial world characterized by ever-increasing technology and innovation.

5. Conclusions

By the measure of the share of manufacturing value added in the economy, which peaked in 1982 and has been declining since, it can be said that the Philippines experienced premature deindustrialization. The share of industry and manufacturing GVA to GDP also revealed the same pattern. By both measures, deindustrialization commenced around 1982. Meanwhile, the share of services in GDP began to rise around that time.

Like many developing economies, the Philippines pursued an ISI strategy with tariff protection after the Second World War. This evolved into an export-oriented strategy in the 1970s. The country's external debt also ballooned in the 1970s, setting the stage for a balance of payments crisis in the early 1980s. Political developments, namely the assassination of Senator Benigno Aquino Jr., aggravated the situation by triggering capital flight, deepening the foreign exchange crisis, and creating political instability. Investments were deterred, slowing to a trickle, and the economy slipped into a deep recession.

The removal of President Marcos Sr. and his replacement by President Corazon Aquino did not immediately change things for the better. Nor was political stability immediate, as several failed military coups were staged during her administration. Some measure of political normalcy returned with President Fidel Ramos who pursued a policy of deregulation, privatization, and liberalization. This brought back investors, but the return was hampered by the electric power crisis early in his administration (and later, the Southeast Asian crisis). Unfortunately, the Philippines missed out on a wave of foreign investments that went to neighboring countries such as Thailand, Indonesia, and, of course, China.

The electronics industry seems to have been the exception to deindustrialization. Some major semiconductor companies entered the country in the 1970s; economic zones likely played a role in attracting other multinational electronics companies to locate in the country. While one major company subsequently left the country in 2009, a significant number of other companies remained. Today, electronics exports remain the Philippines' leading merchandise export.

Meanwhile, remittances from overseas Filipino workers have expanded and now rival electronics exports. In terms of value added, remittances may be even more significant, as there is very little imported content. The electronics sector still mainly operates testing and assembly, and therefore a significant portion of the value added is imported. Currently, revenue from the contact center BPO has become a third export pillar. Another advantage is that since operations are set up inside the Philippines, the social costs associated with overseas workers leaving their families behind are avoided; moreover, by staying in the country, the talent is retained.

It can be argued that the economy's pivot towards services, such as overseas workers and information and technology services, is a reflection of a comparative advantage: the young, educated and English-proficient workforce. The availability of labor may have been due to a lack of employment opportunities that an expanded manufacturing and industrial base could have provided. Many workers who go abroad cite higher wages and lack of opportunities back home as factors in their decision.

But de Dios and Williamson suggested that the relative success of the services exports may have created a "Dutch disease" for the economy by competing with manufacturing for workers. The foreign exchange inflows may have also contributed to a stronger currency that handicapped a

Philippine manufacturing sector dependent on imported raw materials and capital inputs. Both forces were likely at play. This researcher agrees with de Dios and Williamson in their assessment that the political and economic crisis towards the end of the Marcos Sr. administration led to a series of unfortunate consequences, precipitating capital and investor flight from the country which the Philippines was not able to immediately shake off.

For the Philippines, the risk of deindustrialization appears to have been mitigated somewhat as the IT-BPO sector has grown to be a key driver of the economy, along with remittances from overseas workers. It is important to remember that ultimately, these phenomena are the result of market forces. Workers were not forced to go abroad but chose to due to higher salaries. Firms that outsourced or offshored their operations to the Philippines did so because of the profit motive, partly due to labor availability. In a similar vein, manufacturing firms did not expand or locate to the Philippines because costs of doing business were uncompetitive. It could be argued, then, that the view illustrating the service sector competing labor away from manufacturing is an incomplete one. The service sector may have simply taken some of the excess labor left behind in manufacturing and deindustrialization.

With the rise of the digital economy and increased demand for IT services, this sector promises growth. The pandemic gave e-commerce a further boost as community quarantines and lockdowns shifted work and consumer spending online.

The World Bank report [11] suggests that there may be synergies between services (at least some sub-sectors and digital technologies), manufacturing and industry. Perhaps the way forward is how to facilitate such synergies, starting with the adoption of appropriate digital technologies. With the Fourth Industrial Revolution and AI descending on the industrial horizon, there may be natural opportunities for synergies.

In the outline of the government's Philippine Development Plan 2023–2028 [13], one of the key transformation strategies for the economy is to "Revitalize Industry." It speaks of "servicification or embedding services into manufacturing to add greater value to local products."

The ultimate bottleneck, however, may lie in the labor force. The Philippines must invest in improving its basic and technical education in order to supply the necessary skilled workers. Reforms have been instituted in the country's education system, but this remains a long-term endeavor.

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SRI LANKA

Executive Summary

This comprehensive report examines the economic evolution of the Democratic Socialist Republic of Sri Lanka, focusing on historical backgrounds, policy shifts, and the contemporary challenges faced.

The report begins with an overview of Sri Lanka's geographical and historical context, emphasizing the evolution of its economy from an agrarian base to a plantation economy during colonial times. Post-independence, the nation underwent phases of import substitution policies and subsequent economic liberalization in 1977. The civil conflict (1983–2009) diverted resources, leading to regional economic disparities. Post conflict, the nation embarked on postwar reconstruction and economic recovery efforts.

The report explains into the concept of premature deindustrialization, highlighting its occurrence in developing countries, and its potential impact on development pathways. It examines Sri Lanka's economic policies since 1977, identifying a shift towards reinforcing state influence post-2005, resulting in challenges such as an unfavorable balance of payment (BOP) and escalating national debt. The report suggests a link between the shrinking economy since 2022 and unfavorable conditions for industrial growth.

To address the risk of premature deindustrialization, the report proposes short-term and medium- to long-term policy recommendations. Short-term measures include improving energy security, establishing investment promotion agencies, and encouraging foreign and local investments. Medium- to long-term strategies focus on creating a robust industrial policy, promoting eco-industrial parks, attracting foreign investment for technology intensity, expanding export markets, and enhancing human capital.

Despite challenges in identifying clear trends of premature deindustrialization, the report acknowledges the impact of the COVID-19 pandemic on Sri Lanka's economy, particularly its industrial sector. The deepest economic contraction since independence, driven by an unprecedented crisis and compounded by domestic and global challenges. The textile and apparel industry faced challenges, leading to reduced exports and factory relocation. However, industries relying on local resources showed resilience.

Looking ahead, the report emphasizes the need for strategic government actions and policies to navigate challenges and leverage opportunities arising from deindustrialization. Proactive measures include formulating and implementing policies supporting a diversified and robust industrial base, aligning with technological advancements, promoting skill development, and embracing automation to counter premature deindustrialization and shape a resilient economic future for Sri Lanka.

1. Economic Growth Background

1.1 Economic overview analysis

The Democratic Socialist Republic of Sri Lanka is an island republic lying in the Indian Ocean off the southeastern tip of the Indian subcontinent. The Arabian Sea lies to the west, the Bay of Bengal to the northeast, and the Indian Ocean to the south. The area of Sri Lanka is 65,610 km^2. The island stretches over 440 km from north to south and 220 km from east to west. Colombo, situated on the western coast, is the largest city and the commercial capital of Sri Lanka. The administrative capital is Sri Jayewardenepura (Kotte), located about 16 km east of Colombo. The population of Sri Lanka was estimated at 22.18 million as of the 2021 census. The major economic sectors in Sri Lanka are industrial, agriculture and service sectors.

The ancient economy of Sri Lanka was predominantly based on agriculture, with a specific focus on rice cultivation. The strategic location of Sri Lanka in the Indian Ocean made it a hub for international trade. During the Colonial Era (1505–1948), Sri Lanka's colonial experience fundamentally oriented its economy towards exporting commercial crops to satisfy the demand in European markets. The Portuguese initiated the colonial economy by trading cinnamon with European markets in the early 1500s. The Dutch expanded coastal crop trading in the 1700s, especially arecanut exports using South Asian trade networks. The British dramatically transformed Sri Lanka into a plantation economy exporting coffee then tea to the British Empire in the 1800s. This created a trade dependency and shifted land to monoculture production for export. By independence in 1948, Sri Lanka's economy centered on exporting crops from British-developed plantations at the expense of native economic and social systems. In the post-independence period, Sri Lanka adopted import substitution policies, aiming to reduce reliance on foreign goods by promoting domestic industries. The government implemented centralized economic planning, emphasizing social welfare and public sector expansion. Industries such as textiles and steel were nationalized during this period.

In 1977, Sri Lanka began a significant economic liberalization process, signaling a clear departure from years of protective policies (Rajapatirana 1991, Cuthbertson and Athukorala 1991). The reforms floated the currency, slashed trade restrictions and taxes, welcomed foreign investment, and privatized state enterprises. Despite some policy reversals, the market-oriented 1977 reforms broadly transformed Sri Lanka's economic policy in a more open direction that persists today.

During the period of 1983–2009, The civil conflict had a profound and lasting impact on Sri Lanka's economy, beyond just immediate costs. The civil conflict resulted in significant military expenditures, diverting resources away from development projects. This strained the overall economy and led to a focus on security-related expenditures. The conflict exacerbated regional economic disparities, with certain areas facing greater challenges due to the conflict's impact on infrastructure and economic activities.

After the end of the civil conflict in 2009, Sri Lanka embarked on a path of postwar reconstruction. North and East Provinces especially benefited. Efforts were made to rebuild infrastructure, including roads, bridges, and ports, to stimulate economic recovery. The government sought to attract foreign direct investment (FDI) by creating a more favorable investment climate. Special Economic Zones were established to encourage foreign businesses to set up operations in Sri Lanka.

In recent years, Sri Lanka has faced economic challenges, including high levels of public debt, trade imbalances, and inflation. These challenges have led to the need for economic reforms to address structural issues. COVID-19 severely impacted the tourism sector and export earnings since 2020, further straining already vulnerable macroeconomic conditions. Financial crises prompted turning to the support from the IMF. The government implemented measures to mitigate the pandemic's economic effects.

1.2 Background statistics on economic and labor productivity

1.2.1 Annual Gross Domestic Product (GDP)

According to the annual reports of the Central Bank of Sri Lanka, the annual gross domestic product at the constant market price for the recent 8 years (considering 2015 as the base year) are given below in Table 1.

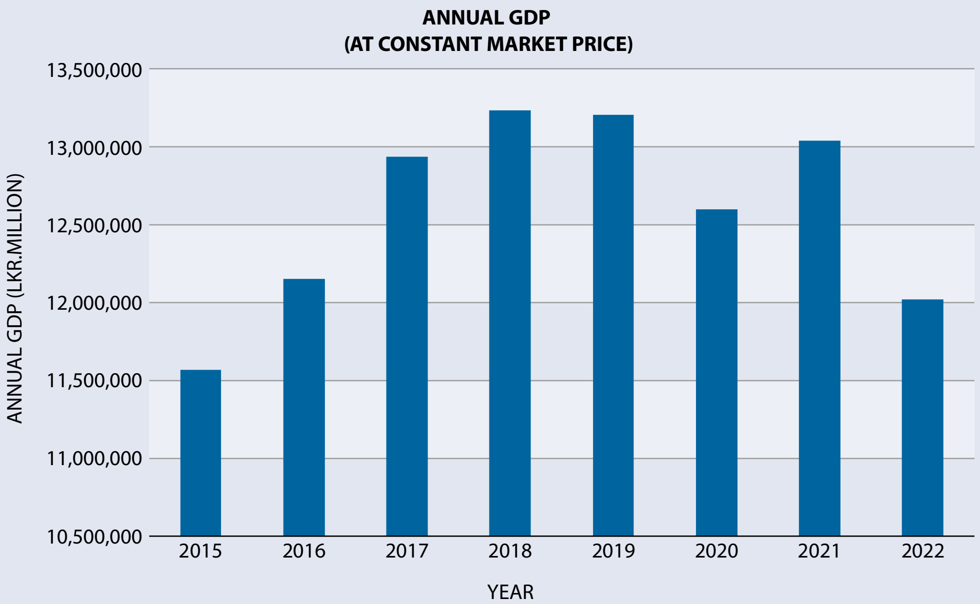
TABLE 1

GROSS DOMESTIC PRODUCT FROM 2015-2022 SRI LANKA

Year	Annual Gross Domestic Product at constant market price (LKR, millions)
2015	11,566,987
2016	12,151,539
2017	12,936,612
2018	13,235,458
2019	13,206,276
2020	12,595,550
2021	13,037,934
2022	12,017,849

FIGURE 1

ANNUAL GROSS DOMESTIC PRODUCT FROM 2015-2022



The GDP in Sri Lanka at constant market price has been fluctuating since 2018. In the year 2022, the annual GDP at constant price, declined to LKR12,017,849.00 million from LKR13,037,934.00 million which was recorded in the year of 2021. The annual GDP for 2021 at constant price has increased up to LKR13,037,934.00 million from LKR12,595,550.00 million which was recorded in the year of 2020. However, in the year 2020 the GDP level reduced up to the above said level from LKR13,206,276.00 million recorded in the year of 2019. The GDP for 2018 was documented at LKR13,235,458.00 million surpassing the figure recorded in 2019. In 2017, the annual GDP has increased up to LKR12,936,612.00 million from LKR12,151,539.00 million which was recorded in 2016. In 2015, the annual GDP was recorded as LKR11,566,987.00 million. Those fluctuations signify the instability of the country's economy and hence the lack of possibilities for the trend analysis and reasonable predictions.

1.2.2 Annual GDP Growth Rate

Table 2. displays the annual GDP growth rate at constant prices for Sri Lanka from 2015 to 2022.

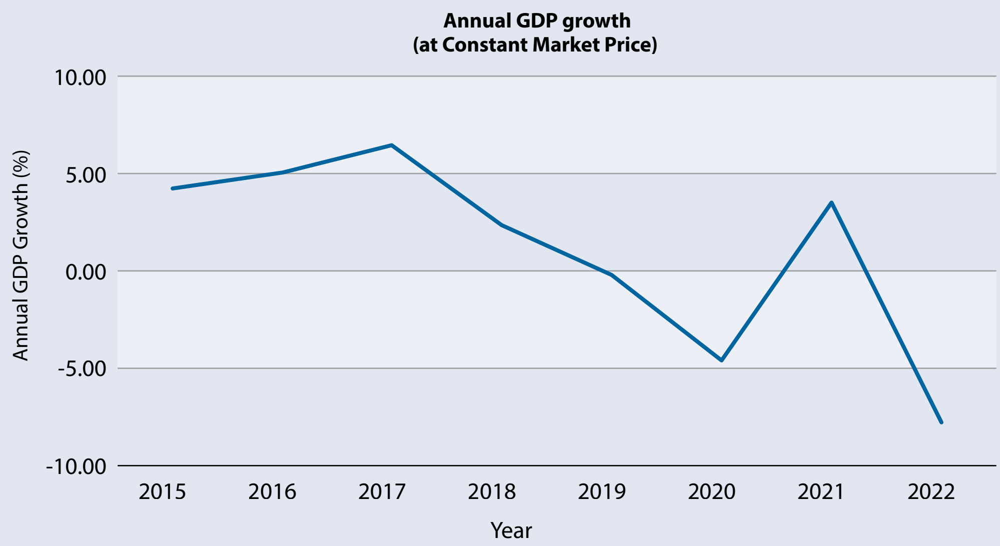
TABLE 2

ANNUAL GDP GROWTH (%) FROM 2015-2022 IN SRI LANKA

Year	Annual GDP growth (at Constant Price) (%)
2015	4.20
2016	5.1
2017	6.5
2018	2.3
2019	(0.2)
2020	(4.6)
2021	3.5
2022	(7.8)

FIGURE 2

ANNUAL GDP GROWTH (%) FROM 2015-2022



During the observed period of 2015–22; the highest annual GDP growth rate was recorded in 2017 while the lowest was 2022. The economic growth sharply fell by 7.8% in 2022 compared to the 3.5% growth witnessed in 2021.

1.2.3 Annual GDP Per Capita

GDP per capita is the sum of gross value added by all resident producers in the economy plus any product taxes (less subsidies) not included in the valuation of output, divided by mid-year population. Growth is calculated from constant price GDP data in local currency. Sustained economic growth increases average incomes and is strongly linked to poverty reduction. GDP per capita provides a basic measure of the value of output per person, which is an indirect indicator of per capita income. Growth in GDP and GDP per capita are considered as broad measures of economic growth.

1.3 Per capita GDP Growth by Sector

Per capita GDP growth by sector is an economic metric that breaks down a country's economic output per person in the specific sectors [2] [3]. Per capita GDP growth by major economic sectors in Sri Lanka are given below in Table 3.

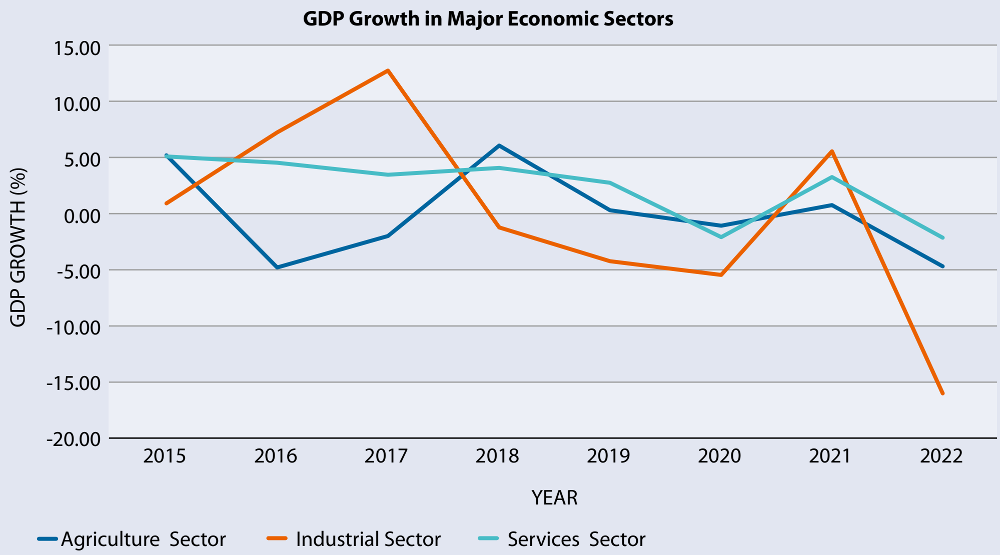
TABLE 3

PER CAPITA GDP GROWTH BY MAJOR ECONOMIC SECTORS IN SRI LANKA

Sector	Unit	2015	2016	2017	2018	2019	2020	2021	2022
Industrial sector	%	1.1	7.4	13.0	(1.1)	(4.1)	(5.3)	5.7	(16.0)
Service sector	%	5.3	4.7	3.6	4.3	2.9	(1.9)	3.5	(2.0)
Agriculture Sector	%	5.4	(4.7)	(1.8)	6.3	0.5	(0.9)	0.9	(4.6)

FIGURE 3

GROWTH OF PER CAPITA GDP BY MAJOR ECONOMIC SECTORS IN SRI LANKA



Agriculture sector experienced a negative growth in 2016, 2017, 2020 and 2022, and positive growth in 2018, 2019, and 2021. Overall, agriculture seems to have experienced both positive and negative growth over the years, with some volatility. Industry had positive growth in all years except for 2018, 2019, 2020 and 2022 when it experienced negative growth. The most significant positive growth occurred in 2017 and 2021 with growth rates of 13% and 5.7%, respectively. The negative growth in 2018, 2019, 2020 and 2022 suggests periods of contraction in the industrial sector. Services consistently had positive growth in all years, with varying rates. The growth rates in Services are generally lower compared to Industry, but the service sector shows resilience with positive growth even in challenging years like 2020. The highest growth in Services occurred in 2016, with a rate of 4.7%. In summary, agriculture has shown mixed growth, industry experienced both positive and negative growth with some volatility, and the services demonstrated a consistent positive growth.

1.4 Agriculture/ Manufacturing/ Services GDP shares and Growth rates in Value added term

1.4.1 Annual GDP in Agriculture Sector

Agriculture is one of the main contributors to Sri Lanka's economy due to being the main livelihood of the majority of the population. However, the agricultural sector was the least contributing subdivision of the Sri Lankan economy. The importance of agriculture in the economy of Sri Lanka is measured as the value added of the agricultural sector. Table 4. below shows the annual GDP fluctuations in the agriculture sector Sri Lanka as gross value-added terms.

In 2022, the agriculture sector's annual GDP declined to LKR906,505.00 million from the 2021 recorded figure of LKR949,929.00 million. However, in 2020, the GDP level was LKR941,046.00 million. The annual GDP in the agriculture sector for 2019 was documented at LKR949,582.00 million. In 2018, it increased up to LKR945,292.00 million, while 2017 marked the lowest point in the 2015–22 period at LKR889,557.00 million. In 2016, the annual GDP in the agriculture sector decreased to LKR906,100.00 million from the 2015 recorded figure of LKR950,452.00 million.

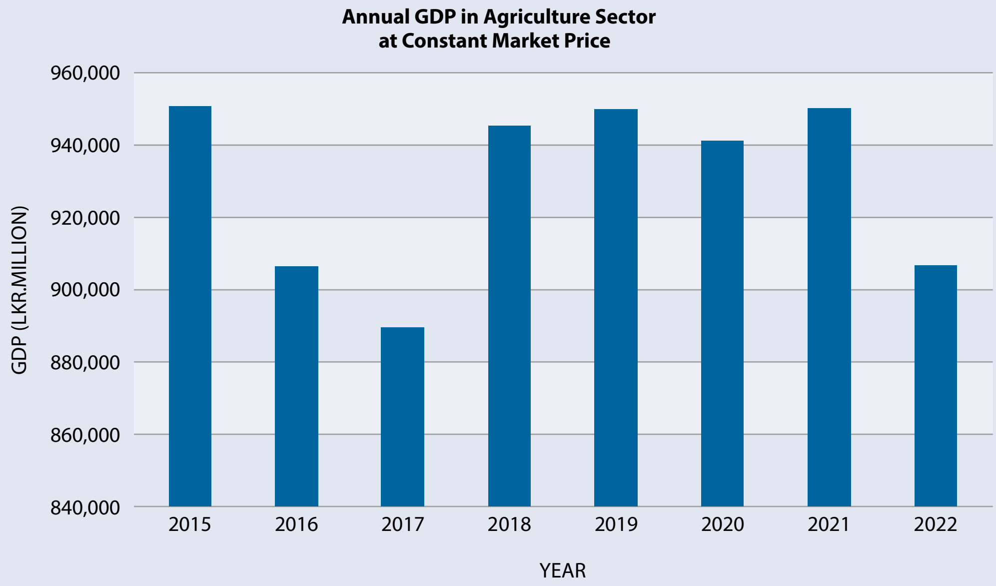
TABLE 4

ANNUAL GDP IN THE AGRICULTURE SECTOR

Year	GDP at Constant Market Price (LKR, millions)
2015	950,452
2016	906,100
2017	889,557
2018	945,292
2019	949,582
2020	941,046
2021	949,929
2022	906,505

FIGURE 4

ANNUAL GDP IN THE AGRICULTURE SECTOR (GROSS VALUE -ADDED TERM)



1.4.2 Annual GDP in the Industrial Sector

Contributing to more than 30% of Sri Lanka's entire economic output was the industrial sector, As stated by the Central Bank of Sri Lanka, the largest proportion of the industrial sector was manufacturing businesses, which accounted for more than 17% of the segment's entire output. Apart from that, the construction industry also had a notable footprint in the industrial sector and mining, or electricity had only a minor impact on the economy. Table 5. below shows the annual GDP fluctuations in the industrial sector in Sri Lanka as gross value-added terms.

TABLE 5

ANNUAL GDP FLUCTUATIONS IN THE INDUSTRIAL SECTOR SRI LANKA

Year	Industrial Sector GDP at Constant Market Price (LKR, millions)
2015	3,416,358
2016	3,670,106
2017	4,145,813
2018	4,101,467
2019	3,933,728
2020	3,724,566
2021	3,937,880
2022	3,309,764

FIGURE 5

ANNUAL GDP FLUCTUATIONS IN THE INDUSTRIAL SECTOR SRI LANKA IN GROSS VALUE -ADDED TERM

During the timeframe from 2015 to 2022, the industrial sector achieved its peak GDP level in 2017, with 2022 marking the lowest GDP within this period. However, the GDP growth in the industrial sector declined after 2017 and experienced a subsequent increase in 2021. According to the "News Release of National Accounts Estimates of Sri Lanka 2021" an article published by the Department of Census and Statistics Sri Lanka, the two main manufacturing industries of "manufacture of textiles, wearing apparel and leather related products" and "manufacture of food, beverages and tobacco products' have reported significant expansions on their activities during the year of 2021.

1.4.3 Annual GDP in the Service Sector (Gross Value-Added Term)

Contributing to more than 56% of Sri Lanka's entire economic output was the service sector, as stated by the Central Bank of Sri Lanka. The tourism, banking, finance, and retail trade sectors are the major components of the service sector. Table 6. below shows the annual GDP fluctuations in the service sector in Sri Lanka as gross value-added terms.

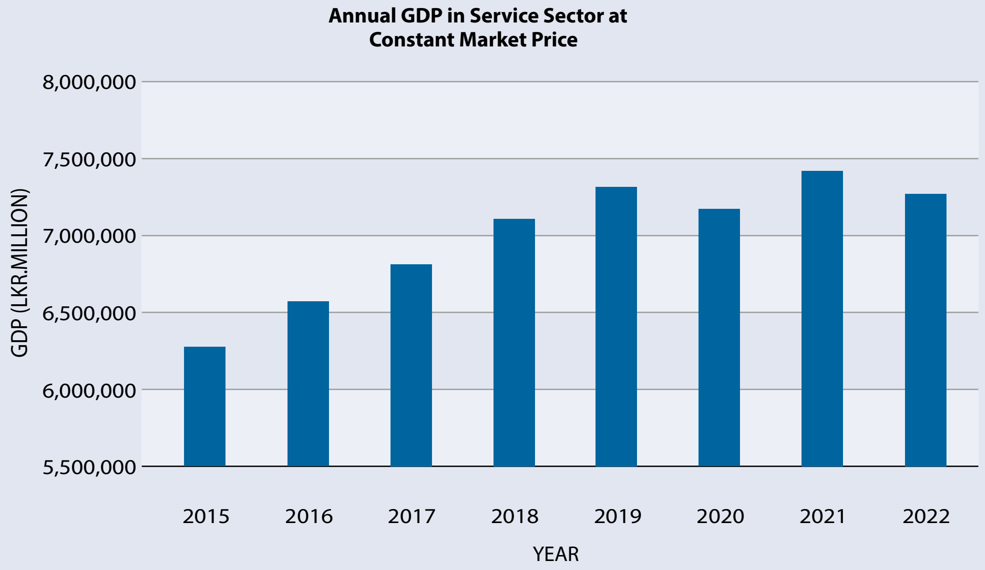
TABLE 6

ANNUAL GDP FLUCTUATIONS IN THE SERVICE SECTOR

Year	Service Sector GDP at Constant Market Price
2015	6,270,536
2016	6,567,892
2017	6,807,557
2018	7,099,084
2019	7,307,036
2020	7,166,506
2021	7,414,250
2022	7,265,095

FIGURE 6

ANNUAL GDP FLUCTUATIONS IN SERVICE SECTOR



From 2015 to 2019, there was an increase in the annual GDP in the service sector at constant prices. However, the trend in 2020, recorded a decrease, and in 2021, the highest level was observed.

1.5 Agriculture/ Manufacturing/ Services shares in employment term

1.5.1 Employed Population in the Agriculture Sector

Table 7. shows the employed population in the agriculture sector from 2015 to 2022 in Sri Lanka.

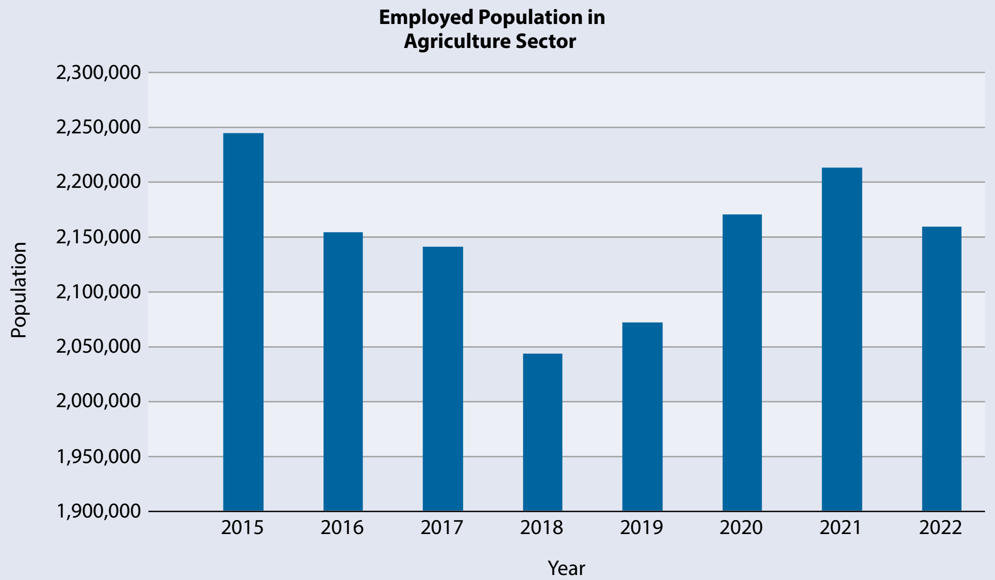
TABLE 7

EMPLOYED POPULATION IN AGRICULTURE SECTOR

Year	Employed Population
2015	2,244,547
2016	2,153,874
2017	2,140,185
2018	2,043,698
2019	2,071,940
2020	2,169,679
2021	2,213,015
2022	2,158,559

FIGURE 7

EMPLOYED POPULATION IN AGRICULTURE SECTOR



Based on Table 7., the peak of employment in the agriculture sector is noted in 2015, reaching 2,244,547 individuals. Conversely, the lowest point of employment in the agricultural sector was documented in 2018 at 2,043,698. Subsequent to 2018, there was a consistent rise in employment within the agricultural sector until 2021, with a contraction evident in 2022.

1.5.2 Employed Population in Industrial Sector

Table 8. shows the employed population in industrial sector from 2015 to 2022 in Sri Lanka.

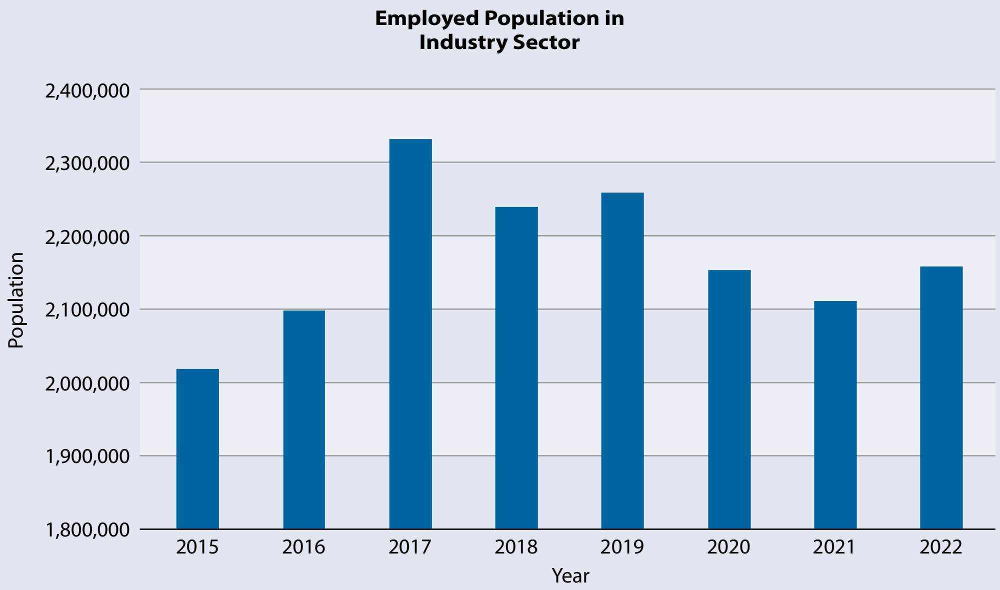
TABLE 8

EMPLOYED POPULATION IN INDUSTRIAL SECTOR

Year	Employed Population
2015	2,018,171
2016	2,097,503
2017	2,331,494
2018	2,239,262
2019	2,258,421
2020	2,152,746
2021	2,109,482
2022	2,158,199

FIGURE 8

EMPLOYED POPULATION IN INDUSTRIAL SECTOR



According to Table 8., the highest level of employment in the industrial sector occurred in 2017, with 2,331,494 individuals. In contrast, the lowest employment figure in the industrial sector was recorded in 2015, totaling 2,018,171. Following 2019, there has been a continuous decrease in employment within the industrial sector until 2021, with an upturn observed in 2022.

1.5.3 Employed Population in Service Sector

Table 9. shows the employed population in service sector from 2015–22 in Sri Lanka.

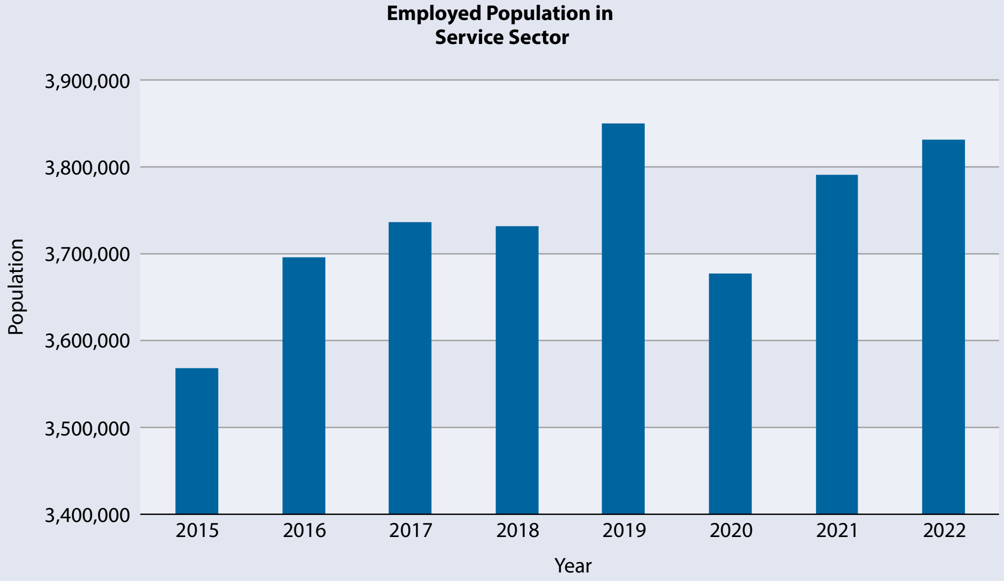
TABLE 9

EMPLOYED POPULATION IN SERVICE SECTOR

Year	Employed Population
2015	3,568,259
2016	3,696,306
2017	3,736,500
2018	3,732,206
2019	3,850,332
2020	3,676,688
2021	3,791,011
2022	3,830,973

FIGURE 9

EMPLOYED POPULATION IN SERVICE SECTOR



Based on Table 9., the peak of employment in the service sector was observed in 2019, reaching 3,850,332 individuals. Conversely, the lowest point of employment in the service sector was documented in 2015, totaling 3,568,259. Following 2020, there was a consistent upward trend in employment within the service sector until 2022.

Table 10. shows the Labor Force Status in Sri Lanka.

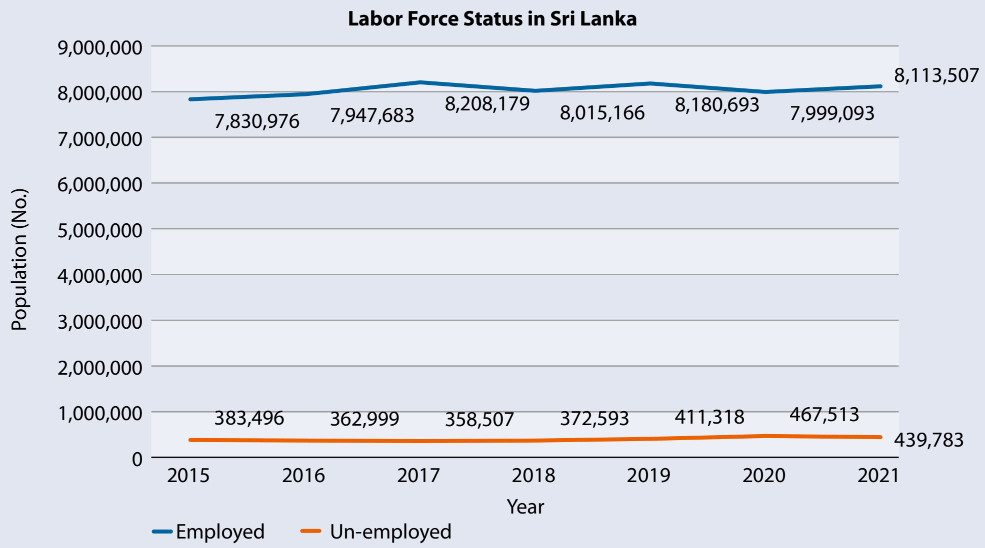
TABLE 10

LABOR FORCE STATUS IN SRI LANKA [2] [3]

Year	Total Number of Labor Force	Employed	Un-employed	Employment Rate	Unemployment Rate	Labor Force Participation Rate
2015	8,214,473	7,830,976	383,496	95.3	4.7	53.8
2016	8,310,682	7,947,683	362,999	95.6	4.4	53.8
2017	8,566,686	8,208,179	358,507	95.8	4.2	54.1
2018	8,387,759	8,015,166	372,593	95.6	4.4	51.8
2019	8,592,010	8,180,693	411,318	95.2	4.8	52.3
2020	8,466,606	7,999,093	467,513	94.5	5.5	50.6
2021	8,553,290	8,113,507	439,783	94.9	5.1	49.9

FIGURE 10

LABOR FORCE STATUS IN SRI LANKA



The provided data in Table 10. represents the labor force status in Sri Lanka over the years 2015 to 2021. The total number of individuals in the labor force has varied over the years, ranging from 8.21 million in 2015 to 8.55 million in 2021. The number of employed individuals has generally increased over the years, reaching 8.11 million in 2021. The number of unemployed individuals has fluctuated, with a notable increase in 2020, reaching 467,513, and a decrease in 2021 to 439,783. The employment rate represents the percentage of the labor force that is employed. It has remained relatively high, ranging from 94.5% in 2020 to 95.8% in 2017. This indicates a high level of employment relative to the total labor force. The unemployment rate represents the percentage of the labor force that is unemployed. It has varied, with a peak of 5.5% in 2020 and a decrease to 5.1% in 2021. The employed population has generally increased over the years, reflecting overall growth in the labor market. The unemployment rate has shown some variability, with a peak in 2020, likely influenced by economic conditions such as the global COVID-19 pandemic. The labor force participation rate has seen fluctuations, possibly indicating changes in the willingness of individuals to participate in the labor market.

1.5.4 Labor Productivity Growth

Labor productivity growth refers to the increase in output per worker or per hour worked. Several factors have contributed to the labor productivity growth in Sri Lanka, and these can be broadly categorized into the following sources:

Technological Progress: Though the technological advancement in the country is relatively low compared to the rest of the world, the primary technological advancements such as automation, ICT applications etc. have played a significant role in enhancing labor productivity.

Capital Investment: Businesses have invested in new and more efficient equipment, machinery, and tools such as programmable machines; as a result, productivity has been increased.

Education and Training: Investing in education and providing training opportunities for workers has enhanced their skills and capabilities, making them more effective in their roles.

Innovation and Research: Innovation, whether in products or processes, can drive productivity growth. Research and development (R&D) activities that lead to new and improved ways of doing things also have resulted in increased efficiency and output.

Infrastructure Development: The country has prioritized infrastructure development in the last few decades. Infrastructure developed in roads, transportation and communication has a positive impact on labor productivity. Improved infrastructure reduces logistical challenges and can facilitate smoother business operations.

2. Deindustrialization Trends

Industrialization implies the transformation of an economy's foundation from agriculture to the production of goods. Conversely, deindustrialization is the reduction of manufacturing activities within an economy. Premature deindustrialization is becoming evident in several developing countries, marked by a decline in the share of manufacturing value added in GDP. In comparison to early industrializers, these countries exhibit a significantly lower manufacturing share that is diminishing at income levels much lower than those experienced by the early industrializers. Sri Lanka is also undergoing a decrease in the share of manufacturing in its GDP in recent years.

The following tables and figures explain the trends of fluctuating in the value added in GDP of agriculture, manufacturing and service sectors.

2.1 Deindustrialization Trend in Major Economic Sectors in Sri Lanka in value added term

Table 11. shows annual GDP in the major economic sectors.

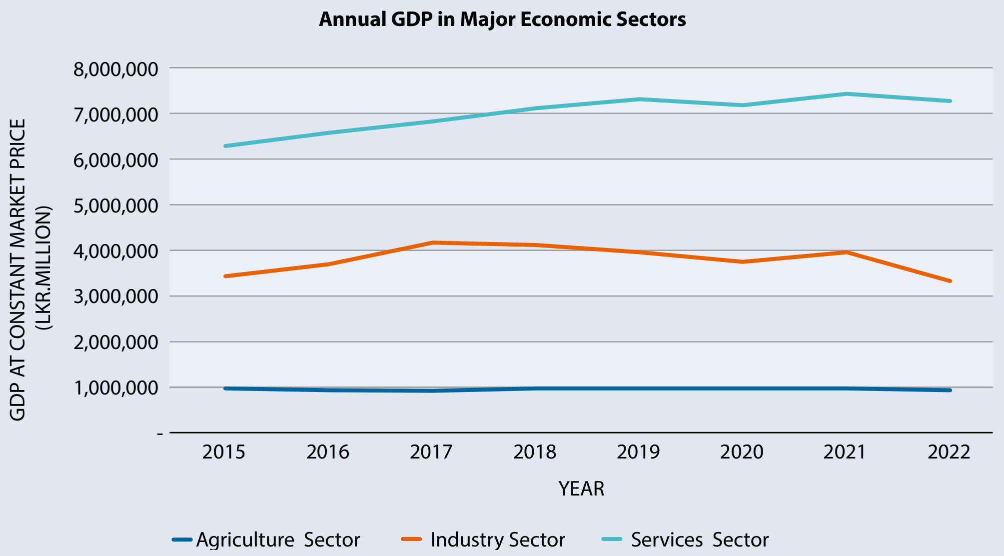
TABLE 11

ANNUAL GDP IN MAJOR ECONOMIC SECTORS

Year	Annual GDP		
	Agriculture Sector	Industrial Sector	Service Sector
2015	950,452	3,416,358	6,270,536
2016	906,100	3,670,106	6,567,892
2017	889,557	4,145,813	6,807,557
2018	945,292	4,101,467	7,099,084
2019	949,582	3,933,728	7,307,036
2020	941,046	3,724,566	7,166,506
2021	949,929	3,937,880	7,414,250
2022	906,505	3,309,764	7,265,095

FIGURE 11

ANNUAL GDP IN MAJOR ECONOMIC SECTORS



During the 2015–17 period the industrial sector and service sector GDP at constant price increases and after 2017 the industrial sector shows a contraction in GDP until 2020. However, during 2021 again it has increased up to LKR3,937,880.00. All sectors of the economy including agriculture, industry and services contracted in 2022 with a sharp contraction in manufacturing, construction, mining and quarrying, marine fishing and marine aquaculture, real estate, insurance and financial services. The industrial sector contraction was mainly due to the shrinkage of all the subsectors of the industrial sector except the sectors such as manufacture of textiles, wearing apparel and leather related products, electricity, gas, steam and air conditioning, and water collection, treatment and supply.

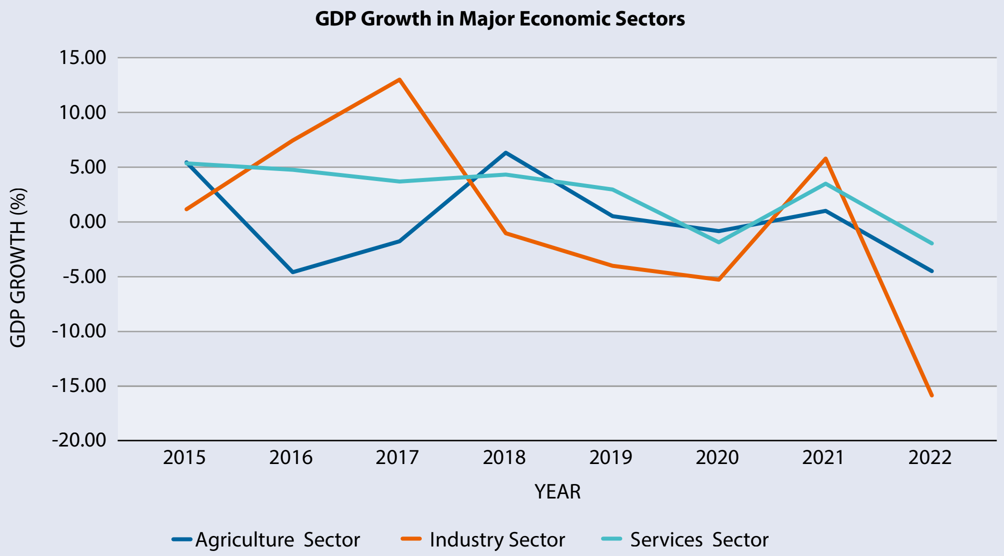
TABLE 12

ANNUAL GDP GROWTH IN MAJOR ECONOMIC SECTORS

Annual GDP Growth (%)			
Year	Agriculture Sector	Industrial Sector	Service Sector
2015	5.40	1.09	5.30
2016	-4.67	7.43	4.74
2017	-1.83	12.96	3.65
2018	6.27	-1.07	4.28
2019	0.45	-4.09	2.93
2020	-0.90	-5.32	-1.92
2021	0.94	5.73	3.46
2022	-4.57	-15.95	-2.01

FIGURE 12

ANNUAL GDP GROWTH IN MAJOR ECONOMIC SECTORS



The data represents the percentage share of major economic sectors in the GDP at constant market prices for the years 2015 to 2022. The share of agriculture in GDP has been fluctuating over the years. It decreased from 5.40% in 2015 to -1.83% in 2017, indicating a decline. It then increased 6.27% in 2018. There was a decrease to 0.45% in 2019 and -0.90% in both 2020 and 2021, suggesting a stabilization and showing again a contraction in 2022.

The industrial sector's share in GDP has also experienced fluctuations. It increased from 1.09% in 2015 to 12.96% in 2017, indicating growth. However, it then decreased in the following years, reaching -5.32% in 2020. There was a slight increase to 5.73% in 2021, but in 2022, it has contracted severely to -2.01% recording the lowest rate during the 2015–22 period.

The services sector has generally shown an increasing trend in its GDP share. It started at 1.09% in 2015 and declined slightly in 2017 to 3.65%. It then increased, reaching 4.28% in 2018 and declined until 2020. Again, it has increased up to 3.46% in 2021. The services sector has been the dominant contributor to GDP and has shown resilience and growth over the years. But in 2022, it contracted severely to -15.9% recording the lowest rate during the 2015–22 period.

All three major economic activities of agriculture, industry and services recorded negative growth rates in the first half of 2022. In summary, while agriculture and industry have experienced fluctuations in their GDP shares, the services sector has shown a more consistent upward trend. The overall economic structure seems to be shifting towards a higher reliance on services. Despite the contraction trend in the industrial sector and the upward trend in the service sector, it would be premature to label it as "premature deindustrialization." Several other factors may play a role in triggering the reduction in growth within the industrial sector such as the COVID-19 pandemic which started to spread globally at the end of 2019 and throughout 2020. The Sri Lankan economy experienced adverse impacts with the spread of the first and second waves of the pandemic.

2.2 Deindustrialization Trend in Major Economic Sectors in Sri Lanka in employment term

Table 13. shows the employed population by major economic sectors in Sri Lanka.

TABLE 13

EMPLOYED POPULATION BY MAJOR ECONOMIC SECTORS IN SRI LANKA [2] [3]

Sector	Agriculture		Industry		Service	
Year	Total No.	%	Total No.	%	Total No.	%
2015	2,244,547	28.7	2,018,171	25.8	3,568,259	45.6
2016	2,153,874	27.1	2,097,503	26.4	3,696,306	46.5
2017	2,140,185	26.1	2,331,494	28.4	3,736,500	45.5
2018	2,043,698	25.5	2,239,262	27.9	3,732,206	46.6
2019	2,071,940	25.3	2,258,421	27.6	3,850,332	47.1
2020	2,169,679	27.1	2,152,746	26.9	3,676,688	46
2021	2,213,015	27	2,109,482	26	3,791,011	47
2022	2,158,559	26.5	2,158,199	26.5	3,380,973	47

FIGURE 13

EMPLOYED POPULATION BY MAJOR ECONOMIC SECTORS IN SRI LANKA

	2015	2016	2017	2018	2019	2020	2021	2022
Agriculture	2,244,547	2,153,874	2,140,185	2,043,698	2,071,940	2,169,679	2,213,015	2,158,559
Industry	2,018,171	2,097,503	2,331,494	2,239,262	2,258,421	2,152,746	2,109,482	2,158,199
Service	3,568,259	3,696,306	3,736,500	3,732,206	3,850,332	3,676,688	3,791,011	3,830,973

The data includes the total number of employees in major economic sectors for the years 2015–21, along with the percentage distribution. Employment in the agriculture sector has been gradually decreasing from 28.7% in 2015 to 25.3% in 2019. However, there is a slight increase in 2020 (27.1%) and 2021 (27%). Then, the total number of employees in major economic sectors decreased in 2022. This could indicate some stabilization or a mild resurgence in agricultural employment.

The industrial sector shows a relatively stable trend in terms of employment percentage, ranging from 25.8% in 2015 to 27.9% in 2018.

There is a slight dip from 27.6% in 2019 to 26.5% in 2022. The percentage drops indicate a potential decrease in industrial employment. The service sector has consistently shown an increasing trend in employment, rising from 46.5% in 2016 to 47% in 2021.

This indicates a shift in the employment structure toward the service sector, suggesting that the service industry is becoming a more significant contributor to overall employment in Sri Lanka. In summary, the trend in employment in Sri Lanka reflects a transition from traditional sectors like agriculture and industry toward a more service-oriented economy.

2.3 Deindustrialization Trend in Labor Productivity by Industry

Table 14. represents Labor Productivity in Manufacturing Establishments.

TABLE 14

LABOR PRODUCTIVITY IN MANUFACTURING ESTABLISHMENTS

Year	2016	2017	2018	2019	2020
Labor Productivity (Output per Persons engaged in Manufacturing Establishments) [LKR. Mn per Persons engaged]	3.2	3	3.15	3.38	3.48

FIGURE 14

LABOR PRODUCTIVITY IN MANUFACTURING ESTABLISHMENTS [6]

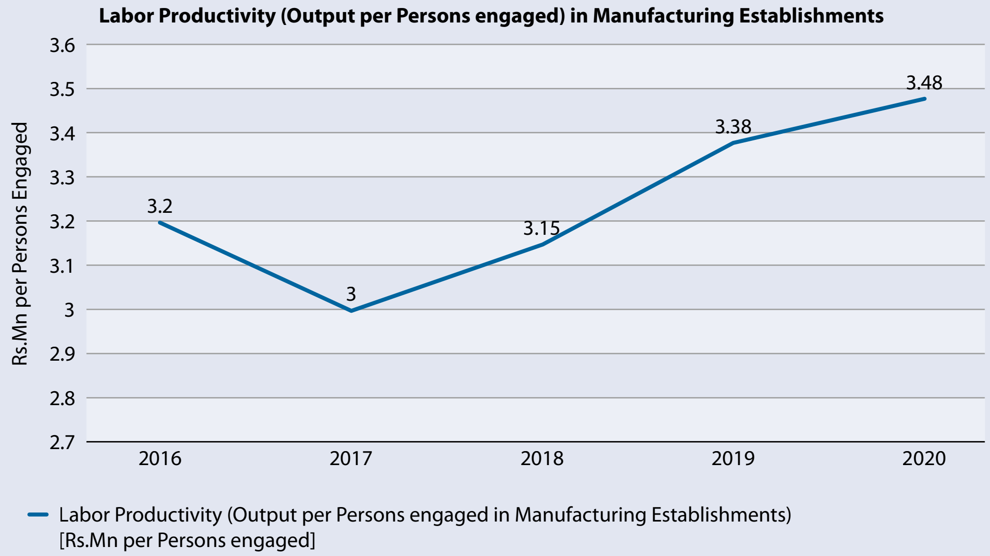


Figure 14. represents the labor productivity in manufacturing establishments in Sri Lanka, measured in terms of output per person engaged; it is specifically calculated for manufacturing establishments and expressed in LKR millions per person engaged. In 2016, the labor productivity was LKR3.2 million per person engaged in manufacturing establishments.

There was a decrease in 2017, with productivity dropping to LKR3.00 million per person engaged. In 2018, there was a slight increase to LKR3.15 million. The trend continued upward in 2019, reaching LKR3.38 million. There was a further increase in 2020, with labor productivity reaching LKR3.48 million per person engaged. The data suggests that there is a general increasing trend in labor productivity in manufacturing establishments from 2016–20.

Even though the data provided earlier indicated a positive trend in labor productivity from 2016–20, the economic crisis in Sri Lanka from 2020 can have significant effects on various sectors, including manufacturing. Factors such as reduced investment, disruptions in the supply chain, and overall economic uncertainty can contribute to negative outcomes. Unfortunately, specific data from 2021 to 2023 is not available, but the APO Productivity Databook 2022 suggested that the negative growth in labor productivity in the manufacturing sector may have ongoing effects into 2023 [1].

2.4 Decomposition of Labor productivity by industry

Table 15. represents Decomposition of labor Productivity by industry.

TABLE 15

DECOMPOSITION OF LABOR PRODUCTIVITY BY INDUSTRY

Activities in Industrial Sector	2015	2016	2017	2018	2019
Mining and Quarrying	0.8	1.1	1.02	1.06	1.12
Manufacturing	3.2	3	3.15	3.38	3.48
Electricity, gas	22.6	15.1	13.66	10.26	9.78
Water Supply; sewerage, waste management	3.5	2.5	2.52	2.54	2.7

FIGURE 15

DECOMPOSITION OF LABOR PRODUCTIVITY BY INDUSTRY [6]

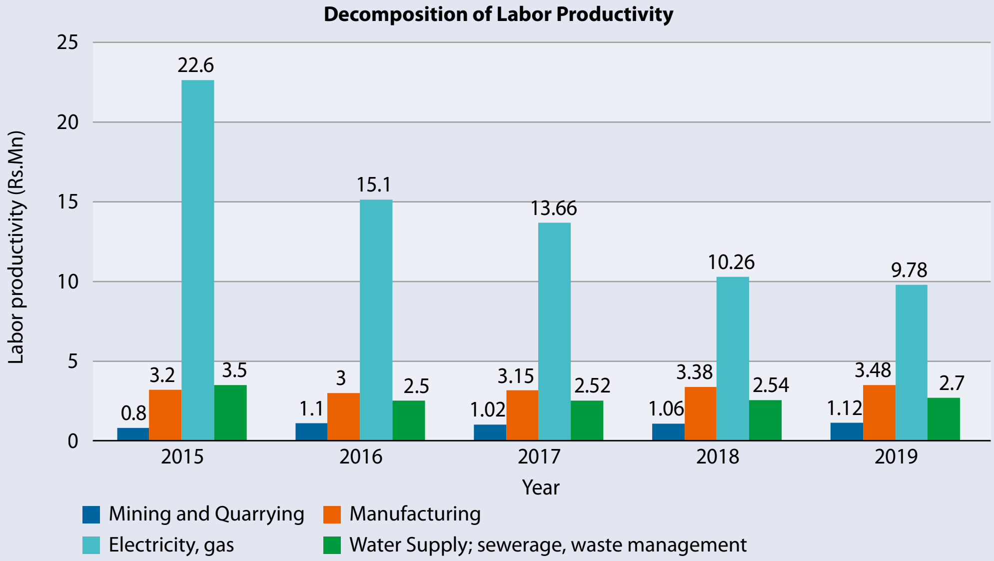


Figure 15. indicates that labor productivity in the mining and quarrying industry has increased over the years. In 2015, it was 0.80 units of output per unit of labor input, and by 2019, it had risen to 1.12 units. Labor productivity in manufacturing also shows an increasing trend over the years. It was 3.20 units in 2015 and increased to 3.48 units in 2019. Labor productivity in the electricity and gas sector has decreased over the years. In 2015, it was 22.60 units, but by 2019, it had fallen to 9.78 units. Labor productivity in the water supply, sewerage, and waste management sector has shown a fluctuating pattern. There is a slight increase from 2015–17, followed by a small decrease in 2018, and a slight increase again in 2019.

It is challenging to decisively identify a trend of premature deindustrialization in Sri Lanka due to the heightened economic turbulence experienced in the last three years. The economy faced significant disruptions, declaring bankruptcy in 2020 among the challenges posed by the COVID-19 pandemic. Particularly, the approach taken by the Sri Lankan government differed from that of other countries, selecting for an extended closure of the economy. While this strategy successfully controlled the pandemic compared to other economies, the prolonged economic shutdown had severe consequences across all sectors, excluding agriculture.

3. Impact of Premature Deindustrialization on Productivity Performance

3.1 Assessment of Premature Deindustrialization Risk

Premature deindustrialization refers to an economic occurrence which is observed in developing economies, where the manufacturing sector reaches its peak at a significantly lower income level and share, both in terms of employment and output, compared to early industrialized counterparts [4], [7]. The deindustrialization and the transition to a service economy have been considered as evidence of development.

The deindustrialization in developed countries is concurrent with labor productivity improvements in the manufacturing sector. This trend is resulting in a decline in employment rather than fostering industrial output. On the other hand, the "premature" deindustrialization represents that the developing countries have experienced the shrinking of manufacturing in both employment and output, sooner at lower levels of income with their much lower shares compared to early industrializers. The process of deindustrialization in developing nations controls their development by removing pathways that drive economic growth, including the benefits of scale economies, experiential learning, and the unrestricted convergence of labor productivity.

In 1977, the Government of Sri Lanka implemented open economic policies aimed at reducing the fiscal deficit, liberalizing trade, privatizing industries, deregulating foreign investments, and fostering export-oriented industrialization. This policy reform has benefited positive outcomes, including increased growth rates and decreased unemployment rates over the subsequent decades.

Economic growth has been uneven in the following years as the economy faced a multitude of global and domestic economic and political challenges due to a series of destructive terrorist attacks, domestic economic problems, political instability as well as external factors such as war and the political changes in the world. The main reason associated with the premature deindustrialization trend in Sri Lanka is the lack of adequate policy support for the industrial sector.

In 1977, Sri Lanka embraced trade liberalization, implementing regulatory adjustments on foreign investment, trade, and other measures. Consequently, it established institutional mechanisms to support these policy initiatives. Complete liberalization of the imports gradually caused the decline of local industries that were catering to the local market. Despite evident economic successes, there has been a shift since 2005 towards reinforcing the state's influence in steering market forces. This shift led to challenges such as an unfavorable BOP situation, escalating national debt and finally the debt unsustainability by year 2020. The shrinking economy since 2022 has not been favorable for industrial growth.

Issues related to the mismatch of education system and Skills development

The labor productivity in Sri Lanka is affected by the shortage of the skilled workforce required by the industry. A significant imbalance and mismatch can be observed between the existing education system and skill development programs and industrial requirements. The difference has resulted in sectoral misallocation, with a substantial proportion of the working population employed in low-productive areas of the economy, resulting in low productivity and innovation. In this context, industry-level studies show significant labor shortages in several industries, such as manufacturing, tourism, construction, and ICT [5].

In response, developing economies are seeking to reform their education and training systems to equip their workforce with the necessary skills and knowledge to harness these opportunities. Sri Lanka is no exception, and the government has declared 2021–30 the Decade of Skills Development. This move is expected to bring about a transformational phase of educational reform and skills development for the nation in line with the government's national policy framework. Revise the educational curriculum at all levels to better align with current and future industry demands. Recognizing the importance of Technical and Vocational Education and Training (TVET) for economic productivity, poverty reduction, and social development, the Sri Lankan government endorsed the National Policy on Technical and Vocational Education in 2018. Increase the availability and accessibility of vocational training programs that are directly linked to industry needs, especially in regions with high unemployment rates. Incorporate entrepreneurship into the curriculum to inspire innovative thinking and the creation of new businesses, which can drive economic growth and create jobs.

Absence of National Innovation System

Industrialization and economic development in most of the East Asian economies has been backed by the National innovation system of the respective economies. Though the sustainability of the industries and their growth strategy heavily depend on the innovations and R&D, the poor linkages and modalities amongst the Industries and R&D service providers in the economy causing deindustrialization due to lack of competitiveness. Hence, in Sri Lanka, strengthening the institutional setup of those responsible for commercializing R&D is needed to align with the evolving global market dynamics. As of now, despite the significant number of patents being granted for new innovations, commercialization of those researches targeting mass production is lagging behind significantly.

Inadequate measures for creating the enabling environment including Infrastructure development

Infrastructure development to facilitate industry performance is a critical factor for the expansion. Developments in road and transport systems, port facilities, telecommunication networks and energy supply systems are necessary for faster industrial growth. For example, in Sri Lanka, in 1985 the government spent 13% of the GDP as public investment in infrastructure, this percentage declined to 5% in 1997 due to the higher conflict-related expenditure, to 4% in 2018 due to the fiscal deficit. In addition to that, enabling a legislative environment is also imperative for industrial growth. Explore opportunities for financing from international development banks, foreign governments, and private-sector investors to support large-scale infrastructure projects.

Lack of diversification of industries

Apparel manufacturing still accounts for 39.74% of the country's merchandise exports despite the diversification of industrial production that has taken place over the years. It is a global trend that the labor intensive industries such as Apparel manufacturing do not remain in an economy where the per capita GDP increases to the middle income level. In that juncture the industry shall get diversified into high-tech products or more and more automation. However, this trend of diversification has not been taken up in Sri Lanka. To reduce the overreliance on a single industry, it is necessary for Sri Lanka to concentrate on its industry diversification, in particular through backward integration, high-tech application and innovation.

Lack of foreign direct investment (FDI)

Sri Lanka has not been an attractive destination for the foreign direct investments for the industrial sector for the last few decades, though some investments flew to the service sector. Lack of conducive industrial policy & incentives, high cost of production factors such as labor, electricity etc. have been the key reasons for the poor status of performance. Very small domestic market and free flow of merchandise also under open economic policy discourage any investor targeting the local market also.

Foreign investment plays a crucial role in an economy's economic growth and development. It brings in capital, creates job opportunities, and boosts technological advancements. However, the imposition of value-added tax (VAT) can influence the decision-making process of foreign investors. High tax rates may discourage investment, particularly in sectors where profit margins are already tight. Reinforced by long-term financing conditions, recovery stimulus packages and overseas investment programs, international project finance. While taxes like VAT are necessary for the economy's revenue, it's important to balance these with incentives that encourage investment. For instance, implementing a more favorable tax structure for foreign investors or specific industries can make Sri Lanka more competitive internationally.

Implementing an industrial policy that is both inviting and rewarding to foreign investors is crucial. This involves reviewing and potentially lowering tax rates for foreign investments, providing tax holidays for specific sectors, and offering subsidies for critical costs like energy. Efforts must be made to reduce the cost of production factors. This could involve subsidizing electricity for industrial use, offering training programs to improve labor productivity, and thus, making labor costs more competitive on the global stage. Establish and promote privately owned industrial zones with world-class infrastructure, dedicated facilities, and preferential policies to attract foreign investors. Actively promote Sri Lanka as an investment destination through diplomatic missions, international trade fairs, and targeted marketing campaigns, highlighting the country's strategic location, skilled workforce, and investment opportunities.

3.2 Issues Posed by Premature Deindustrialization related to Productivity and Economic Growth -An empirical analysis

This section illustrates an empirical analysis to verify the risk of premature deindustrialization in Sri Lanka. Premature deindustrialization can pose several challenges related to productivity and economic growth. Here are key issues associated with this phenomenon in Sri Lanka.

Productivity Slowdown:

According to the WB website, the economy contracted by 7.8% in 2022 and 7.9% in the first half of 2023. Construction and manufacturing suffered the most amid shrinking private credit, shortages of inputs, and supply chain disruptions, worsening the negative welfare impacts of income contractions and job losses registered in 2022.

For example, Sri Lanka's garment exports stood at USD1,468.7 million during January–April 2023. This is a decrease of 17% over the exports in the same period of the previous year which amounted to USD1,769.9 million, as per statistics released by the Central Bank of Sri Lanka. Garments are the largest exporting commodity of Sri Lanka.

Reduced Innovation and Technological Progress:

The manufacturing sector is often a driver of technological innovation, and deindustrialization shrinks down R&D activities. Accordingly, premature deindustrialization may hinder the development and adoption of new technologies, impacting overall economic progress and competitiveness.

Employment Challenges:
The manufacturing sector tends to provide employment opportunities for a large segment of the workforce. A decline in this sector may lead to an increased unemployment rate, affecting both skilled and unskilled labor.

Balance of Payments Issues:
Many industrialized economies rely on manufactured goods for export, contributing to favorable trade balances. A premature shift away from manufacturing may result in increased reliance on imports, lack of import substitution, and lack of foreign exchange, negatively impacting the balance of payments.

Dependency on Services:
A rapid shift towards a service-oriented economy without a mature industrial base can lead to increased vulnerability. Import dependence due to lack of import substitution and over-reliance on services may expose the economy to external shocks and fluctuations in demand for specific services.

Income Inequality:
The manufacturing sector often provides opportunities for upward mobility and the creation of a diverse range of jobs. Per-employee income generation in a manufacturing industry is much higher than that of the service industry. Premature deindustrialization may exacerbate income inequality, as service jobs may not offer the same upward mobility as manufacturing positions.

Skills Mismatch:
The skills required for service-oriented industries may differ from those needed in manufacturing. A rapid transition may result in a mismatch between the skills available in the labor force and those demanded by the evolving job market.

3.3 Country case study on specific issues relating to premature deindustrialization
Prior to the adoption of open economic policy in Sri Lanka in 1977, the country had a fairly large domestic textile industry in order to cater to the local demand. In concurrence with opening the economy targeting the rapid industrialization with foreign investments, it was the clothing industry that evolved in Sri Lanka as the main export-oriented industrial sector. The local textile industry was unable to compete with imported textiles and the industry started declining its presence.

Apparel sector was primarily fostered by the Multi-Fibre Agreement (MFA) that regulated international trade in this domain. The gradual dismantling of the MFA in 2005 led to heightened competition, prompting a wave of innovations within Sri Lanka's clothing and textile industry. However, this transition also adversely impacted less competitive apparel manufacturing sectors.

When the MFA was coming to an end in 1995, certain portions of apparel industries owned by local investors were closed down. However, leading apparel manufacturers in Sri Lanka were able to survive and operate in the post-MFA period. The export-oriented apparel industry was depending on the opportunity given for tax-free imports of textile fabrics to the export apparel industry. However, in 1997, the tax on textiles completely abolished all the textile imports and it severely hampered the existing local textile industry. Those industries were catering to the local market protecting themselves with the import tax on textiles.

However, the textile mills that were set up under vertical integration of the apparel industry were able to survive for a long time. During the last 5 years those industries were also facing the threat of deindustrialization and shrinking the number of entities and their production volumes. The recent deindustrialization of the vertically integrated textile sector has been caused by deindustrialization of the apparel sector from Sri Lanka, high cost of production in the country due to escalation of the labor cost, and electricity costs, etc.

By today, certain segments of the textile industry such as spinning, weaving etc. were not in existence in the industry though it was self-sufficient at a time.

However, the newly drafted National Policy for Industrial Development by the Ministry of Industries is yet to receive the cabinet approval. Apparently, the policy lacks robust measures to counteract the capital outflow in the apparel industry or to increase the growth in other pivotal sectors. Despite government initiatives such as direct foreign investments and joint ventures aimed at boosting the apparel industry, there remains a gap in approaches to retain the industries and prevent the deindustrialization within the policy framework.

4. Policy recommendations

To address the risk of premature deindustrialization in Sri Lanka, several recommendations can be considered. The policy recommendations can be formally categorized into two temporal domains: short-term and medium- and long-term.

Short-Term Policy Recommendations

1. Improve Energy Security

Recognize energy security as a critical element of industrial policy. Lack of consistent supply and high energy costs have led some investors to relocate their businesses overseas. To address this, efforts should be made to connect to a regional grid to maintain lower energy costs and enhance the competitiveness of local industries.

2. Investment Offsets and Promotion Agencies

Establish investment offsets, foreign trade promotion agencies, and industrial research institutes to support and guide the growth of industries. These entities can play a crucial role in facilitating collaboration, innovation, and international linkages.

3. Promoting Foreign and Local Investments and a Two-Way Ecosystem for Foreign Investment

Agencies such as the Industry Development Board and Board of Investment can work on promotions for foreign and domestic investors. Further, they shall encourage privately owned industrial parks. This includes providing incentives, streamlining regulations, and creating a conducive environment for business growth. Furthermore, they shall encourage the privately owned industrial parks that will offer more attractive benefit packages to the investors.

Encourage foreign investment not only to participate in the global supply chain but also to strengthen technology, introduce talent, and establish a two-way ecosystem that benefits both local and foreign entities.

Medium- and Long-Term Policy Recommendations

1. Establish a Robust Industrial Policy

Developing and implementing a favorable industrial policy that encourages technological advancements and facilitates R&D activities is essential to sustain industrial growth and prevent deindustrialization. This policy should encourage foreign investments in the industrial sector and create a conducive environment for industries to stay competitive in the global market.

2. Promote Eco-Industrial Parks

Implement policies that encourage the establishment and growth of eco-industrial parks will be an attraction for future investments in industrial development. These parks can provide a sustainable environment for industries, promoting resource efficiency, waste reduction, and environmentally friendly practices.

3. Technology Policy to Attract Foreign Investment for Technology Intensity

The technology policy of the country should be aligned to actively attract foreign investment with a focus on increasing technology intensity. This involves encouraging foreign investors to bring in advanced technologies, expertise, and talent to upgrade the technological capabilities of local industries. Policy tools, both fiscal and legal, should be made favorable for technology transfer, technology adaptation, and indigenous technology development.

4. Expand Export Markets

Facilitating the expansion of export markets, particularly for labor-intensive products is an important prerequisite. This involves engaging in free-trade agreements, improving logistics, and supporting industries in accessing international markets.

5. Enhance Human Capital

Recognize the importance of human capital and implement policies aimed at rapidly enhancing the quantity and quality of the workforce in Sri Lanka. This includes investing in education, skills training, and talent development programs.

5. Conclusion

According to this study the GDP, GDP growth by sector and labor productivity exhibit fluctuations. The agriculture sector has been experiencing a mixed growth, the industrial sector has been facing both positive and negative trends, whereas the services sector has been consistently showing positive growth. The shift towards a service-oriented economy is emphasized by a declining share of manufacturing in GDP and an increasing dominance of the services sector.

However, identifying clear trends of premature deindustrialization in Sri Lanka is extremely challenging due to more serious economic turbulences experienced in the last three years in the economy. Multiple factors have caused multiple impacts on the economy under the crisis situation. Hence, labeling the industrial sector's contraction and the service sector's growth as "premature deindustrialization" would be premature itself.

The global spread of the COVID-19 pandemic in 2020 had the adverse impacts on the Sri Lankan economy and on growth of the industrial sector. During the COVID-19 pandemic, the Sri Lankan government's approach differed from that of other governments, opting for an extended closure of the economy. While this strategy successfully controlled the pandemic compared to other governments, the prolonged economic shutdown had severe consequences across all sectors, excluding agriculture. The economy faced significant disruptions, declaring bankruptcy in 2022.

The Central Bank Report 2022 reveals that the Sri Lankan economy faced its deepest economic contraction since independence in 2022. Driven by an unprecedented economic crisis and compounded by domestic and global challenges, the contraction disrupted the postpandemic recovery. Issues like acute fuel shortages, hampered supply chains, prolonged power outages, scarcity of raw materials due to imports compression, and a surge in production costs contributed to the economic downturn. Challenges in construction and manufacturing subsectors, including severe shortages in raw materials and escalating input costs, have played a significant role in this decline. Factors such as an energy crisis and stricter monetary conditions have further contributed to the weakened performance of the industrial sector.

However, some deindustrialization trend shows in the sectors such as apparel which has the reduced exports and a decline in the number of factories. The apparel industry, grappling with higher labor costs in Sri Lanka, has witnessed the relocation of factories to economies with more affordable labor. Addressing high labor costs in the textile industry, requires a multifaceted approach that not only looks at reducing costs but also at enhancing productivity, efficiency, and value. Here are several strategies that can help mitigate the impact of high labor costs: Implement advanced software for supply chain management, inventory control, and production planning to optimize operations and reduce waste, enhance the skills of the existing workforce through training programs focused on operating new technologies, lean manufacturing practices, and quality control. A more skilled workforce can produce higher value-added products, and hiring labor from other economies to mitigate high local labor costs in Sri Lanka, especially for the textile and apparel industry, can be a strategic approach but it requires careful consideration of legal, social, and economic factors.

However, industries relying on local resources, such as tea, rubber, spices, fruits, and plantation and agro-based sectors, have not experienced a decline.

However, the reduction of the industrial sector poses several challenges for Sri Lanka, including a lack of adequate policy support for the industrial sector, shortcomings in the education system and skills development, insufficient entrepreneurial and innovative activities, infrastructure development constraints, and limited diversification of industries. The reliance on key sectors, such as apparel manufacturing, raises concerns about economic vulnerability, unemployment, and a potential innovation slowdown.

To address these challenges, recommendations include establishing a robust industrial policy, improving energy security, promoting eco-industrial parks, enhancing industry promotions, attracting foreign investment for technology intensity, expanding export markets, and investing in human capital. Proactive trade and industrial policies, coupled with a two-way ecosystem for foreign investment, are suggested as key strategies to mitigate the risks associated with premature deindustrialization in Sri Lanka.

6. Future Outlook

Looking ahead, the future outlook for Sri Lanka's economic landscape, shaped by the ongoing trend of deindustrialization, calls for strategic government actions and policies to navigate potential challenges and leverage opportunities. Government initiatives should be directed towards fostering sustainable economic growth, boosting industrial resilience, and capitalizing on the shifting dynamics.

To prevent the adverse effects of deindustrialization, the Sri Lankan government must take proactive measures. This includes formulating and implementing policies that support a diversified and robust industrial base. The government should prioritize the creation of an enabling environment for industries, offering incentives, streamlining regulations, and facilitating ease of doing business.

Developing and implementing forward-looking industrial policies is crucial. These policies should align with technological advancements, encourage R&D activities, and attract foreign investments. A comprehensive industrial policy framework will provide a roadmap for sustaining industrial growth and preventing further deindustrialization.

A strategic focus on skill development and education is essential. The government should invest in programs that enhance the workforce's skills, aligning them with the evolving needs of the industry. Additionally, efforts to promote the export of skilled labor can contribute significantly to revenue generation. Encouraging skilled professionals to seek opportunities abroad can lead to remittances and economic inflows.

Embracing automation and technological innovation is crucial for staying competitive on the global stage. The government should incentivize industries to adopt automation technologies, thereby improving efficiency and productivity. A joint effort to integrate automation across sectors can position Sri Lanka as a technologically advanced player in the global market.

In conclusion, while the challenges of deindustrialization emerge, the Sri Lankan government has the opportunity to reshape its economic trajectory. By implementing proactive policies, supporting industrial diversification, investing in human capital, and embracing automation, the government can lay the foundation for a resilient and innovation-driven economy. As the government navigates the complexities of global economic shifts, strategic government actions will play a pivotal role in steering Sri Lanka towards a sustainable and prosperous future.

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THAILAND

Executive Summary

This report provides a comprehensive description of Thailand's economic development and industrial policy objectives. The report highlights the impact of globalization and China's entry into the WTO, leading to deindustrialization in Thailand and an imbalance in industrial policies which also leads to deindustrialization occurring in different regions. Then, the government has been promoting more specific policy responses to address competition with China, such as the investment promotion strategy in which the following incentives and additional incentives in i) Competitiveness Enhancing Incentives promotion in technology, innovation and research and development (R&D), ii) Area-based Incentives promotion for industrial estate, special economic zone in four regions, science and technology park, and iii) Agenda-based Incentives promotion in smart and sustainable industrial upgrade and social and local development investment including investment in infrastructure in digital transformation and capacity building in human resources to realize their comparative and competitive advantage in the manufacturing sector to enhance Thailand's productivity and resolve the issue of regional imbalance in deindustrialization.

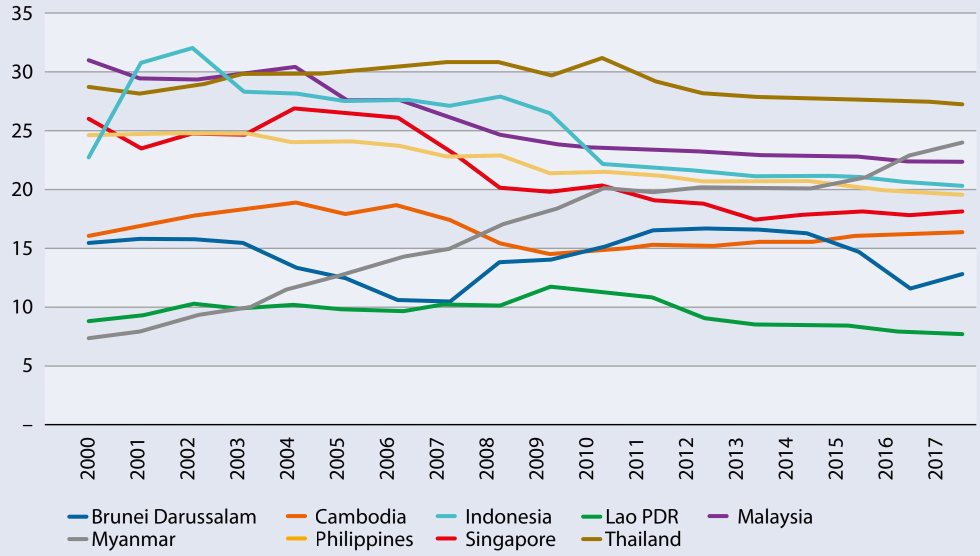
1. Background

Thailand's Economy and its Manufacturing Trends

Thailand is a member of the ASEAN economy, which is among the seven largest economies in the world. The average economic growth of 10 ASEAN members in 2017 was estimated at 5%, up from the previous year 4.8%. This condition exceeds global growth in 2017 which only reached 3.6%. However, all ASEAN have faced challenges that could potentially hinder its stated objective of the presence of GDP per capita disparity among ASEAN member countries caused by the different industrialization processes among ASEAN member countries. Data from the last 17 years among ASEAN countries shows that in 2000–01, for example, the contribution of industry could reach 25–30% of GDP, but in 2017 the contribution reached a maximum of only 27% as shown in Figure 1. Most ASEAN members such as Indonesia, Malaysia, Thailand and Singapore experienced deindustrialization that was too early and the decline in their contribution is around 7–10% and the Philippines is 5%. Some other countries have experienced a significant increase in contributions such as Myanmar, which in 2000 was only 7.2%, yet in 2017 reaching 23.9%. Meanwhile for countries like Laos and Cambodia, the contribution of the industrial sector to GDP is quite stable. Data from WB shows that the manufacturing share of GDP in selected Southeast Asian countries experienced decline whereas China experienced a significant increase as shown in Figure 2.

FIGURE 1

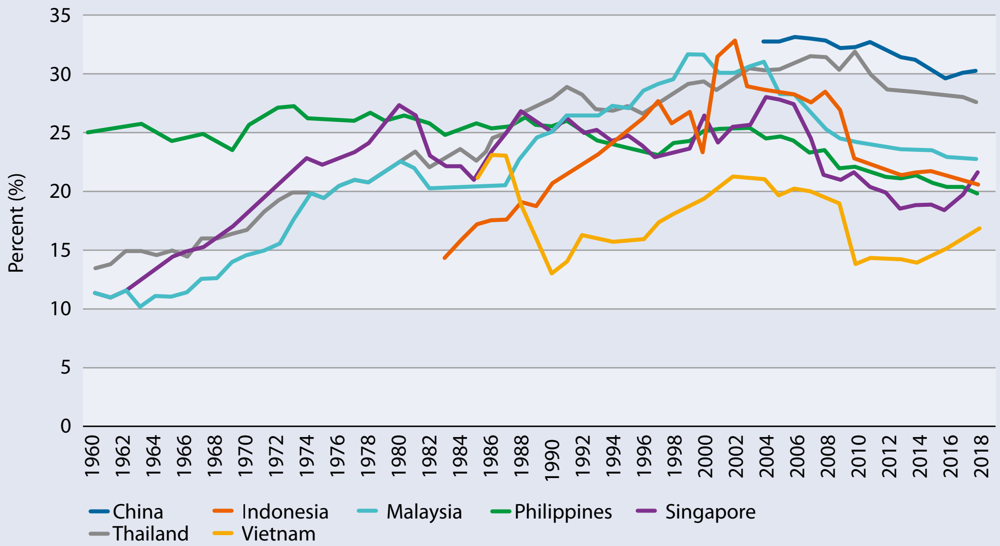
SHARE OF MANUFACTURING VALUE ADDED IN GDP ASEAN COUNTRIES, %



Source: CEIC, 2018) https://www.researchgate.net/publication/335230721_DEINDUSTRIALIZATION_AMONG_ASEAN_COUNTRIES_AND_RELATED_AFFECTING_FACTORS

FIGURE 2

MANUFACTURING SHARE OF GDP IN SELECTED SOUTHEAST ASIAN COUNTRIES



Source: https://so05.tci-thaijo.org/index.php/TER/article/view/257037/173455 Vol. 40, No.1, January–April2022Page [1–16]

2. Framework and Research Methodology

2.1 Analysis Framework

In this section the key parameters of analysis in this study are outlined.

A. Premature Deindustrialization Trend

1. Economic Indicators to Assess Premature Deindustrialization

The 13th National Economic and Social Development Plan, NESDP, (2023–27) is a second-level plan that acts as a key mechanism to translate the National Strategy into implementation and serves as a framework to stimulate the formulation of the third-level plans for the purpose of enabling relevant development partners to function in support of achieving the target goals of the National Strategy within the expected timeframe and focus on tangible development and targeted implementations as well as to indicate a clear direction of the country. The objectives of the National Strategies plan were accomplished by processing well-rounded data, including the various dimensions of capital lessons learned from the previous National Strategies plan, and modification factors and conditions that will influence various organizations of the country.

Under the various limitation of COVID-19 pandemic which not only caused illness and death but also adversely affected economic conditions, the 13th Plan was formulated to impact the livelihoods of all groups of the population, the rapidly disruption technological development, climate change, an aging society as well as geo-political changes of the world. Under these particular trends of transformation, therefore, enabling support for the internal strengths of the country to continue prosper in the midst of wide-ranging transformation while attending to the economic, social and ecological benefits in a sustainable development goal.

Thus, four principles were adopted in the direction of the 13th Plan in order to address these challenges, overcome the rapid transformation and reach the stage of developed country with security, prosperity and sustainability in accordance with the "**Sufficiency Economy Philosophy**" in the spirit of the National Strategy as follow:

1. Sufficiency Economy Philosophy through national development guided by perpetuating, maintaining, and furthering based on knowledge and integrity with national and international situations and conditions must be considered along with the potentials of economic, social, natural resources and ecological capitals of the nation by enhancement of national competitiveness, maintaining self-sufficiency, fairness in opportunities to reduce poverty, and enabling people to co-exist in a sustainably ecological environment for the utmost benefits and ensure the ability to cope with risks from both domestic and international challenges.

2. Resilience by Emphasizing Development at Three Levels: 1) 'survival level' or 'readiness' to resolve or eliminate existing limitations or weaknesses that cause distress to people's lives or put the country at risk to internal and external changes; 2) 'Sufficiency level' or 'adjustment' of factors that are necessary to generate economic, social, and environmental stability from the family level to the community and national levels and 3) 'Sustainable level' or 'Transformation for sustainable growth' by pushing for structural change in various dimensions to continuously increase the ability of individuals and society to develop and support the sustainable growth of the nation.

3. Sustainable Development Goals (SDGs) based on the development guidelines concept of "Leave no one behind" and focus on improving the quality of life for all groups of people in terms of adequate access to the fundamental necessities of life, healthy environment factors, and commitment to passing on natural resources and a healthy environment to future generations.

4. Bio-Circular-Green Economy Model (BCG Model) by emphasizing scientific knowledge, technology and innovation to create added economic value and strive to achieve a balance between conservation and use of the natural resource base and biodiversity. The model also aims to change production, service and consumption patterns to reduce environmental impacts in the country.

Therefore, the 13th Plan is set with an aim to transform the country into a "**Progressive Society with Sustainable Value-Creating Economy**" through comprehensive changes at the structural, policy, and mechanism levels. To pursue the objectives, the five main development targets of the 13th plan are determined as follows:

1. Restructuring the manufacturing and service sectors towards an innovation-based economy: Increase the competitiveness of key manufacturing and service sectors by stimulating value added through innovation, technology, and creativity that conform with the development of modern society and environmental friendliness.

2. Developing human capital for the new global era: Prepare Thai people to have skills and suitable characteristics for the modern world in terms of knowledge, behavioral skills, and etiquette adhering to social norms.

3. Creating a society of opportunities and fairness: To reduce the economic and social disparity in income, geography, wealth, and business competition. By supporting and helping underprivileged and vulnerable groups to have more opportunities for socioeconomic mobility.

4. Ensuring the transition of production and consumption towards sustainability: Reducing pollution while improving the use of natural resources in accordance with the ecosystem capacity. Push forward the reduction of the GHG emissions so that Thailand can achieve carbon neutrality by 2050 and net zero by 2065.

5. Enhancing Thailand's capability to cope with changes and risks in the new global context: Promote preparedness and seize opportunities arising from an aging society, climate change, pandemics, digital transformation and cyber threats. Developing infrastructure and institutional mechanisms that can facilitate the digital transformation of the country in various sectors.

Targets and indicators of each main aim are determined as shown in Table 1.

TABLE 1

TARGET AND INDICATORS OF THE 13TH PLAN OF EACH MAIN AIM

Main Target	Indicators	Current Condition	2027 Target values
Restructuring manufacturing and service sectors towards an innovation-based economy	Gross National Income per capita	US$7,097 (THB227,000) in 2021	US$9,300 (THB300,000)
Developing human capital for the new global era	Human Achievement Index (HAI) (Covering 8 dimensions: health, education, employment, income, housing and living, family and neighborhood life, transportation and communication and participation)	0.6501 (Medium human achievement level) in 2020	0.7209 (High human achievement level)
Creating a society of opportunities and fairness	Disparity in wellbeing (expenditure) between population groups in the highest echelon: 10% (Top 10) and the lowest echelon: 40% (Bottom 40)	5.68 times in 2020	Lower than 5 times
Ensuring the transition of production and consumption towards sustainability	Greenhouse Gas (GHG) emissions	Reduction of GHG emissions from energy & transport sectors in 2019 by 17% from business-as-usual (BAU) level	Reduction of overall GHG emissions (energy and transport/ industry/waste management) by no less than 20% from business-as-usual (BAU) level
Enhancing Thailand's capability to cope with changes and risks under the new global context	Composite index measuring resiliency which comprises of four sub-indicators reflecting ability to cope with changes:		
	1) International Health Regulations (IHR) capacity and health emergency preparedness	85% in 2020	90% With each core competency at no less than 80%
	2) Global Climate Risk Index (CRI)	5-year average rank (2015-2019): 36.8	5-year average rank (2023-2027): no less than 40[1]
	3) Digital Competitiveness Rank	38th in 2021	30th
	4) Government Effectiveness Rank	20th in 2021	15th

Source: http://nscr.nesdc.go.th/wp-content/uploads/2023/09/NESDP-13th.pdf

2. Definition/Approaches to Premature Deindustrialization

Recently, the concept of "premature deindustrialization" has gained attention among academics. Economists and policy makers, in particular, Dasgupta and Singh [4] and Rodrik [14] have highlighted the rapid transition of developing countries into the service sector with the reduction or destruction of the manufacturing sector. Advanced countries have already experienced this practice of deindustrialization. However, labor productivity achievement rather than prematurity has led to a structural shift from the secondary to the tertiary sector resulting in loss of employment but without losing productivity. Rodrik's [14] theoretical framework treats developing countries as price takers with no comparative or competitive advantage. Then, the countries are forced to import

1 High rank indicates high level of climate risk

mass production products from developed countries, which is called "import deindustrialization." This premature deindustrialization should be examined since the interruption to output in manufacturing lessens the catching-up effect for developing countries.

3. Causes and Risks of Premature Deindustrialization

The Thai Ministry of Labor has confirmed that it will increase the minimum wage in 2024 with a high likelihood and will be announced in December 2023. The new minimum wage is expected to be higher than inflation but is unlikely to increase to THB400 (USD11.12) per day, as originally proposed due to fear of the adverse effect on small and medium enterprises (SMEs).

Increasing the daily minimum wage to THB600 by 2027 is a key tenet of the Pheu Thai Party's campaign promise which formed a coalition government after the May 2023 general election. However, the government has since stated that the minimum wage may not reach THB600 by 2027, but will be "close to that rate" as it is raised annually.

B. Productivity Performance

1. Premature Deindustrialization Impact Long-term Labor Productivity Growth

Infrastructure investment: an important driving factor for overall economic growth in the country. Structural problems are eroding the competitiveness of Thai industry:

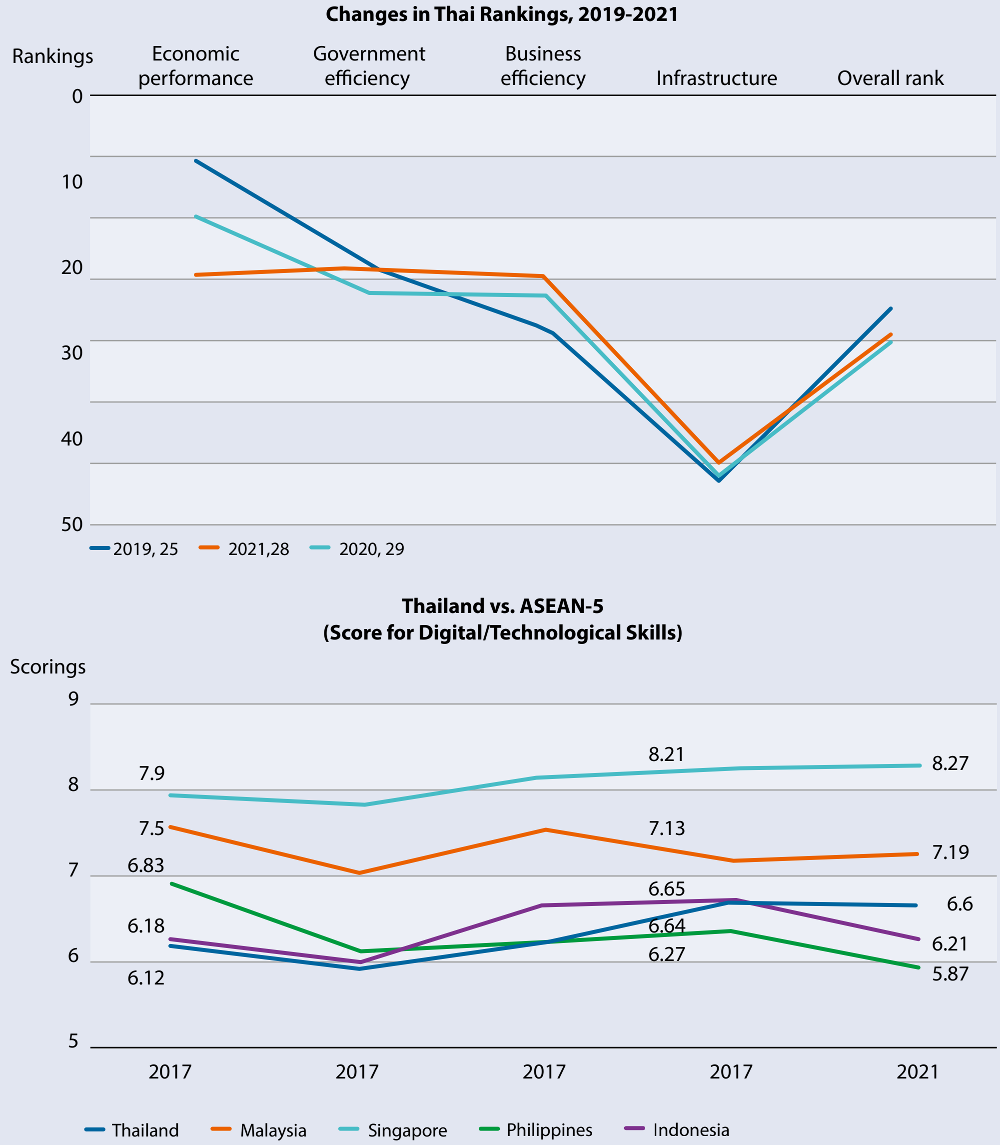
The industrial environment

In terms of infrastructure, Thailand is progressing slowly, and although the country is ahead of Indonesia and the Philippines in technology and digital skills, it is still significantly behind Singapore and Malaysia. Thailand's labor force still lacks skilled workers in these areas which limits the ability of companies to invent and develop new intellectual property. In the coming period, this will also affect the development of the manufacturing and service sectors. In terms of spending on research and development as shown in Figure 3.

To increase the connectivity within as well to the EEC, the Thai government has invested heavily in infrastructure to increase the connectivity of these three provinces with the rest of the world as shown in Figure 4. A total of USD43 billion in infrastructure investments has been directed to the EEC by 2021 and the investments came from the state funds, direct investment fund from abroad and through infrastructure development under the framework of cooperation between the public and private sectors. Air transportation and cargo transport capabilities have also been greatly improved with the expansion of U-Tapao Airport and the establishment of a Maintenance, Repair and Overhaul (MRO) center in Rayong Province (USD5.6 billion). Laem Chabang Seaport (Laem Chabang Phase 3), which is already the country's largest seaport, will be further expanded with the goal to change it into a marine hub of Southeast Asia to create a sea route from the eastern provinces of Thailand to Myanmar's on-going Dawei deep seaport project, Sihanoukville Port of Cambodia and Vietnam's Vung Tau port (USD2.5 billion) with a total investment of USD1.5 billion. The road network will be expanded to increase the connectivity with sea and air transport (high-speed rail, double-track railway, highway) (USD4.5 billion). The high-speed rail and double-track connecting ports, airports, industrial clusters, and the major city centers will be launched to improve road connectivity and linked to the expressway improvements from other provinces (Northeast, Central and Bangkok to the EEC). Land links to China will be strengthened with the construction of a new high-speed railway from Bangkok to Kunming to ensure the link to China's mega projects related to the Belt and Road Initiative.

FIGURE 3

THAILAND'S COMPETITIVENESS INDICATORS



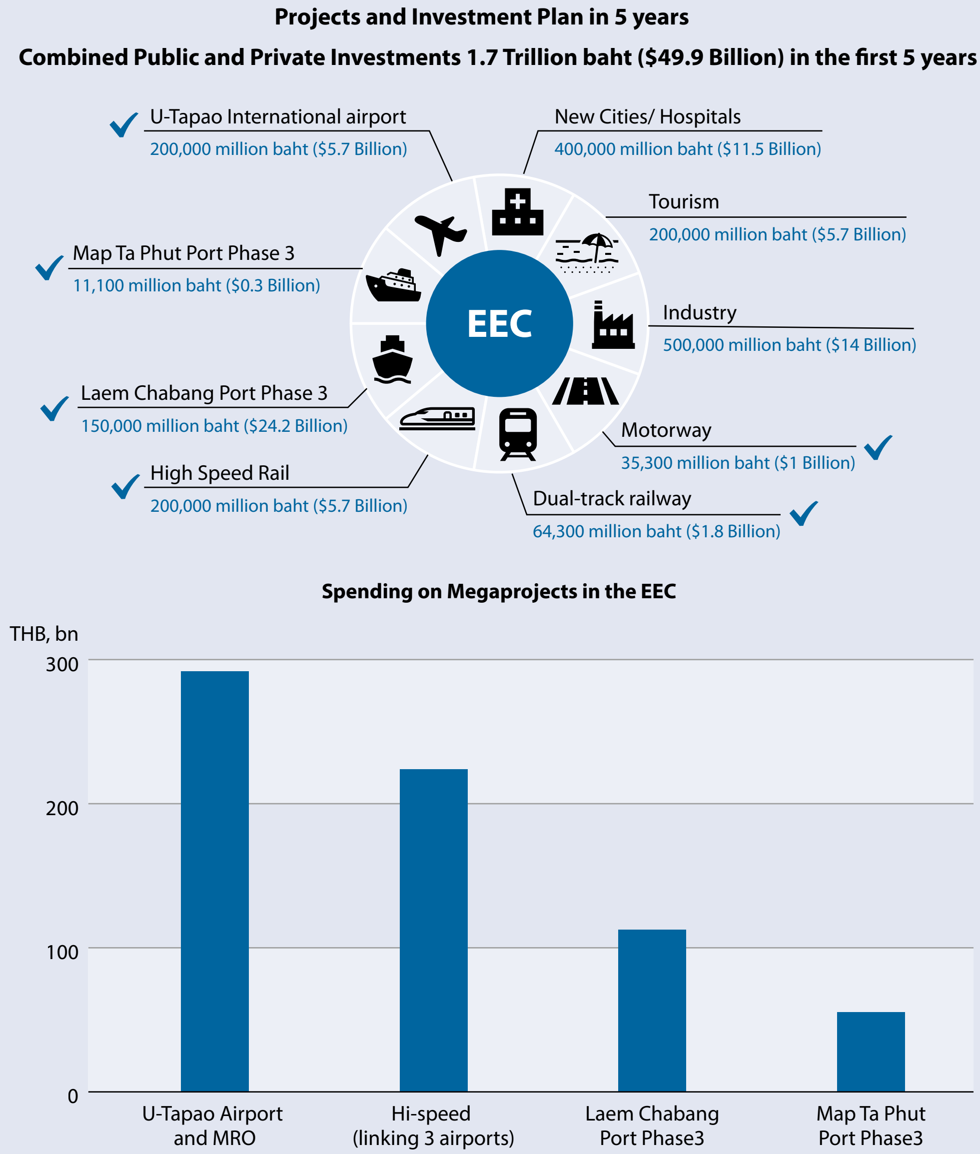
Source: https://www.krungsri.com/en/research/industry/summary-outlook/outlook-2022-2024

Thailand should set four conditions for the policy to be effective in order for Thailand to participate and enhance GVCs levels and comply with the factors and conditions for facilitating GVCs as follows.

First, an urgent need to improve the functionality and complexity of tasks for macroeconomic and institutions structures due to the coordination between and within sectors and integration between different actors are increasingly demanded. As the world is changing rapidly and becoming more complex, new business models such as peer-to-peer ridesharing, short-term accommodation services and financial technology involves more than one actor from a single sector, but also a wide range of actors from different sectors. These models tend to operate higher in GVCs such as peer-

FIGURE 4

INFRASTRUCTURE INVESTMENT PROJECTS IN EEC



Source: https://www.boi.go.th/upload/content/Aviation_BOI%20roadshow_Full%20version_5ab4f81a06c70.pdf
www.krungsri.com/en/research/industry/summary-outlook/outlook-2022-2024

to-peer ridesharing. Authorities from the Ministry of Commerce, the Ministry of Transportation, and the Ministry of Digital Economy and Society must work closely in parallel to quickly respond to supply and demand in this new market that requires officials to adjust their attitudes accordingly. In the case of education, the country needs to put more effort into promoting the quality of human capital in its education system and working environment in technology transfer and practical training educational programs. Promoting the quality of education should be a priority and the government must take immediate action to address this urgent problem. Carefully planned research and pilot studies must be conducted before implementing any educational programs to assess their impact and prevent potential failures along with promoting quality education with all sectors to identify the skillsets needed in today's and future labor markets, such as digital literacy, technological skills, and soft skills such as creativity and collaboration. Acquiring quality human capital is one of the keys to success in global economic competition and GVCs.

For the problem of low-level technology transfer, increasing the government's R&D budget is one common remedy. Engaging the private sector by providing incentives for technology upgrades and innovation and encourages better cooperation between multinational corporations and local companies. In addition, universities will help to improve the situation and provide opportunities for local micro, small, and medium-sized enterprises (MSMEs), such as those in Tier 2 and Tier 3, to leverage their positions higher in GVCs and focus on producing more complex products.

Third, the Thai government should give more importance to MSMEs, as they play an important role in the economy. In 2017, MSMEs accounted for 99.7% of all enterprises in Thailand, 78.5% of total employment, and 29% of total exports. Especially, the agricultural sector had found difficulties to keep up with the digital era, responding to new markets and participation in GVCs.

Therefore, the role of government should be to strengthen Thailand's MSME capacity through a combination of policy tools including promoting the digital transformation capabilities of MSMEs by reducing access to credit of the commercial banks and provide corporate tax incentives and also provide the business support services. Under these particular capacity building initiatives, Thai MSMEs will be able to play their part in upgrading GVCs.

Finally, the country should put a lot of effort into developing its infrastructure. However, progress is still slow and not yet reached the competitiveness or sufficient levels, especially in the area of digital infrastructure economic zone. To reach higher levels in GVCs, technology is a prerequisite; even under the Thailand 4.0 initiative, the country is on the right track. But the digital infrastructure agenda should be moved forward and given top priority.

GVCs can be a tool for Thailand to escape the middle-income trap that can set the growth trajectory of the country as well as GVCs participation and economic growth in parallel. Then, the mainstreaming of GVCs must be integrated into the economic and industrial policy. The three factors and conditions mentioned above play an important role in accelerating GVCs for development. The stagnation of GVCs and global trade as shown in Figure 5.

Then, it can believe that the listed above characteristics of the macroeconomic and business environment will present the businesses with both opportunities and threats and in response to this situation, the players must adapt more quickly to evolving economic and social contexts also due to the changing regulation regime, thus will support the private sector lay the needed foundations to support the construction of an environment for a long-term, sustainable growth.

2. Premature Deindustrialization Risk, Productivity, and Impacts on Country-Specific Issue

C. Policy Approach in APO Members to Mitigate the Risk Posed by Premature Deindustrialization

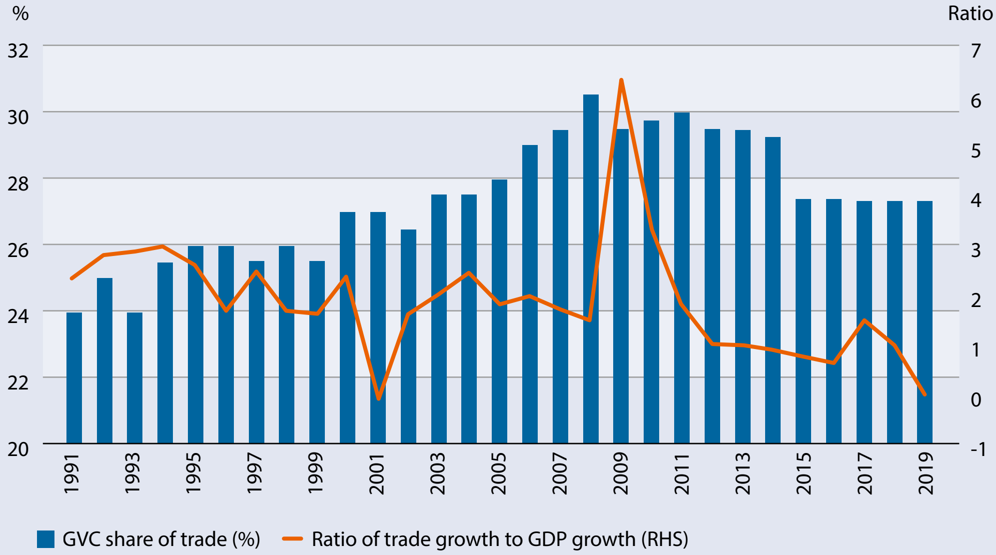
1. Government Policy

Economic Management in the 13th National Economic and Social Development Plan

To manage the economic aspect in the 13th National Economic and Social Development Plan, NESDP, (2023–27) the country has prioritized on the key following issues composed of:

FIGURE 5

STAGNATION OF GVCS AND GLOBAL TRADE, POST-2008



Source: www.krungsri.com/en/research/industry/summary-outlook/outlook-2022-2024

(1) Maintaining a favorable economic and political environment as well as creating economic stability and cushioning the impact from uncertain financial market and global economy in the new world.

(2) Maintaining the momentum of growth from public expenditure and investment, by (i) accelerating the disbursement of the forward budget and state enterprise budgets (ii) accelerating the disbursement process of FY 2024 (iii) Prepare projects under the FY2024 budget to be ready for disbursement and (iv) scrutinizing the achievement and monitoring the project performance.

(3) Stimulate and recover the tourism and related services sectors by (i) organizing tourism promotion activities in conjunction with the promotion of Long-Term Resident VISA (LTR) in order to attract high-potential foreign tourists, particularly long-stay group; (ii) promote domestic tourism, especially in secondary provinces with high potential that has not yet fully recovered; and (iii) promote the development of high-quality tourism.

(4) Support agricultural production and farmers' income by (i) protecting and mitigating the effects of climate change; especially managing water to be sufficient for cultivation; (ii) distributing an additional share of agricultural income to farmers; (iii) supporting farmers' risk mitigation measures under effective climate change crop insurance program; and (iv) cushioning the impact of rising agricultural materials cost.

(5) Promote export growth by (i) facilitating the export process and reducing related costs; (ii) promoting exports to the key markets with strong economic recovery in accordance with expanding into new markets with high potential and purchasing power; (iii) stimulating exports of products that generate benefit from trade protection measures; (iv) taking the advantage of the Regional Comprehensive Economic Partnership (RCEP) as well as accelerating the ongoing free trade agreement negotiations and seeking for the new trading partners; (v) protection and resolution of problems arising from trade barriers, especially non-tariff measures from major trading partners;

(vi) encourage the business sector to appropriately manage risks from the fluctuations of exchange rate; and (vii) increase the competitiveness of the export sector.

(6) Stimulate the private investment by (i) accelerating projects that have been approved and received the investment promotion certificates to start the actual investment; (ii) solving the problems and obstacles that hinder investors and entrepreneurs in investing and doing their business including labor shortages in the production sector as well as enhancing the capability in a highly skilled workforce to support the new target industries. (iii) proactively promoting investment and facilitating investors in target industries (iv) stimulate the investment in the Eastern Economic Corridor (EEC) and the Special Economic Corridor (v) support the investment in economic zone and transportation projects in accordance with the development plan.

2. Industrial policy

"Thailand 4.0" will be further facilitated and driven by GVCs, which will be focused on Thailand's general policy recommendations.

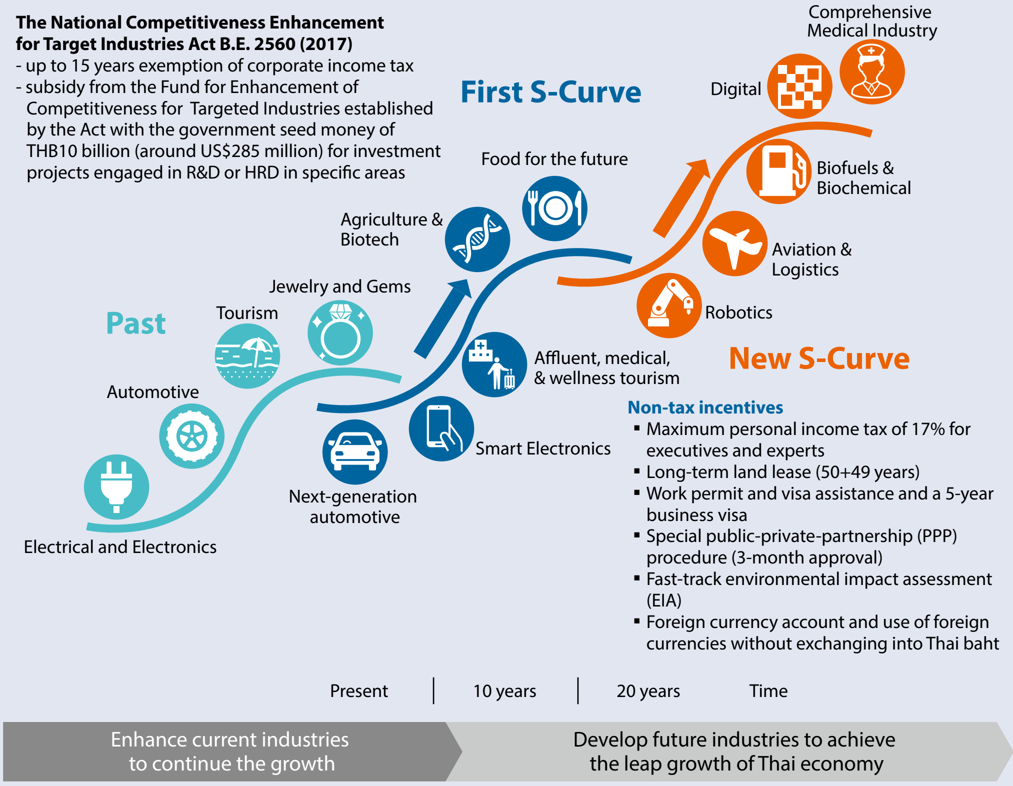
A policy recommendation for the country is to leverage existing strong industries through facilitating knowledge linkages between multinationals and local companies and enhance the movement of labor while improving the productivity and innovation in agriculture and services in high value added, which have become the key issues of the country. The country needs to prepare and move towards a more balanced and knowledge-intensive economy. The bottom-up strategies are also needed to address the underlying problems that remain in terms of institutions, education and infrastructure.

Since 2016, Thailand has been involved in a new structural transformation called "Thailand 4.0." This initiative perspective is inspirational for a good start. The top-down strategy economic model aimed to address three main challenges: the middle-income trap; the inequality trap and imbalanced traps and facilitate a smooth transition to a high value-added service economy. The policy has been focused on five transformations: from traditional farming to smart farming and precision farming, traditional MSMEs to smart enterprises and also startups. Buying technology to create technology, traditional services to high value services and unskilled labor to knowledge workers and highly skilled workers.

In terms of industrial transformation, the government is making more effort to upgrade the existing potential industries by enhancing their technological and innovative content and creates an industry based on new technology simultaneously. Five potential industries that exist are called "First S-Curve" industries which include automotive, electronics, medical tourism, agriculture and biotechnology and also food processing. Whereas, the new technology-led industries, referred to as "New S-Curve" industries, comprised of robotics, aviation and logistics, biofuels and biochemical, digital, and a medical hub represented in Figure 6. Although the government is trying to achieve Thailand 4.0, the reality is quite challenging. Some structural and fundamental problems have not been clearly or appropriately addressed in current policy so that Thailand has not yet fully transitioned to Thailand 3.0, an advanced industrial economy. Basic infrastructure for investment especially in terms of digital infrastructure, which is also required for Industry 4.0 is still not enough. In addition to basic infrastructure development problems, there needs to be attraction of high value-added and innovative activities by multinational corporations. Leveraging multinational corporations to leverage local companies and tackling the shortage of skilled workers due to the limitation of accessibility of quality education as well as the aging society and labor shortage are urgent problems as well. Despite top-down strategies and guidance, the country may be able to

FIGURE 6

THE FEATURE GROWTH OF THAILAND'S INNOVATION-DRIVEN INDUSTRIES



Source: https://www.boi.go.th/upload/content/Aviation_BOI%20roadshow_Full%20version_5ab4f81a06c70.pdf

implement a smooth transition; and the bottom-up strategies are also required to tackle the persisting fundamental problems in terms of institutions, education, and infrastructure as well.

2. 2 Methodology

2.2.1 Data

The research leverages national statistics or APO Productivity Databook and Database, and/or complemented by UN/WB data

2.2.2 Estimation Methodology

Empirical analysis: Observe the contribution of the manufacturing, service, and agriculture industries to economic growth and productivity.

Analysis of which factors contribute more to the economic growth rate, including consumption, investment, foreign investment, etc.

Self-comparison: The ratio among agriculture/manufactory/service in different time spans, the difference in their economic performance. Benchmark country's comparison: Compare country's ratio of different sectors with similar ratio from the benchmark country in their time and observing their changing pattern.

3. Thailand Economic Growth and Deindustrialization Trend, Risk of Premature Deindustrialization Analysis

3.1 Economic Growth Background and (De)industrialization Trend

Thailand's structural transformation from low- to middle-income status has been a success story, the country has been losing its competitiveness due to rising wages and preventing it from competing with more innovative advanced economies. The country has been caught in the "middle-income trap" and unable to become a high-income economy with the prolonged political turbulence that brings the economy in the shadow. Data from 2006 until present show severe fluctuations in the economy, as shown by GDP growth rates that have generally been lower than during the Asian financial crisis as shown in Figure 7.

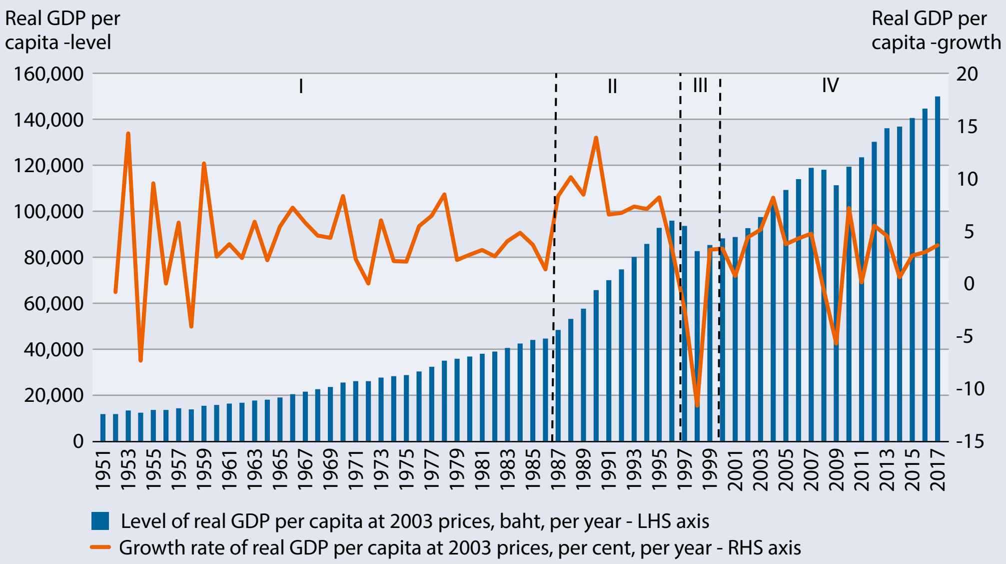
High GDP growth of Thailand has been claimed to be the result of the structural transformation during the pre-boom period from 1951–86 [10]. The country transitioned from a primitive agricultural-based economy to a newly industrialized economy with the share of manufacturing outweighing that of agriculture starting from 1971 and became more important from the 1980s onwards as demonstrated in Figure 8.

3.1.1 Background Statistics on Economic and Labor Productivity

Since, industrialization and urbanization have become the driving engine toward Thailand's modernization in early 1960s [2, 3, 11,16]. The economic growth rate of the country had been on a rise until late in 1990s and its growth rate was one of the highest at more than 7% during the boom with an average of 5% in the recession period during 1999–2005 [6,18]. However, the country started facing a slow-down growth rate in 2013 and fell to lower than the East Asia and Pacific countries average (excluding high-income countries) until 2020 and has been severely impacted by COVID-19 in particular. The industrialization of the country that has been impressive because it

FIGURE 7

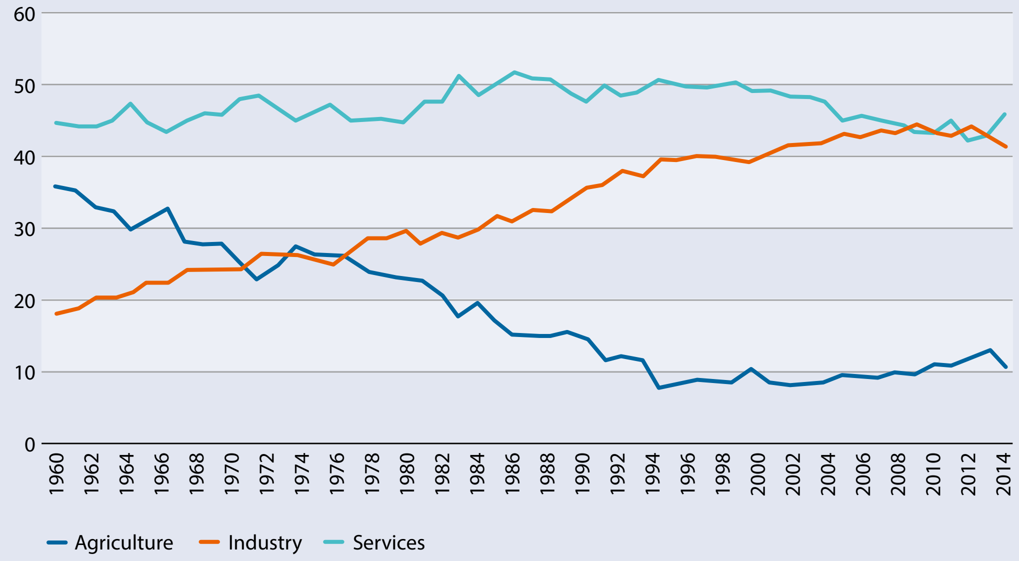
REAL GDP GROWTH AND GDP PER CAPITA IN THAILAND



Source: https://www.wider.unu.edu/sites/default/files/Publications/Working-paper/PDF/wp2020-46.pdf

FIGURE 8

STRUCTURAL TRANSFORMATION: NET OUTPUT AS % OF GDP, 1960–2014



Source: https://www.adb.org/sites/default/files/publication/178077/tha-industrialization-econ-catch.pdf

has been accompanied by job creation, welfare improvement, longer years of education and enrolment, and improvements in health security status [18].

This sector's contributions to the GDP surpassed the agriculture sector during 1986 (Figure 8) and became the export-led industrialization in 1975–78, although it had been practicing import-substitution strategy during 1966–1972 [5]. However, inadequate focus was on industrialization policies and strategies with regard to regional areas, sectoral linkage, and economic distribution in the whole country, despite its import-substitution industrialization strategy propelling the rapid industrialization. Consequently, income inequality increased due to massive domestic migration from rural regions to industrial areas, since the industrialization strategies were primarily concentrated in the Bangkok Metropolis and Eastern Region [7]. Then, the shift in the industrial policy from centralization to decentralization began in 1987 to encourage private investors to invest in remote areas in other regions as the policy effects had been confined to only the Central and Eastern regions in the early 1990s while others regions faced slow growth, income disparity, and dominance of the traditional of agriculture sector, even though the government intended to promote provincial and rural industry development by supporting the infrastructure and other related facilities [12,13]. ADB [1] also warned against unbalanced growth among various regions: the North, Northeast, Western and Southern regions lag behind Bangkok and its vicinity and also the Eastern region. However, in 2022, the GDP of the production side of the country grew at the rate of 2.6% while manufacturing showed a low rate of production. And in 2023, also service for construction on the production side resulted in a minus rate in 2022 and saw growth in early 2023. However, for the GDP expenditure side, investment by the private sector saw growth at the rate of 5.1% whereas the GDP of public expenditure saw growth at the rate of -4.9% as shown in Figs. 9–10. The rebound of the country's economy has been shown in the projected GDP of the country in 2023 as USD552.4 Bil. whereas the GDP in 2020–22 was USD500.5, 505.5 and 495.3 Bil. respectively. Also, the projection GDP per capita in 2023 is USD7886.90 whereas the GDP per capita in 2020–22 was USD7200.70, USD7254.10, and USD7090.90 respectively (Figure 11) and is predicted to increase reach to USD682.68 Bil. as shown in Figure 12.

FIGURE 9

GDP PRODUCTION SIDE

%YoY	2022							2023		
	Year	H1	H2	Q1	Q2	Q3	Q4	H1	Q1	Q2
Agriculture	2.4	3.7	1.2	3.4	4.0	-2.2	3.4	3.4	6.2	0.5
Non-Agriculture	2.6	2.2	3.1	2.0	2.3	5.1	1.2	2.1	2.2	1.9
Manufacturing	0.4	0.6	0.1	2.0	-0.8	6.0	-5.0	-3.2	-3.0	-3.3
Service	4.3	3.7	4.9	2.8	4.7	5.5	4.3	4.7	5.2	4.1
Construction	-2.7	-4.7	-0.4	-5.1	-4.4	-2.6	2.6	2.1	3.9	0.4
Wholesale and Retail Trade	3.1	2.9	3.3	2.7	3.2	3.5	3.1	3.4	3.3	3.4
Transportation and Storage	7.1	4.2	9.9	3.5	5.0	10.1	9.8	10.0	12.1	7.5
Accommodation and Food Service Activities	39.3	38.6	39.9	32.2	44.7	53.2	30.6	23.9	34.3	15.0
Information and Communication	5.1	6.0	4.3	5.7	6.3	4.7	3.9	3.5	3.4	3.6
Financial and Insurance Activities	1.0	1.2	0.8	1.0	1.4	1.0	0.5	2.5	1.2	3.8
GDP	2.6	2.3	2.9	2.2	2.5	4.6	1.4	2.2	2.6	1.8
GDP_SA (QoQ)				0.5	0.9	0.8	-1.0		1.7	0.2

Source: Office of the National Economic and Social Development Council

FIGURE 10

GDP, EXPENDITURE SIDE

%YoY	2022							2023		
	Year	H1	H2	Q1	Q2	Q3	Q4	H1	Q1	Q2
Private Consumption	6.3	5.3	7.3	3.5	7.1	9.1	5.6	6.8	5.8	7.8
Government Consumption	0.2	5.4	-4.2	8.2	2.7	-1.5	-7.1	-5.3	-6.3	-4.3
Investment*	2.3	0.1	4.7	1.0	-0.9	5.5	3.9	1.8	3.1	0.4
Private	5.1	2.6	7.6	2.9	2.3	11.2	4.5	1.8	2.6	1.0
Public	-4.9	-6.3	-3.3	-3.8	-8.8	-6.8	1.5	1.9	4.7	-1.1
Exports	6.8	9.8	3.9	11.9	7.8	8.7	-0.7	1.4	2.1	0.7
Goods	1.3	6.9	-4.3	9.7	4.3	2.3	-10.5	-6.0	-6.4	-5.7
Services	65.8	41.6	87.7	35.5	47.7	79.2	94.9	66.1	78.2	54.6
Imports	4.1	5.9	2.3	4.4	7.3	9.5	-4.8	-1.7	-0.9	-2.4
Goods	5.4	8.3	2.6	6.6	9.9	11.2	-5.9	-3.8	-3.3	-4.3
Services	-0.6	-2.6	1.3	-3.3	-1.9	3.7	-0.9	7.3	9.2	5.4
GDP	2.6	2.3	2.9	2.2	2.5	4.6	1.4	2.2	2.6	1.8

Source: Office of the National Economic and Social Development Council
Note: * Investment means Gross Fixed Capital Formation

FIGURE 11

ECONOMIC PROJECTION IN 2023

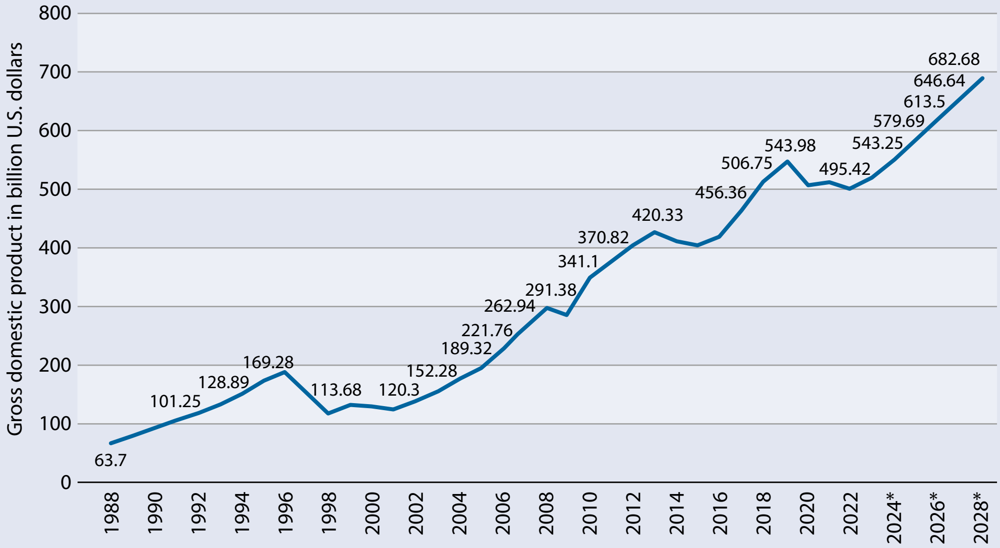
	Actual Data			Projection for 2023	
	2020	2021	2022	May 15th, 2023	Aug 21st, 2023
GDP (at current prices: Bil. Baht)	15,661.1	16,166.6	17,370.2	18,395.1	18,169.3
GDP per capita (Baht per year)	225,311.4	231,986.1	248,677.2	262,633.3	259,409.3
GDP (at current prices: Bil. USD)	500.5	505.5	495.3	552.4	534.4
GDP per capita (USD per year)	7,200.7	7,254.1	7,090.9	7,886.9	7,629.7
GDP Growth (CVM, %)	-6.1	1.5	2.6	2.7 – 3.7	2.5 – 3.0
Investment (CVM, %)[2/]	-4.8	3.1	2.3	2.1	1.6
Private (CVM, %)	-8.1	3.0	5.1	1.9	1.5
Public (CVM, %)	5.1	3.4	-4.9	2.7	2.0
Private Consumption (CVM, %)	-0.8	0.6	6.3	3.7	5.0
Government Consumption (CVM, %)	1.4	3.7	0.2	-2.6	-3.1
Export volume of goods & services (%)	-19.7	11.1	6.8	6.9	5.0
Export value of goods (Bil. USD)	227.0	270.6	285.2	280.8	280.1
Growth rate (%)[3/]	-6.5	19.2	5.4	-1.6	-1.8
Growth rate (Volume, %)[3/]	-5.8	15.5	1.2	-1.1	-1.8
Import volume of goods & services (%)	-13.9	17.8	4.1	1.6	1.1
Import value of goods (Bil. USD)	186.6	238.2	271.6	269.4	268.5
Growth rate (%)[3/]	-13.6	27.7	14.0	-1.9	-1.1
Growth rate (Volume, %)[3/]	-10.5	17.9	1.2	-0.4	-0.6
Trade balance (Bil. USD)	40.4	32.4	13.5	11.4	11.6
Current account balance (Bil. USD)	20.9	-10.6	-14.7	7.9	6.6
Current account to GDP (%)	4.2	-2.1	-3.0	1.4	1.2
Inflation (%)					
CPI	-0.8	1.2	6.1	2.5 - 3.5	1.7 – 2.2
GDP Deflator	-1.3	1.7	4.7	2.2 – 3.2	1.5 – 2.0

Source: Office of the National Economic and Social Development Council, 21st August 2023

Note: [1]/ Data were calculated based on new National Accounts Office's series, published on www.nesdc.go.th.
[2/] Investment means Gross Fixed Capital Formation.
[3/] Export and import is based on the Bank of Thailand's data.

FIGURE 12

THAILAND: GROSS DOMESTIC PRODUCT (GDP) IN CURRENT PRICES FROM 1988–2028



Source: Thailand - Gross domestic product (GDP) 2028 | Statista.pdf

3.1.2 (De)Industrialization Trends

The world economy 2022–24: Gradual recovery

The structural changes to the world economy with long-term impacts on business and industry in Thailand.

The structure of the world economy is changing as it continues to shift from a reliance on manufacturing to a greater focus on high value-added services. The share of global GDP generated by the services sector increased from 60.4% in 2008 to 64.3% in 2019. In developed countries, this share is generally much higher and approximately 75% of the US and UK GDP comes from the services sector. Most of this comes from modern services such as IT/software, telecommunication and finance.

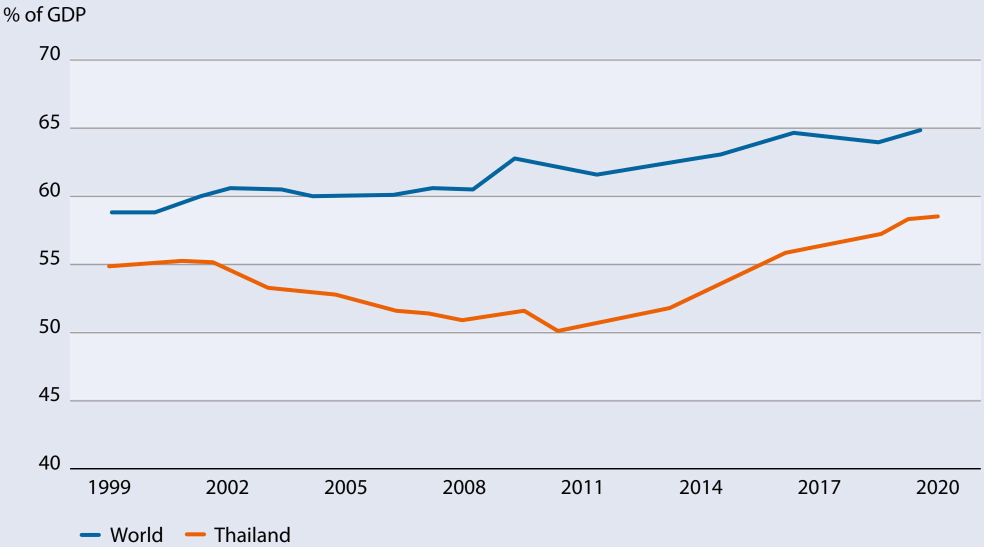
In Thailand, the services accounted for 58.3% of the economy in 2020, up from 50.4% in 2008 (Figure 13), but unlike developed countries, traditional services that have low added value dominate (such as tourism, commerce, hotels and restaurants). In contrast, only 14% of Thailand's GDP comes from modern, high value-added services, which tend to be concentrated in finance, telecommunications, and others.

In the coming period, the service sector will have an opportunity to increase its contribution to Thailand's GDP through increased application of new technology and innovation for high value added within the sector. For example, through the development of online platforms that provide access to tourist attractions around the world and the development of robotic and remote surgery systems. In addition, by improving the high value added in smart farming and precision farming in agricultural sector for better hygiene and quality adapted for climate resilience and GHG emission.

Simultaneously, the manufacturing sector is also turning to "services" to add more value to their products and to increase product differentiation by using IoT, machine learning, deep learning, AI and big data analytics to improve the designs and make recommendations so that companies can

FIGURE 13

SHARE OF SERVICE SECTOR IN GDP



Source: www.krungsri.com/en/research/industry/summary-outlook/outlook-2022-2024

increase sales and produce new products that more directly and accurately meet customer needs. These trends are increasing the importance of services in the supply chain. However, bringing the contribution of services to GDP to developed countries is difficult due to two reasons. One, the service sector and related businesses (e.g. hotels, restaurants, real estate, and construction) have been heavily affected by the COVID-19 crisis. Two, compared to developed countries, Thai regulations and policies are quite unaccepting of foreign investment in the service sector. As reflected in Thailand's ranking of 46 out of 48 in the 2020 WB Services Trade Restrictions Index, existence of high barriers to entry means that it is difficult to bring in new investment and technology to the service sector, and this is a major obstacle to the transition to modern high service delivery. This is a challenge for Thailand in transforming the service sector into modern high services amidst the gradual economic growth of the country.

Modern technology such as IoT, AI, Big Data, Blockchain, Edge Computing and Cloud Computing is rapidly and broadly changing the structure of the manufacturing and service sectors. The wave of digital transformation sweeping the world is helping to create high value for the manufacturing and service sectors to increase the sustainability of growth and enhance the supply chain security. Over the next three years, the key technological developments impacting the economy will be composed of i) IoT: IoT will play a greater role in collecting data related to day-to-day activities in real-time from sensors installed in various devices including medical equipment, electrical appliance and car accessories. The number of IoT applications continues to increase, and it is now being used in smart hotel rooms. Also, the system become more effective in environment detection for smart farming and precision farming to improve the management in crop production, livestock industry and aquaculture through chatbot application. ii) Robotics: The use of robots that are embedded in software, microprocessors, and sensors or other machines can work with precision and automation to reduce production losses and increase work safety. In particular, suitable for use in repetitive applications such as transporting hazardous materials in electronics or construction industries, land preparation and growing crops, feeding livestock and cleaning farmhouse as well.

iii) AI: AI is used in various industries such as manufacturing, agriculture and service sector. It is often combined with other technologies such as Edge Computing, Cloud Computing and IoT for use in big data analytics or to develop “cobots” (robotic systems that work alongside with humans) that are used in the automotive and electronics industries. iv) 5G technology: This technology is used to develop networks that enable the operation of various machines that can be integrated effectively, reducing the labor costs, reducing working time and reducing the production waste. v) Drones: Drones are reducing companies’ reliance on labor and reduce time for land surveying especially in an agricultural context, which is used in every step from planning the planting schedule till harvesting. Agricultural drones are also used to locate and track livestock, spray chemicals, soil mapping and yield mapping. While in the real estate sector, developers are using drones to measure or survey land, especially when doing it manually can be dangerous. vi) Blockchain: Blockchain is a method of storing information on a distributed ledger that can be accessed by those within the network and is restricted by using a password. This is a secure way for storing information and is used in finance to develop digital assets, in the agricultural sector to maintain transparency of the supply chain and origins and in logistics when combined with cloud computing, blockchain will be used to track deliveries. vii) Edge Computing: This involves real-time adjustments to the production process through the application of big data analytics and live data based on consumer preferences for user to user that enable very quick response to changes in consumer behavior. And currently most commonly used in the health, recreation, agriculture and transportation industries. viii) Quantum Computing: Transitioning from binary digital processing to computer systems that take advantage of quantum indeterminacy and lead to huge expansion in computational power and speed. Dramatically increasing the capabilities of AI and robotic systems, commercial applications of quantum computing are beginning to emerge, especially in the field of smart devices (such as robots and self-driving vehicles) and will extend to other field in the near future. ix) 3D Printing: Advances in 3D printing technology have made it possible for low-cost design and produce in a wide range of products rapidly and now increasingly used in manufacturing supply chains connected to development of auto parts and in the production of vehicle and aircraft parts, electronic equipment, medical equipment and dental implants also being used in the construction sector for quick design and building of new structures. x) Synthetic Biology: The most common application of synthetic biology is in the production of synthetic meat, such as ‘cultured meat’, which is grown from stem cells from target animals (such as from cows, chickens, pigs and tuna), and plant-based meat made from plant-based products with the taste and texture as real meat to reduce some health risks associated with meat consumption and as an alternative source of meat in the event of an outbreak of disease in livestock. xi) Data Analytics: The systematic analysis of big data to help companies deliver products and services that better meet the needs of customers. For example, data analytics is used in the tourism sector to analyze historical data for better prediction of the demand growth or to recommend for potential targeted packages travelers.

The global value chains become shorter, and this increases the competitive pressure on the industry. For the upstream industry, the major economic powers are continually creating and maintaining trade barriers as well as increasing self-reliance and competition through the development of new technology. Some of these events are resulted from the COVID-19 pandemic and the subsequent disruption of the production line. This can be seen from the production problems in the automotive industry facing the global chip shortage. Then, a lot of companies have adopted sources of production factors within their home regions. As a result, GVCs are shrinking at an accelerating rate.

When the trade channels narrow, increasing competitive pressures in this environment, the widest range of opportunities will be presented to countries producing upstream products or downstream

FIGURE 14

INDUSTRIES THAT NEED TO MOVE ALONG GLOBAL SUPPLY CHAINS

Move Upstream	Move Downstream
1. Agriculture, forestry and fishing	1. Wood and products of wood and cork
2. Food products, beverages and tobacco	2. Paper products and printing
3. Coke and refined petroleum products	3. Rubber and plastic products
4. Chemicals and pharmaceutical products	4. Other non-metallic mineral products
5. Basic metals	5. Fabricated metal products
6. Computer, electronic and optical products	6. Electrical equipment
7. Motor vehicles, trailers and semi-trailers	7. Machinery and equipment
8. Other transport equipment	8. Electricity, gas, water supply, sewerage, waste and remediation services
9. Other manufacturing	9. Construction
10. Accommodation and food services	10. Transportation and storage
11. Real estate activities	11. Publishing, audiovisual and broadcasting activities
12. Other business sector services	12. Telecommunications
	13. IT and other information services

Source: www.krungsri.com/en/research/industry/summary-outlook/outlook-2022-2024

products, where the players can generate maximum added value to the global value chains. The countries in this group include the United States, the European Union, and China [17].

However, as high competition, the mid-range players produce intermediate products, usually to order in industries such as electronics, computers, and automobile assembly with narrowing opportunities to add value through production processes. The manufacturers in this unfavorable part of the value chain need to reconsider their most appropriate position possible to keep going until reaching the extreme point by going up or down. This particular condition indicates that industrial sectors are more important to the Thai economy. Players in the automotive industry, computer manufacturing and petroleum refining should move upstream, whereas electronics and machinery manufacturers are probably best moved downstream (Figure 14).

To achieve this ultimate goal, it is necessary to form an alliance with countries that already compete strongly and efficiently in the global market that will enable Thai players to add additional high value and establish a sustainable place in the global supply chain.

The global trade integration is more likely to take the form of regional trading blocks, such as the Regional Comprehensive Economic Partnership (RCEP) and the Comprehensive and Progressive Agreement for the Trans-Pacific Partnership (CPTPP). There are 11 member countries: Japan, Canada, Mexico, Peru, Chile, Australia, New Zealand, Singapore, Malaysia, Brunei and Vietnam.

Currently, concerning antitrust regulations that would specifically impact the agricultural and pharmaceutical industries, Thailand still has not yet held clear intention to join the CPTPP. On the other hand, the RCEP has 10 ASEAN member countries and five further countries trade with the ASEAN region including Australia, China, Japan, New Zealand and the Republic of Korea. The agreement has now been fully ratified and will enter into effect on 1 January 2022. Under this matter, all member countries have agreed to reduce tariffs by approximately 90% over a 10–20-

FIGURE 15

RCEP SHARE OF GLOBAL MEASURES (%)

Source: www.krungsri.com/en/research/industry/summary-outlook/outlook-2022-2024

year period, even tax reductions are effective moving forward with the readiness of each country. It can be estimated for Thailand that joining RCEP will benefit the sale of fresh and processed fruits, fishery products, rubber products, tires and tire products, plastics, chemicals, components for electrical appliances, computers and parts.

The overall impact of the proposed tax reduction is expected to be not dramatic because all RCEP members had already had free trade agreements with Thailand. Nevertheless, for the long term, the agreement will provide additional stability for Thai players embedded in regional manufacturing supply chains. Particularly, in countries where Thailand is already competitive and has a strong production base (especially the production of automobiles and auto parts, petrochemicals and plastics). Besides, in the next few years, the significant size of the RCEP market will gear an advantage for all members through greater connectivity to global supply chains as shown on Figure 15.

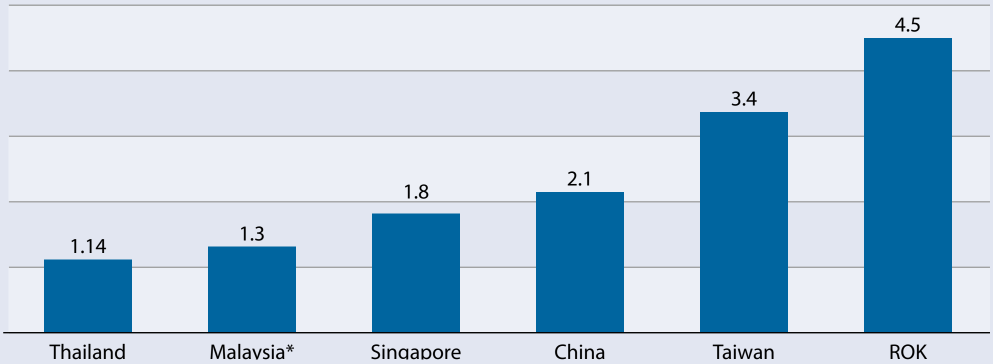
Thai Economy 2022–24: Exports recovery supported by a recovering investment cycle

The economy of Thailand is expected to grow at an average of 3.7% per year over the next three years. Gradually recovery will begin in the final quarter of 2021 and will be supported by a number of factors (i) progress in the vaccination program means that the pandemic of COVID-19 is starting to pass and resulting in the recovery of the domestic economy. In addition, widespread behavioral changes and the adoption of a "new normal" coupled with rapid progress towards digital transformation also stimulate greater demand of goods and services among those affected by these developments. (ii) The tourism sector will gradually recover with reopening to international tourists at the end of 2021, despite tight controls in some origin countries and uncertainty about the possibility of an outbreak will continue to have an impact on the sector, and it won't be until 2025 that arrivals will return to pre-pandemic level. (iii) Continued export growth and global demand recovery; especially the export market combined with more regional trade trends to ensure the export sector will be a key mechanism of Thailand's economic growth in the coming period. The RCEP, which comes into effect from the beginning of 2022, will stimulate the trade of the country in the coming period. Although the outlook is bright, exports are still under pressure from supply

FIGURE 16

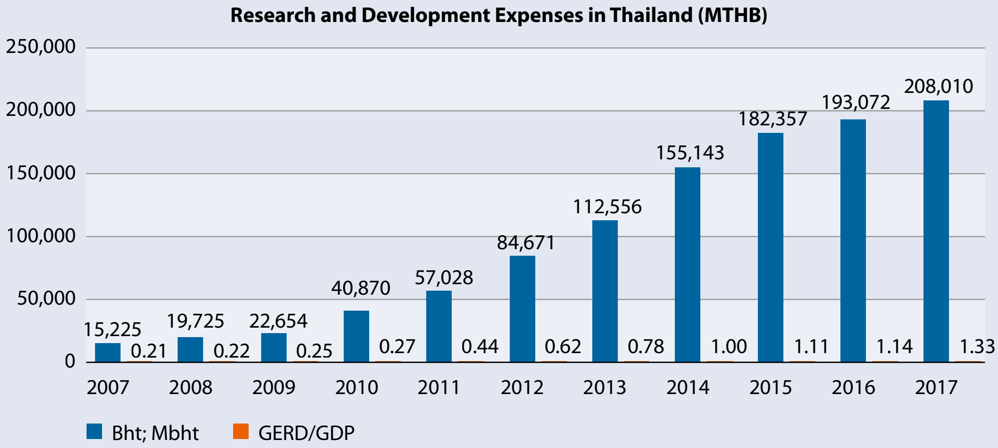
EXPENDITURE ON R&D (% OF GDP)

(a) Comparison on R&D allocation among ASIAN countries



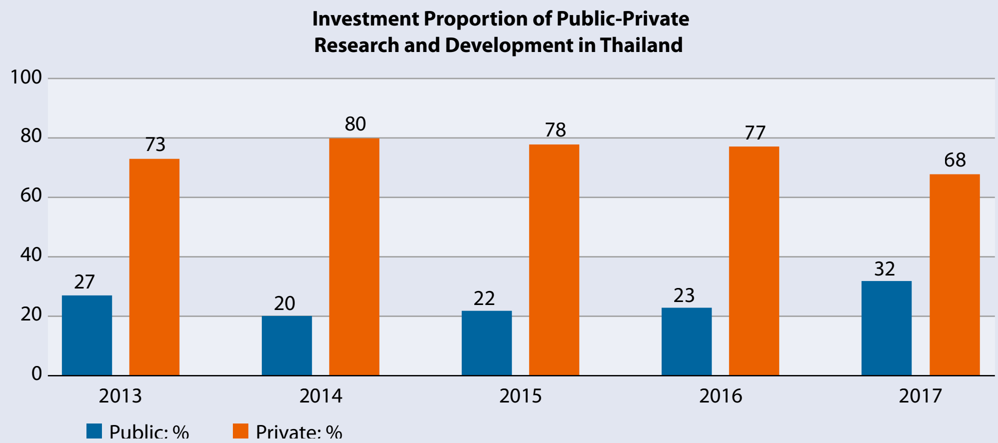
Source: www.krungsri.com/en/research/industry/summary-outlook/outlook-2022-2024

(b) R&D budget in Thailand from 2007–17



Source: https://www.innolifethailand.com/?p=9772

(c) Investment proportion of public-private in R&D



Source: https://www.innolifethailand.com/?p=9772 problems that may take the form of raw material shortages and higher costs or periodic trade barriers. (iv) Private investment is likely to increase due to the cyclical economic recovery and increased production needed to support greater digital transformation. The investment will also benefit from stronger government spending on infrastructure megaprojects. (v) Further economic uplift will come from the government policy that creates stimulus from normal budget expenses. In finance, the Bank of Thailand has maintained the policy interest rate at a record low of 0.5% until at least the end of 2022 and continue to maintain support measures, including debt restructuring measures and increased liquidity for households and business debtors. Regulations will remain relaxed to ensure assistance is provided to debtors. Meanwhile, the temporary relaxation of Loan-to-Value rules will provide additional stimulus to the real estate market.

However, while the trend is to grow over the next few years, negative factors will continue to put pressure on the economy of the country, including labor shortage, market and increased household and corporate debt, which may prevent increased spending. Other risks and uncertainties may arise from additional mutations of the COVID-19 virus or from political tensions in the country that may lead to disruptions in government policy. Domestic and global financial markets may have to contend with increased turmoil and rising financing costs with potential adverse side effects of scaling back stimulus packages and policy normalization in major economies.

3.2 Impact of Premature Deindustrialization on Productivity Performance

3.2.1 Assessment of Premature Deindustrialization Risk

Thailand still performs poorly in R&D and allocates only 1.14% of GDP to R&D (Figure 16), the lowest rate among its Asian competitors and grows to 1.33% of GDP in 2017. The country aimed to increase the allocated budget to 2% of GDP in 2024. However, the investment of public research and development budget in Thailand are still low compared to the investment of private research and development budget. The R&D budgets of the government gradually increase year by year, and in 2017, the ratio of R&D budget between public and private was 32 to 68, with the total amount of research budget being THB208,010M as shown in Figure 16 (b and c). However, the joint research collaboration between the public sector and private companies has made more effort to develop new products such as IoT platforms for smart livestock farming and EV trucks as represented in Figure 17 (a and b) and try to implement and launch in the real market. This indicates that it will take a long time to develop the ability of Thai players to produce products and value creation services through innovation to compete in the global market, especially compared to the five most competitive countries: Switzerland, Sweden, Denmark, the Netherlands and Singapore. These are all strengthened by investments in innovation, digitalization, welfare benefits provision, and social cohesion.

3.2.2 Issues Posed by Premature Deindustrialization related to Productivity and Economic Growth - An Empirical Analysis

Taguchi [15] addresses premature deindustrialization in Thailand, noting that the regional manufacturing activities related to premature deindustrialization also appear to have been affected by the following events. First, the country suffered from a financial crisis from 1997–98, and continuous capital flights have put pressure on regional manufacturing activities. Second, China's entry into the World Trade Organization (WTO) in 2001 has impacted manufacturing in Thailand, resulting in a large influx of lower-priced manufactured goods from China. Third, the political crisis between 2005–06 and the floods in 2011 also had an impact on the manufacturing sector.

Then, a panel dataset was created for seven regions of Thailand over the period 2014–21. All data has been accumulated and drawn from the Office of the National Economic and Social Development

FIGURE 17

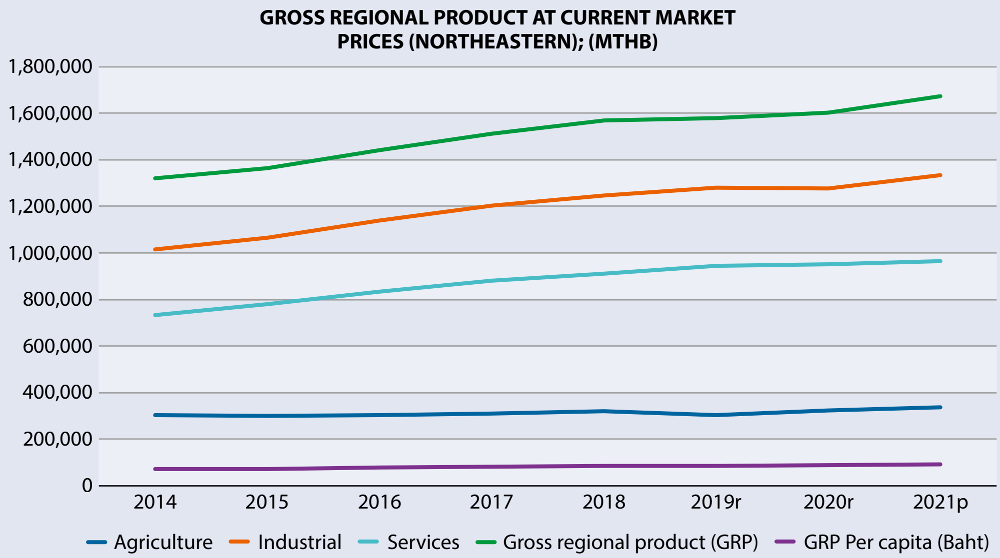
JOINT RESEARCH PARTNERSHIP TO DEVELOP NEW PRODUCTS IN EV TRUCK AND IOT PLATFORM

(A) IOT PLATFORM FOR LIVESTOCK **(B) EV TRUCK**

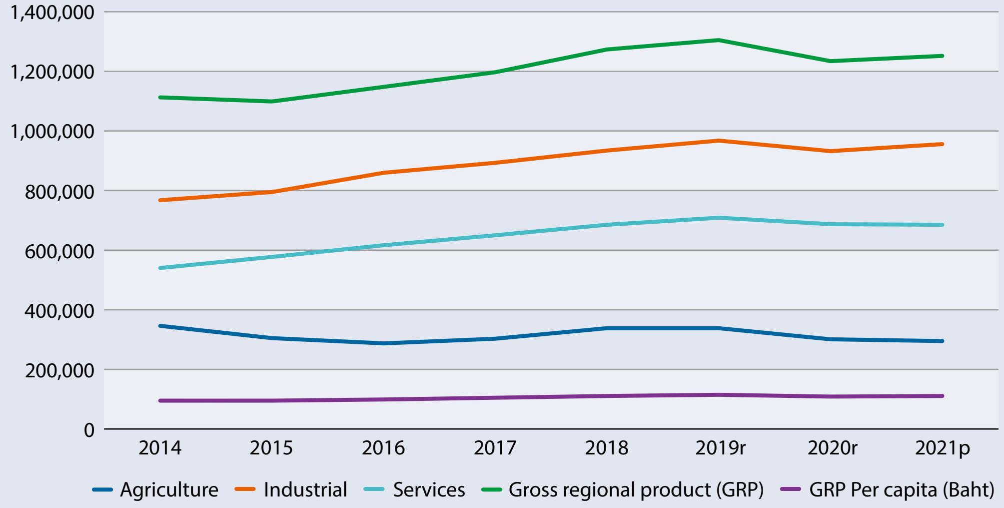
Source: Presentation1_LivestockTechTH.pdf

FIGURE 18

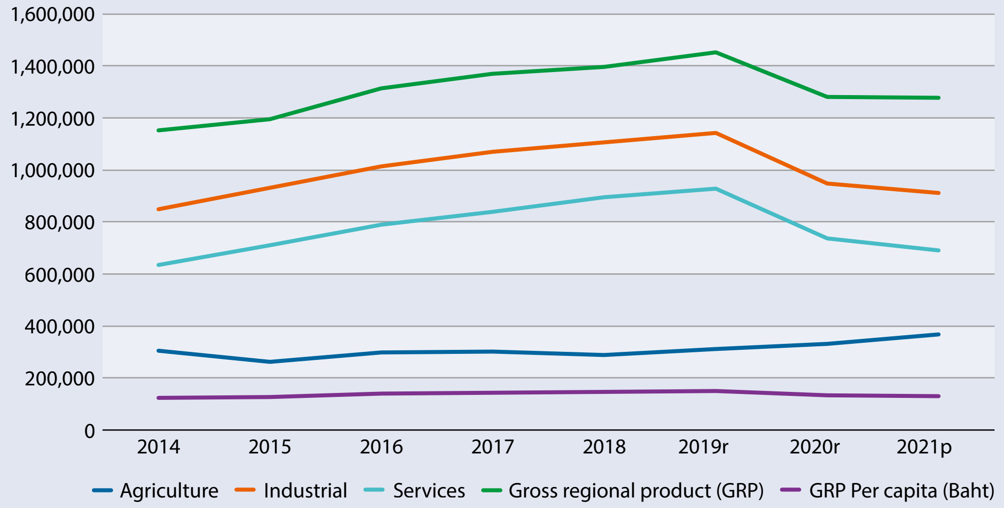
THAILAND REGIONAL STRUCTURAL TRANSFORMATION DURING 2014–21



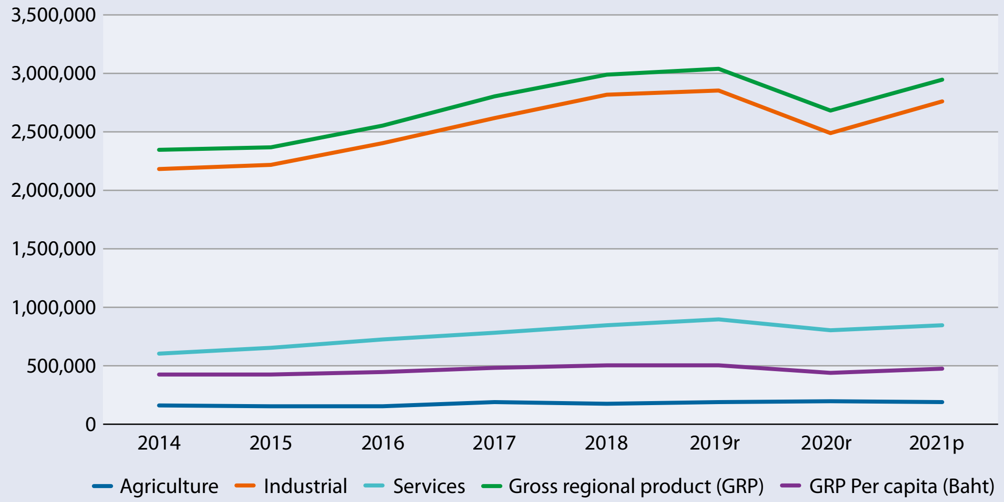
GROSS REGIONAL PRODUCT AT CURRENT MARKET PRICES (NORTHERN); (MTHB)

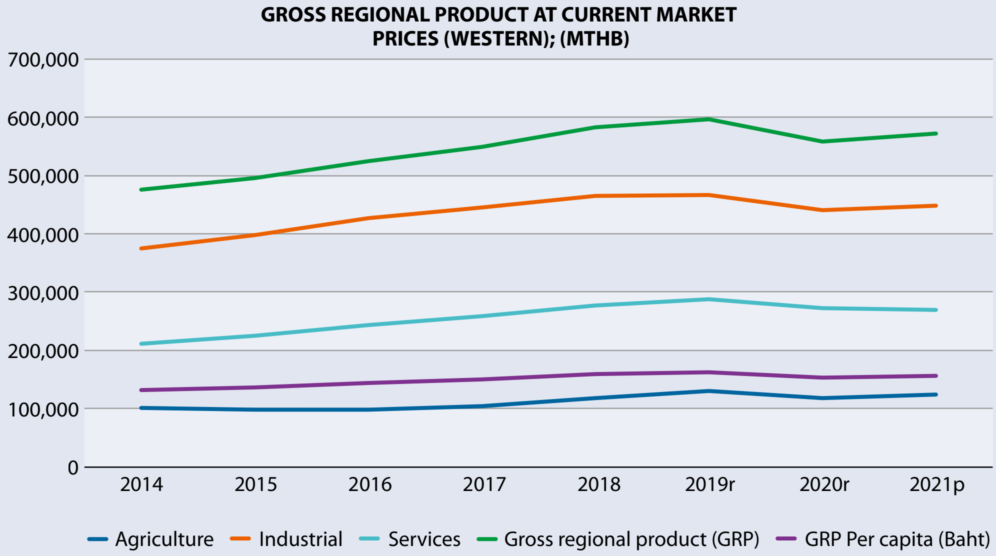


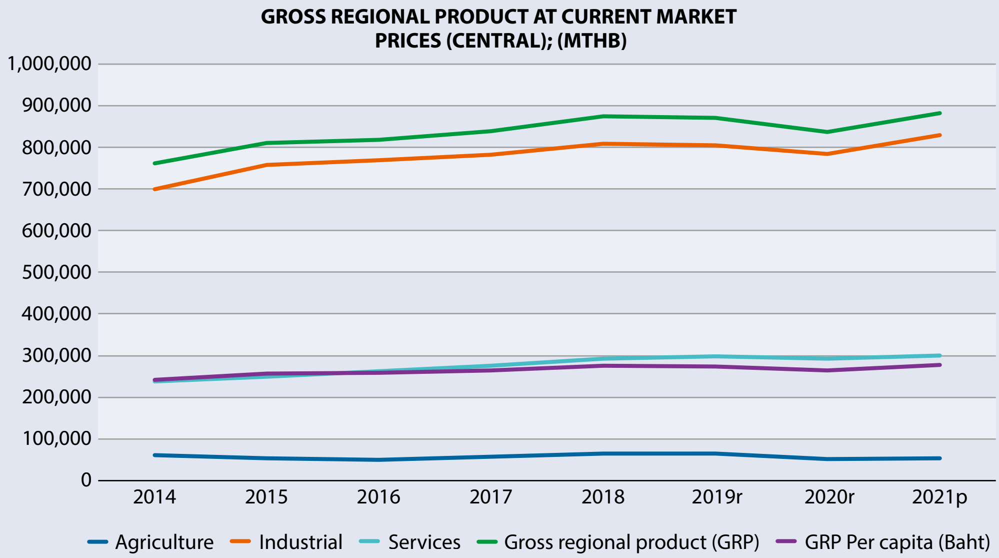
GROSS REGIONAL PRODUCT AT CURRENT MARKET PRICES (SOUTHERN); (MTHB)

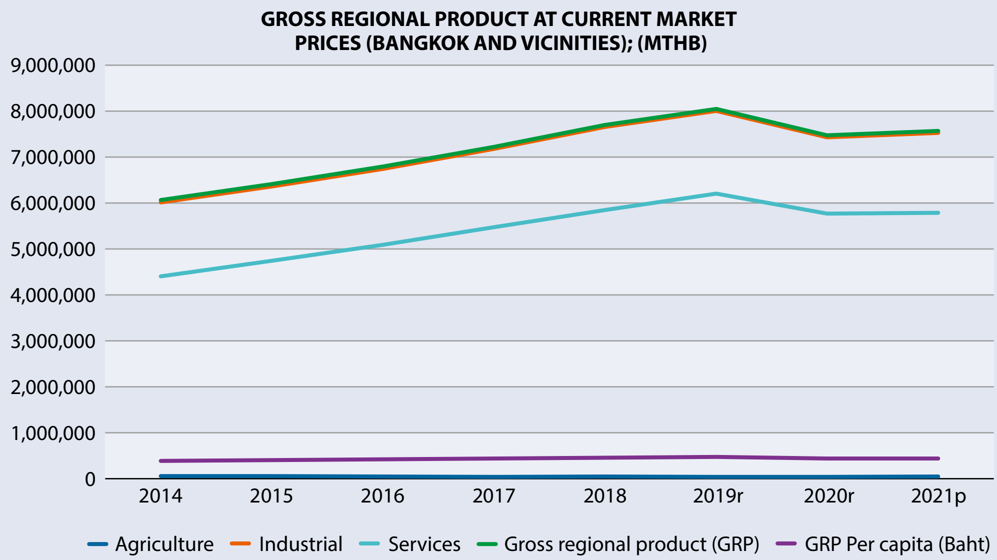


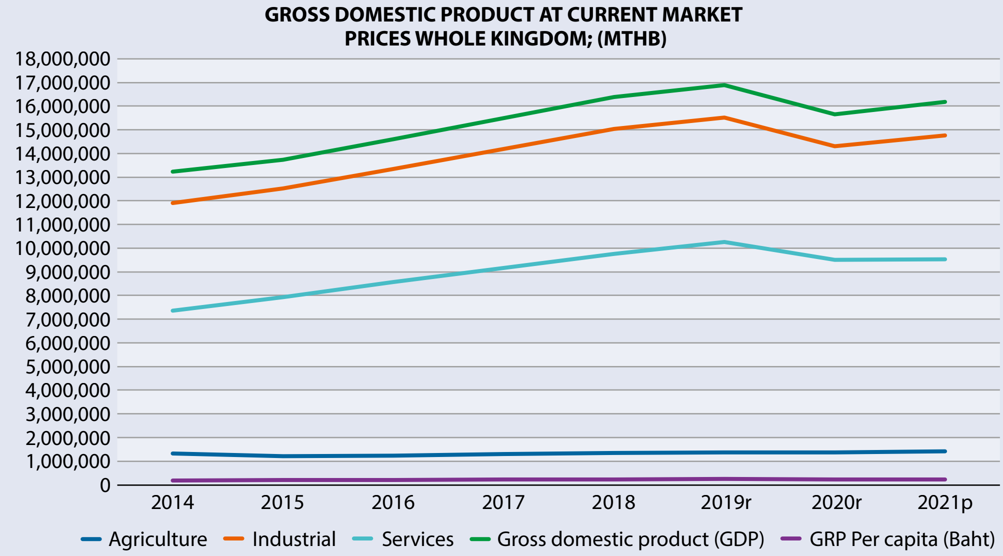
GROSS REGIONAL PRODUCT AT CURRENT MARKET PRICES (EASTERN); (MTHB)




GROSS REGIONAL PRODUCT AT CURRENT MARKET PRICES (WESTERN); (MTHB)
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
2014
2015
2016
2017
2018
2019r
2020r
2021p
Agriculture
Industrial
Services
Gross regional product (GRP)
GRP Per capita (Baht)


GROSS REGIONAL PRODUCT AT CURRENT MARKET PRICES (CENTRAL); (MTHB)
1,000,000
900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
2014
2015
2016
2017
2018
2019r
2020r
2021p
Agriculture
Industrial
Services
Gross regional product (GRP)
GRP Per capita (Baht)

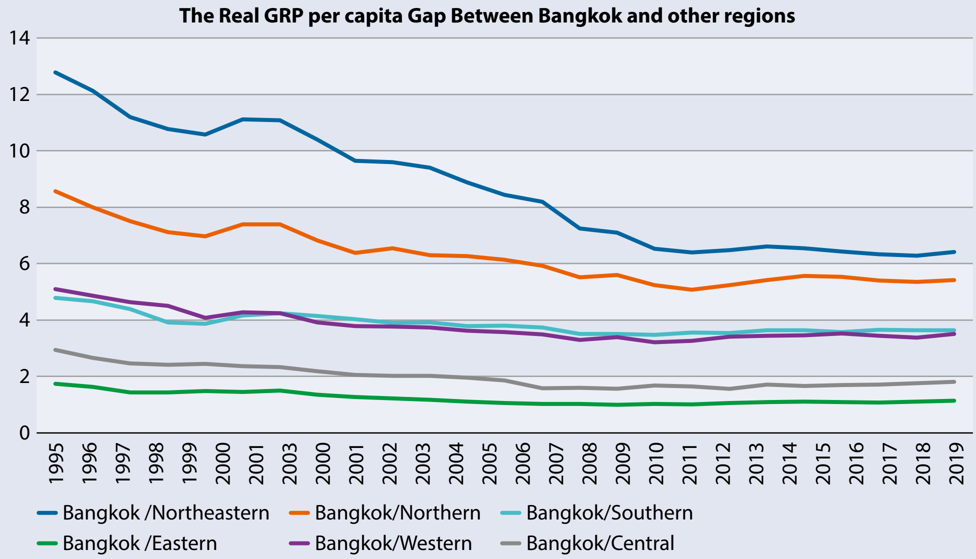

GROSS REGIONAL PRODUCT AT CURRENT MARKET PRICES (BANGKOK AND VICINITIES); (MTHB)
9,000,000
8,000,000
7,000,000
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
2014
2015
2016
2017
2018
2019r
2020r
2021p
Agriculture
Industrial
Services
Gross regional product (GRP)
GRP Per capita (Baht)



Source: NESDC stat (https://www.nesdc.go.th/nesdb_en/main.php?filename=index)

FIGURE 19

THE REAL GRP PER CAPITA GAP BETWEEN BANGKOK AND OTHER REGIONS



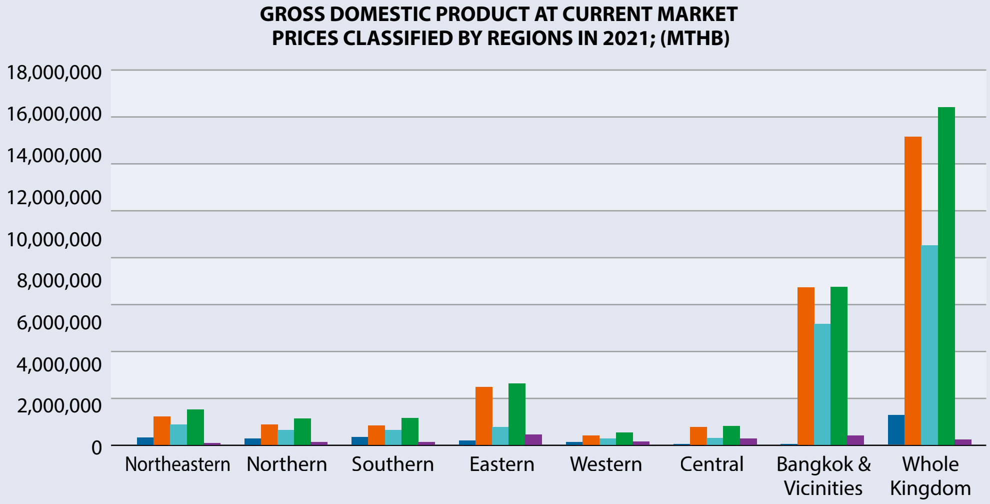
Source: https://mpra.ub.uni-muenchen.de/113560/ MPRA Paper No. 113560, posted 30 Jun 2022 07:09 UTC

Council (NESDB). Descriptive statistics for the data are presented in Figure 17.

The industrial transformation in Thailand differs by region. There were clear differences between the two groups (Eastern and Central regions, and the other regions): the Eastern and Central regions focus on the manufacturing sector; while in the others, the service sector has a dominant share, and only the Southern service sector declined during 2020–21 due to the COVID-19 pandemic. Bangkok and the vicinities appear to be entering a mature stage with an increase in the service

FIGURE 20

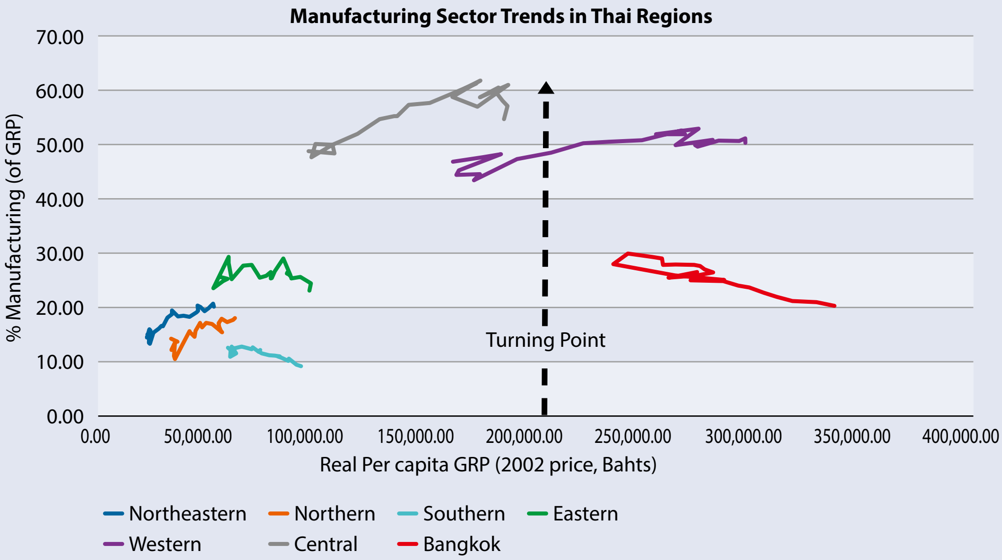
GDP AT CURRENT MARKET PRICE CLASSIFIED BY REGION IN 2021



Source: NESDC stat (https://www.nesdc.go.th/nesdb_en/main.php?filename=index)

FIGURE 21

REGIONAL TURNING POINT IN THAILAND



Source: https://mpra.ub.uni-muenchen.de/113560/ MPRA Paper No. 113560, posted 30 Jun 2022 07:09 UTC

sector's share, as their GRP per capita (2002 constant prices) is the highest among the regions. The Eastern and Central regions appear to follow a robust industrialization process as their manufacturing shares reach a high level above 50%. In the other regions, the manufacturing shares stay at lower levels implying that the existence of the premature deindustrialization risk and also the degree of convergence in GRP per capita among regions can be observed.

Islami and Hastiadi [8] also estimate the highest industrial GDP per capita level to be USD6,285 in Indonesia, so the maximum income in Thailand is lower than USD47,099 in the pre-1990 period and USD20,537 in the post-1990 period. It is estimated to be the highest level of industrial development income by Rodrik [14]. This indicates the existence of premature deindustrialization at the national level in the country. Figure 18 shows the relationship between the share of manufacturing output and GDP per capita in each of the seven regions of Thailand, Bangkok and The East has passed a turning point and the central region is close. The remaining regions are far behind the turning point with lower share of output [15] as shown in Figure 19 and the GDP at current market price classified by region in 2021 demonstrated in Figure 20.

To avoid the risk of premature deindustrialization in latecomer regions, currently, the government industrial policy does not necessarily focus on the industrial development of latecomer regions. In fact, the Western, Northern, Northeastern and Southern regions are lagging behind other regions in terms of manufacturing development, as shown in Figs. 18 and 19. Rodrick [14] has recommended avoiding the premature deindustrialization even under "import deindustrialization" by the creation of comparative and competitive advantage in the manufacturing sector in the national economy. In the context of regional development within the country, the overcoming premature deindustrialization in latecomer regions is likely to lead to its attainment of "inclusive growth," fairly distributed throughout society, and create opportunities for all in the economy.

3.2.3 Economy case study on specific issue relating to premature deindustrialization.

Example of Republic of China: due to environmental protection protests, rising labor costs and land acquisition costs, industries have moved out on a large scale, the proportion of manufacturing has declined, and economic growth has been sluggish.

3.3 Policy recommendations

Recommendations in terms of Industrial policies/Productivity policies/Innovation policies such as:

3.4 Attract foreign investment to increase technology intensity

Expand export markets to facilitate the export of labor-intensive products.

Establish science parks/industrial parks, talent training, R&D/automation.

Investment offsets, foreign trade promotion agencies, industrial research institutes, etc.

In addition to encouraging foreign investment to lay out the global supply chain, Board of Investment (BOI) has announced on December 8, 2022 the Five-Year Investment Promotion Strategies (2023–28) which are enforced on BOI applications submitted from January 3, 2023 onward.

1. In order to develop competitiveness in the agricultural, industrial and service sector, the projects that submitted for BOI promotion must have the following qualification.

   1.1 The value-added of the project must not be less than 20% of revenues, except projects for agriculture and agricultural products, electronic products and parts, and coil centers, all of which must have value added of at least 10% of the revenues.

   1.2 The modern production processes and servicing procedures must be used and in accordance with the Board of BOI approval.

1.3 New machinery must be used in case of imported used machinery. For example in general cases, for used machinery not exceeding 5 years (from manufacturing year to import year) or used machinery exceeding 5 years but not exceeding 10 years, the machinery performance certificate must be submitted on the same date in which the master list of machinery was submitted.

2. The projects that have the investment capital of BHT10 million or more (excluding land and working capital) must obtain ISO 9000 or ISO 14000 certification or similar international standard certificate within 2 years from the full start-up date.

3. Environmental protection must have adequate, efficient guidelines and measures to protect environmental quality and to reduce environmental impact. It must be required to submit environmental impact assessment report.

4. Minimum capital investment and project feasibility requirement of each project is BHT1 million (excluding cost of land and working capital). For the project with investment value of over 2,000 million more (excluding land and working capital), the project's feasibility study must be submitted with details specified by the Board.

Incentives and Additional Incentive Under the Investment Promotion Act

In order to obtain the investment promotion, the applicants of BOI must follow the conditions prescribed by the Board of Investment as specified in the BOI promotion certificate in which the

FIGURE 22

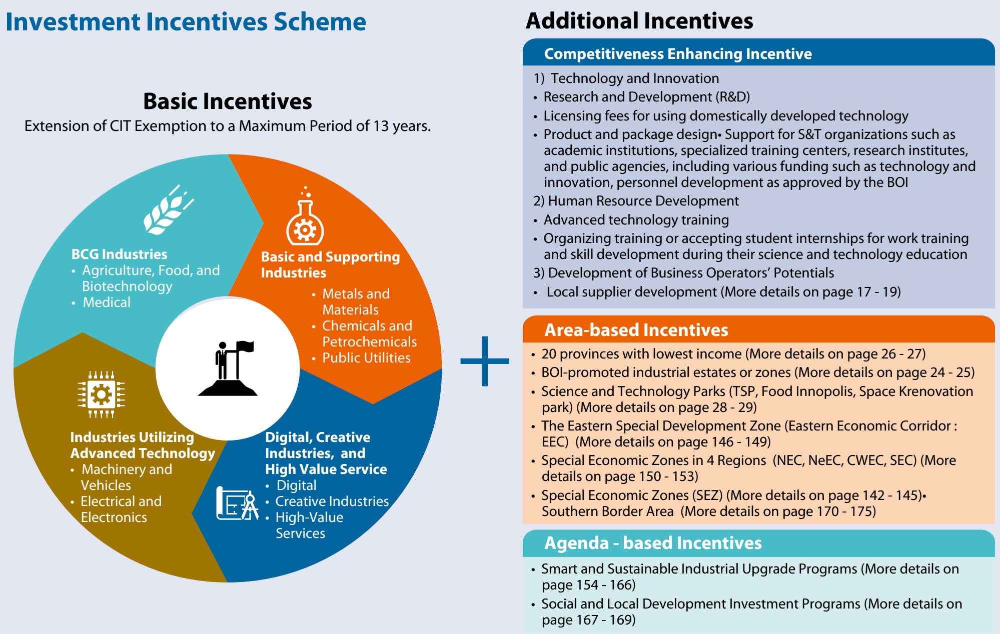
INCENTIVE INVESTMENT PROMOTION ACT

(a) Tax incentives and non-tax incentives

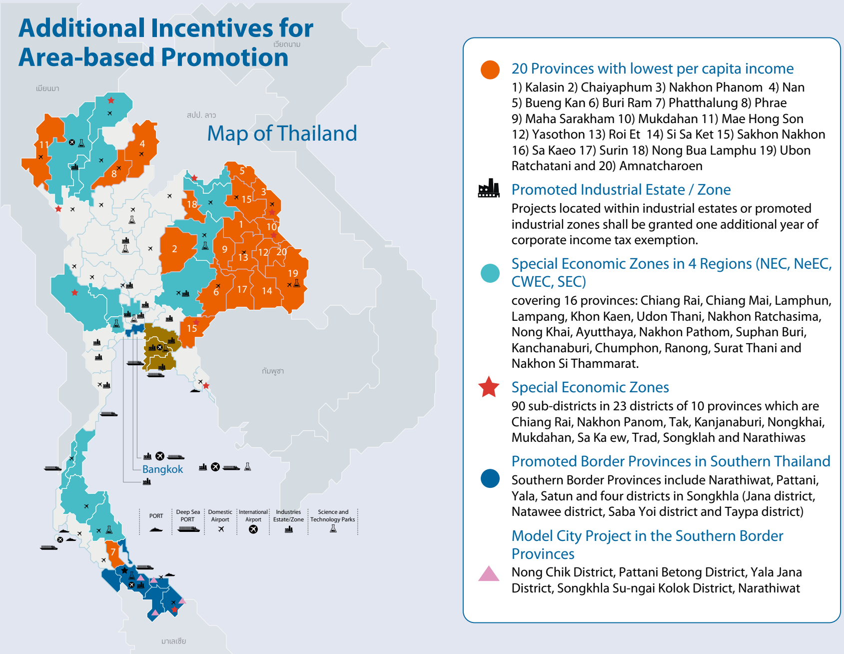
Incentive

Tax Incentives	Non-tax Incentives
• Exemption/reduction of import duties on machinery (Section 28/29) • Reduction of import duties for raw or essential materials (Section 30) • Exemption of import duties on materials imported for R&D purposes (Section 30/1) • Exemption of corporate income tax on the net profit and dividends derived from the promoted activity (Section 31, 31/1 and 34) • A 50 percent reduction of the corporate income tax (Section 35(1)) • Double deduction from the costs of transportation, electricity and water supply (Section 35 (2)) • Additional 25 percent deduction of the cost of installation or construction of facilities (Section 35(3)) • Exemption of import duty on raw or essential materials imported for use in production for export (Section 36)	• Permit for foreign nationals to enter the Kingdom for the purpose of studying investment opportunities. (Section 24) • Permit to bring into the Kingdom skilled workers and experts to work in investment promoted activities (Section 25 and 26) • Permit to own land (Section 27) • Permit to take out or remit money abroad in foreign currency (Section 37)

(b) Investment incentive scheme

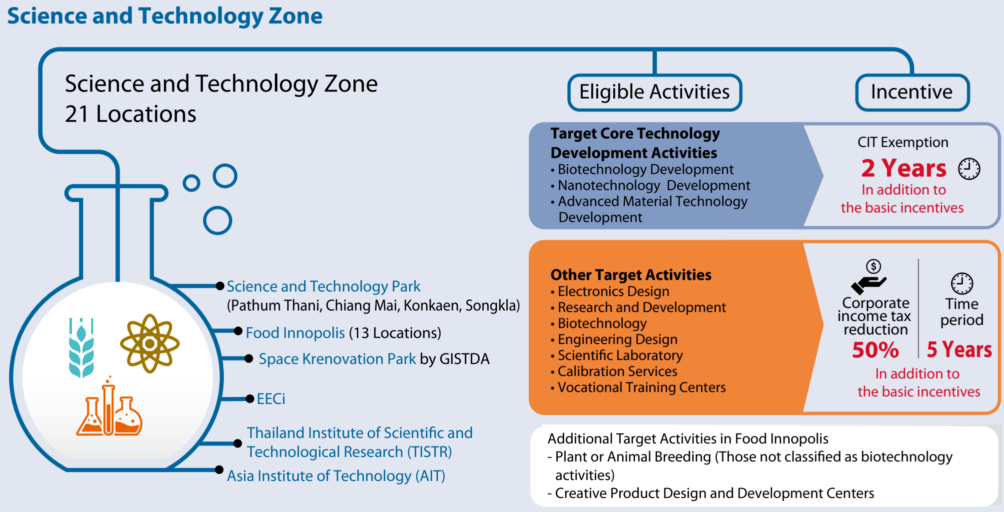


(c) Additional incentives for area-based promotion



following incentives and additional incentives such as i) Competitiveness Enhancing Incentive promotion in technology, innovation and R&D, ii) Area-based Incentives promotion for industrial estate, special economic zone in four regions, science and technology parks, and iii) Agenda-based Incentives promotion in smart and sustainable industrial upgrade and social and local development investments will be granted as shown in Figure 22 (a, b, c and d).

(d) Science and technology zone



Source: BOI_A_Guide_EN.pdf

Also, Thailand has set the vision on the next-generation automotive to be one of the most important EV production bases and component parts in 2035 and will be ranked among top global BEV manufacturers by 2025. BOI also promotes every various type of battery electric vehicle (BEV) including BEV platforms and the Development of Software & Digital Platform for the purpose of developing the country as Asia's manufacturing hub of EV with the Corporate Income Tax (CIT) exemption up to 13 years as shown in Figure 23 (a, b, c and d).

Eastern Economic Corridor (EEC), the newest special economic zone established to achieve industrial transformation under Thailand 4.0, is the flagship industrial development project of the General Prayut administration (2014–19) and is expected to continue under the current government. The EEC has been set up at three provinces in eastern Thailand: Chonburi, Rayong, and Chachoengsao which are located off the coast of the Gulf of Thailand and covers a total area of 13,285 square kilometers. The government hopes to complete the EEC by 2021, transforming these provinces into technological manufacturing and high value-added service hubs with strong connectivity with neighboring ASEAN countries by land, sea and air. On February 1, 2018, the Thai Parliament approved the trade and investment law in the Eastern Economic Corridor (EEC) and announced in the Government Gazette on May 14, 2018. The EEC Policy Committee ("EECPC") was established to carry out the work and enforce the EEC, chaired by the Prime Minister. The EEC Office ("EECO") has been established for a one-stop service center in three locations: Bangkok, Laem Chabang Industrial Estate and Map Ta Phut Industrial Estate in Rayong to handle and facilitate the applications for permissions and licenses necessary for business operation in the SEPZ that authorized responsibility for approving license applications under various laws (e.g. Building Control Law, Factory Law, etc.) and has been transferred to EECO in order to simplify the regulatory process for foreign investment. EECO is building a system of electronic permits and privileges to facilitate online application and approval.

Additional investment incentives are being offered to keep the EEC competitive. Particularly, those investing in the three provinces of the EEC can request an exemption from income tax for up to 15 years with a reduction of personal income tax rate of 17% and a reduction for corporate

FIGURE 23

NEXT-GENERATION AUTOMOTIVE INCENTIVES POLICY

(a) Aspiration ranking among global BEV Manufacturers

With 30@30 aspiration, Thailand will be ranked among top global BEV Manufacturers by 2025

2025 Global BEV Vehicles Manufacturing Ranking

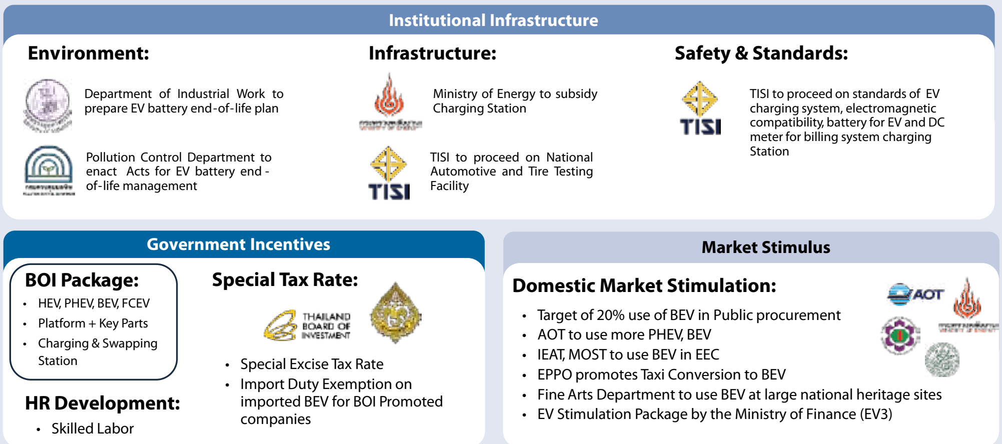
Rank	Country	Volume (Million Units)
1	China	7.35
2	USA	2.17
3	Germany	2.00
4	Japan	1.08
5	France	0.63
6	South Korea	0.62
7	Mexico	0.56
8	Czechia	0.36
9	UK	0.31
10	Spain	0.27
11	Thailand	0.23
12	Italy	0.19
13	Poland	0.11
14	Hungary	0.10
15	India	0.08

2030 Global BEV Vehicles Manufacturing Ranking

Rank	Country	Volume (Million Units)
1	China	15.54
2	USA	4.90
3	Germany	4.86
4	Spain	2.36
5	Hapan	1.80
6	France	1.56
7	South Korea	1.10
8	Czechia	1.09
9	Mexico	0.90
10	Thailand	0.73
11	Italy	0.71
12	UK	0.69
13	India	0.55
14	Hungary	0.45
15	Romania	0.26

(b) Government organization involving supports for EV

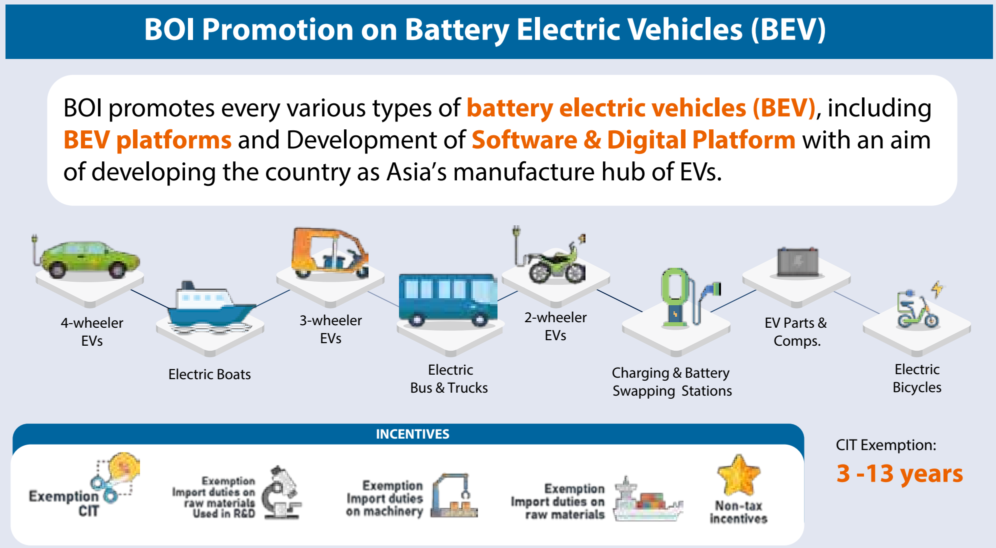
Thai Government Supports for EVs



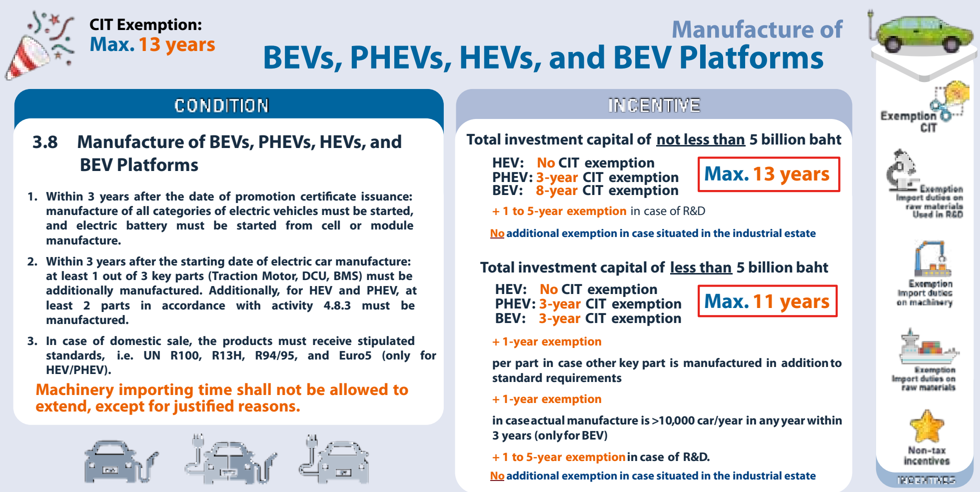
income tax rate of 50% over a period of five years, also including the existing exemptions and benefits offering by the Board of Investment (BOI), such as access to long-term land leases, import duty exemptions and work visas.

These incentive packages are more than what the Thai government normally offers for BOI investment promotion activities [9]. In addition, new subsidies will be launched in the form of a BHT10 billion seed fund (USD282 million) called the Industrial Economic Development Fund (IEDF), which will offer preferential interest rates and investment funds for prioritized activities of the government including joint research and development also skill building at Thai universities.

(c) BOI promotion on BEV



(d) Incentive for manufactures of BEVs, PHEVs, HEVs and BEV Platforms



Source: 20230706 EN BOI_.pdf

The EEC also avoids the regulatory difficulties that businesses normally experience. For example, skilled foreign workers, executives and professionals working for businesses in Special Economic Zones (SEPZs) can work without having a work permit when receiving a license from the Secretary General of EECO and the authority to approve applications for permission under various laws (such as building control laws, factory laws, etc.) has been transferred to the EEC Policy Committee. The revised Public-Private Partnership Act was enacted to improve and more transparency to the complex regulatory system in the previous Act.

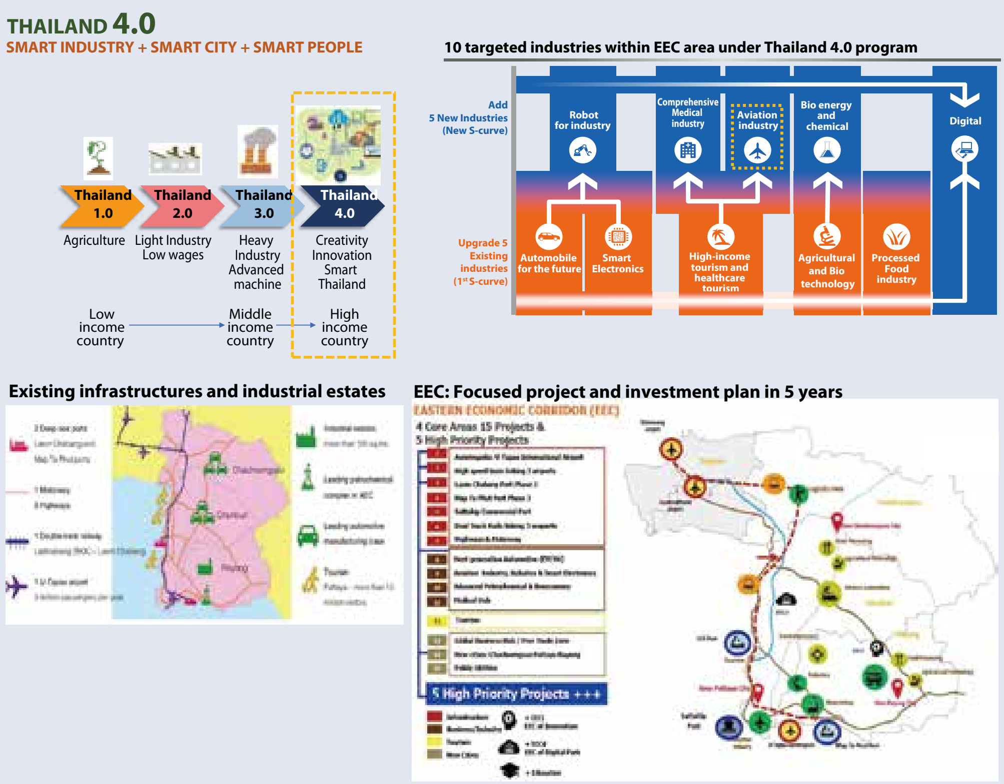
Three insights can be drawn from the policy initiatives mentioned above. First, the rationale for selecting these industries remains unclear. Interestingly, seven of the 10 industries targeted in Thailand 4.0 overlap with the 10 target industries under the initiative. For example, next-generation automotive and smart electronics are planned as entry points for manufacturing robotics. Medical and wellness tourism are further combined into medical hub.

Second, despite more efforts to target specific industries, in practice, the EEC is just a general policy aimed at attracting foreign FDI by providing high quality infrastructure. The operational plan lacks clarity and guidelines. Consider the next generation automotive industry, which is loosely defined as an internal combustion car but it's referred to an electric car in public with highly ambitious targets for the industry. The goal is to have 1.2 million electric cars and 690 charging stations nationwide by 2036, or about 20 years from when plan is launched. To achieve this target, the market share of internal combustion engine vehicles was approximately 99.4% between 2016–18. Targeting certain parts of electric vehicles such as batteries, safety parts, transmission systems, engines over 248 cc for motorcycles. The most important policy tool is a much lower newly designed excise tax on electric vehicles introduced in 2017. However, eligibility for this incentive will depend on local content requirements regarding batteries.

To a certain extent, similar patterns are observed for new S-curved industries such as digital industries that are promoting IoT/embedded software, e-commerce players, analytics and data center, cloud computing and cyber security building a smart city and creative media and animation. The incentives have been offered, such as a 200% tax deduction on research and development expenses, work permits for professionals, and grants to universities to promote digital activities. Under this stage, the overall implementation strategy for the industry remains vague.

FIGURE 24

EASTERN ECONOMIC CORRIDOR (EEC), THE NEWEST SPECIAL ECONOMIC ZONE



Source: Aviation BOI roadshow_Full version_5ab4f81a06c70.pdf

Finally, the challenge to push companies to adopt automatic systems has not been systematically resolved. Although a number of promoting policies have been proposed to encourage indigenous companies to use ICT and automation, they are not considered a top priority. For example, the National Science and Technology Capability (NSTC) program provides financial assistance to companies to install an automatic system. It was implemented within a small group of companies due to the real policy objective being to strengthen local companies in integrating automation instead of adopting automation in production lines. Moreover, a company's fully automated processes take time and involve risks in finance and uncertainties.

Hence, it is difficult for government agencies to be responsible to fulfill the key performance indicators (KPIs) from such activities. Therefore, it is unlikely that this type of assistance will be a top priority for government agencies. The same case has been found in the Big Brother Warranty Success Solution (SME Scale up) program at the Department of Industrial Promotion, Ministry of Industry. This program has several purposes; changing the business to make more use of ICT technology is one of them. Other objectives include marketing, creative innovation villages (CIVs), and process agriculture. These projects are mainly implemented for income redistribution and rural development purposes instead of harnessing the profits from Industry 4.0.

Conclusion

This study confirms the risk of premature deindustrialization in the Thai region as a result of the pressures of globalization (shown by China's entry into the WTO) and the uneven industrial policy pursued by the Thai government. From a regional perspective, the Western, Northeast, Northern and Southern regions still lag behind Bangkok and its vicinity, the Central and Eastern regions, in terms of manufacturing development and value-added service. This suggests that latecomer regions are under the risk of premature deindustrialization. Therefore, the Thai government's current industrial policy should be reconsidered to overcome this risk in late-comer regions. A policy recommendation for the country is to leverage the existing strong industries through facilitating knowledge linkages between multinationals and local companies and enhance the movement of labor while improving the productivity and innovation in agriculture and high value-added services, which have become the key issues of the country. In particular, the government should prioritize the development of regional infrastructure, logistic connectivity, digital infrastructure and capacity building in human resources to enable latecomer regions to realize their comparative and competitive advantages in the manufacturing sector.

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TURKIYE

Executive Summary

The manufacturing industry is a key driver of permanent growth, fostering research and development (R&D), technological advancements, and high-value innovations with widespread economic linkages. It has consistently fueled production, employment, and technological development, playing a vital role in sustained national growth. Manufacturing exhibits higher and faster-growing productivity compared to services and agriculture. Deindustrialization, the decline in manufacturing's economic importance, poses risks to long-term growth, especially for developing nations aspiring to bridge the gap with advanced economies.

Turkiye, a major global economy, has demonstrated stable long-term growth; despite brief interruptions during crises, GDP per capita in Turkiye doubled between 1998 and 2022. Capital accumulation is a significant factor in driving GDP growth, indicating potential for improvements in TFP.

Between 1998 and 2010, Turkiye experienced a decline in the manufacturing industry's share in GDP, but by 2022, it rebounded to 22%. Industrial employment rose from 22% in 1998 to around 27% in 2006, maintaining relative stability afterward. Manufacturing labor productivity growth outpaced the average, especially post-COVID-19, making a substantial contribution to overall labor productivity growth.

Examining value added, employment shares, and labor productivity trends, Turkiye currently does not face deindustrialization. The observed deindustrialization between 1998–2010 resulted from a shift in economic policies, neglecting industrialization goals, but has reversed with renewed focus and active policies.

While Turkiye excels in high-tech production and exports, challenges persist, particularly in export composition. With a 1.02% share in world merchandise exports, ranking 29th in exports and 20th in imports as of 2022, targeted structural changes in manufacturing industry exports remain unrealized. Preserving industry significance, enhancing resilience and promoting green and digital transformations are crucial to mitigate deindustrialization-related risks.

Introduction

The significance of the manufacturing sector as a driver of economic growth is heavily highlighted in literature, with industrialization regarded as a crucial path for developing nations to catch up with more advanced economies. Manufacturing exhibits robust inter-sectoral connections, particularly backward linkages that spur growth. It is an environment conducive to learning through practical experience, organizational innovation, and the cultivation of collective capabilities. Additionally, manufacturing propels technological advancements, both directly from within the sector and indirectly by fostering technological progress in other sectors. It benefits from dynamic increasing returns to scale and cumulative productivity gains, surpassing those of other sectors. Furthermore, its integration with foreign trade holds importance for a country's balance of payments [1].

Similarly, Turkiye's 12th Development Plan underscores key attributes of the manufacturing industry, positioning it centrally within the economy: The industry's pivotal role in enhancing productivity makes it crucial for a country's development and sustained growth. Through its export potential, the manufacturing sector generates foreign exchange income and facilitates technology transfer. Its competitive production structure, open to foreign markets, significantly influences the labor market. A substantial portion of research and development activities occurs within manufacturing. The positive externalities of this sector bolster production and employment, not only within its sub-sectors but also across service and construction sectors, aiding in reducing the current account deficit [2].

Deindustrialization refers to the diminishing significance of the manufacturing industry within an economy. While this decline, observable through the reduced share of manufacturing industry value added and employment in the total economy, is a typical occurrence in developed countries that have completed their industrialization, its early manifestation in developing nations is labeled premature deindustrialization. Deindustrialization is anticipated to have adverse effects on the potential for maintaining long-term economic growth. Specifically, premature deindustrialization is anticipated to negatively impact the aspirations of developing nations in achieving structural transformation and continuous growth in productivity, which are essential for narrowing the gap with advanced economies.

In the context of significance of industry and deindustrialization in developing nations, this study discusses the presence of deindustrialization in Turkiye through both quantitative and qualitative analyses.

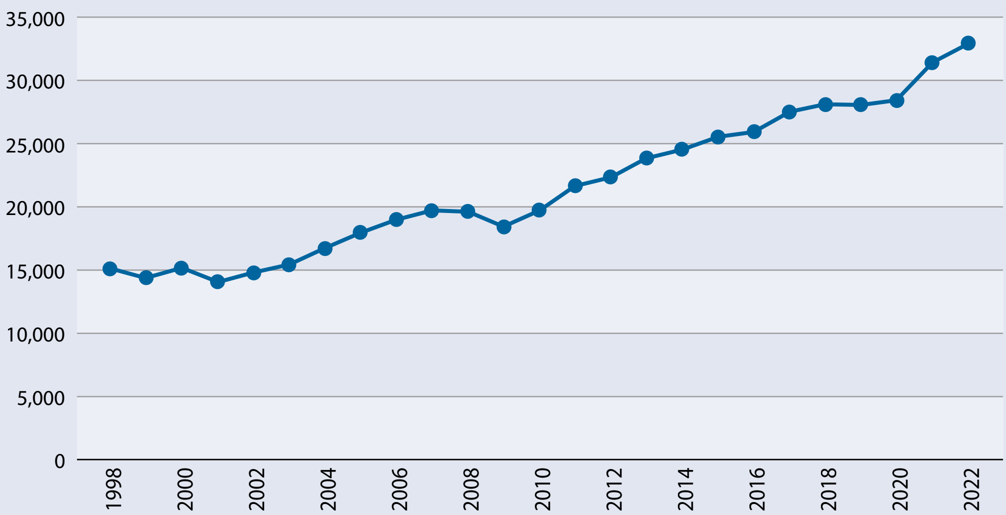
1. Background Statistics on Economic and Labor Productivity

1.1 GPD Per Capita and GDP Per Capita Growth Rate

Turkiye, located at the junction of Europe and Asia, is an important crossroads between Europe, the Middle East and Asia. With a population of 85 million, Turkiye is one of the major economies of the world with a long-term stable growth performance. Continuing its convergence process with advanced economies, GDP per capita in Turkiye more than doubled between 1998 and 2022 and brief interruptions experienced during the crisis periods were followed by rapid recovery phases. Figure 1 and Figure 2 respectively display GDP per capita in absolute terms and its annual growth rate over a span of 25 years, highlighting discernible impacts from the financial crises and the subsequent effects of the COVID-19 pandemic. Notably, Turkiye emerged as one of the countries relatively less affected economically by the pandemic. Although measures to restrict social mobility and the suspension of economic activities due to partial closures or working at reduced capacity had a negative impact on production, the Turkish economy experienced a strong recovery with normalization steps. It exhibited rapid recovery from the crisis, evidenced by a robust growth rate following the pandemic's adverse repercussions.

FIGURE 1

GDP PER CAPITA (1998–2022, PPP, CONSTANT 2017 INTERNATIONAL $)

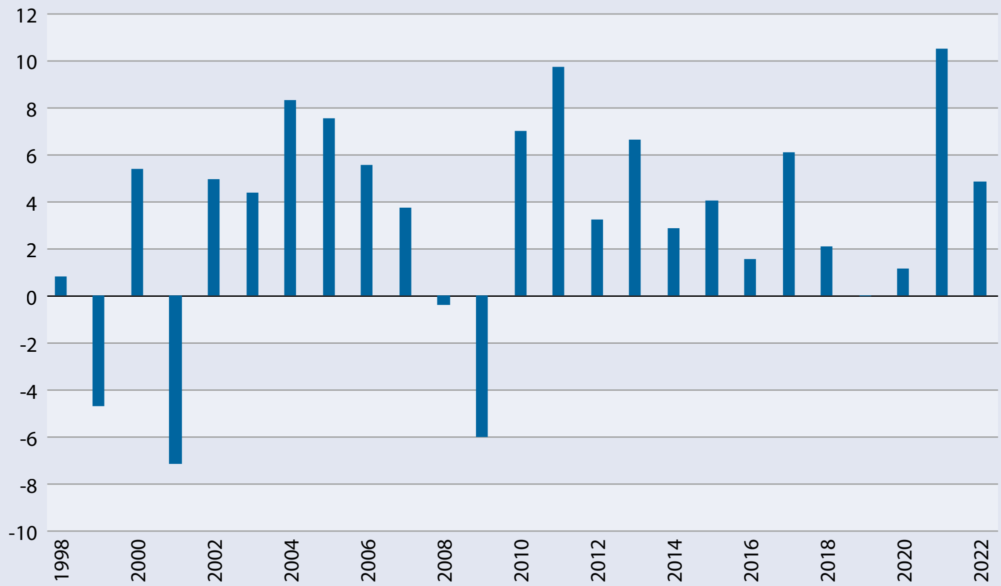


Source: World Bank - World Development Indicators [3]

In 2001, before it had fully recovered from the effects of the 1997–1998 financial crisis and 1999 earthquake, Turkiye experienced a local economic crisis. Subsequently, an IMF economic program was instituted, fortifying the financial system and enhancing economic resilience. Turkiye managed to swiftly overcome the repercussions of the 2008 global financial crisis and this pattern of resilience was again evident during the COVID-19 pandemic. In 2021, Turkiye emerged as one of the fastest-growing countries globally, boasting a growth rate of approximately 11%. These instances affirm Turkiye's capacity to rebound and maneuver through economic crises.

FIGURE 2

GDP PER CAPITA GROWTH RATE (1998–2022, ANNUAL, %)



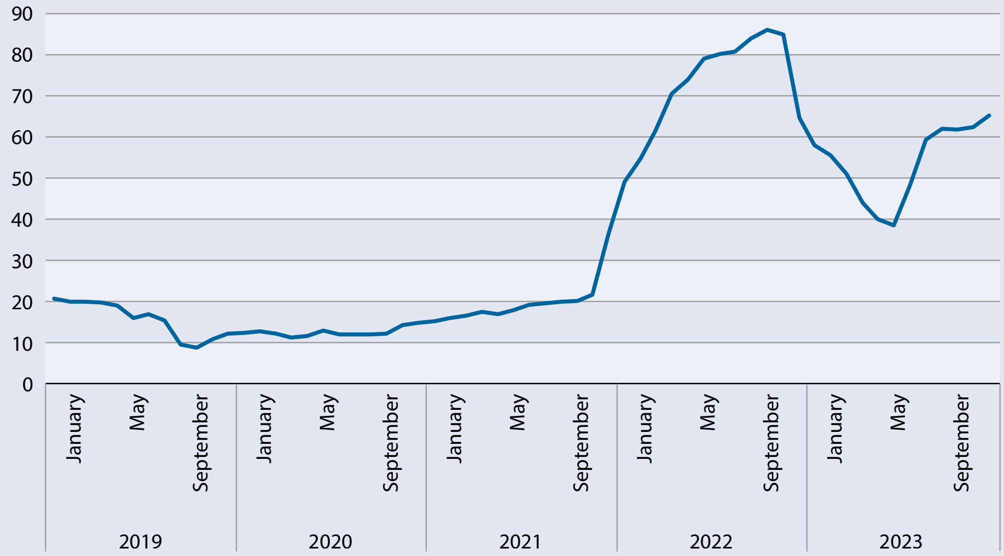
Source: World Bank - World Development Indicators [3]

On the other hand, various external factors have exacerbated challenges recently. The sharp rise in energy prices and other commodity prices triggered by the pandemic and intensified by the conflict between Russia and Ukraine, coupled with a sluggish global economy attributed to soaring input prices and disruptions in supply chains, has placed considerable strain on Turkish economy. Figure 3 and Figure 4 illustrate selected inflation and labor statistics. Inflation increased due to global supply constraints and buoyant domestic and external demand. In November 2022, the annual rate of consumer price index change stood at 84.39% and with the tightening policies pursued, dropped to 62% as of November 2023. After decreasing in 2020, the labor force participation rate has now exceeded pre-pandemic levels. In 2022, the labor force participation rate was 53.1% and the unemployment rate was 10.4%.

After a sharp decline in 2020 and a strong recovery in 2021, global foreign direct investment (FDI) fell by 12% to USD1.3 trillion in 2022 [6]. The slowdown was driven by the global polycrisis mentioned earlier. FDI inflows to Turkiye followed a similar pattern, falling to 1.07% of GDP in 2020, but rising to 1.63% in 2021. By 2022, the net inflow of FDI stood at 1.45% of GDP in Turkiye. The principle of equal treatment was established in 2003 through the Foreign Direct Investment Law. This liberalizing law led to a surge in net FDI inflows, reaching nearly USD20 billion annually between 2005 and 2007, equivalent to 3.62% of GDP. However, following the 2008 crisis, sustaining these levels became challenging, resulting in relatively stagnant investment flows. Notably, approximately 28% of FDI inflows received by Turkiye during the period from 2010 to 2020 were directed toward the manufacturing industry [7].

FIGURE 3

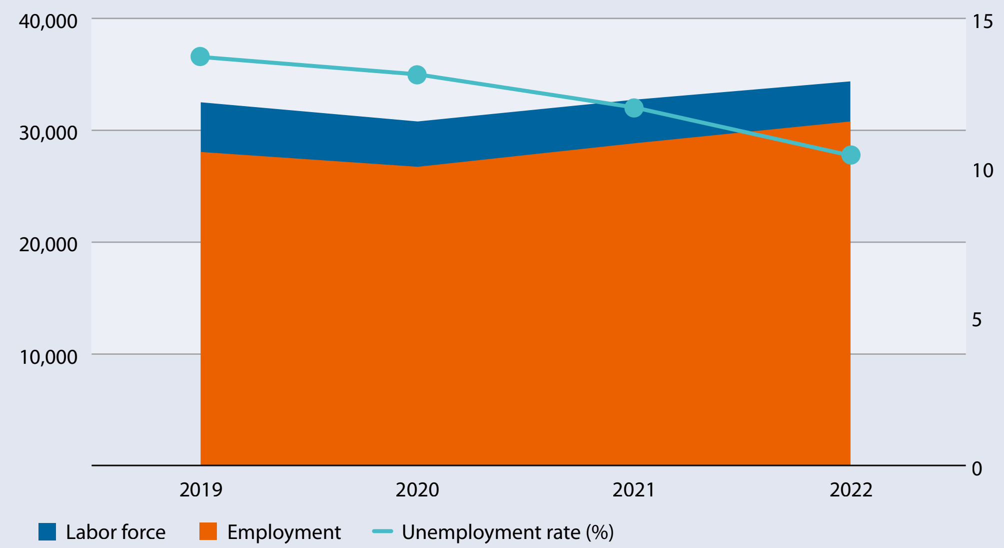
CONSUMER PRICE INDEX ANNUAL RATE OF CHANGE (%)



Source: Turkstat - Inflation and Price Statistics [4]

FIGURE 4

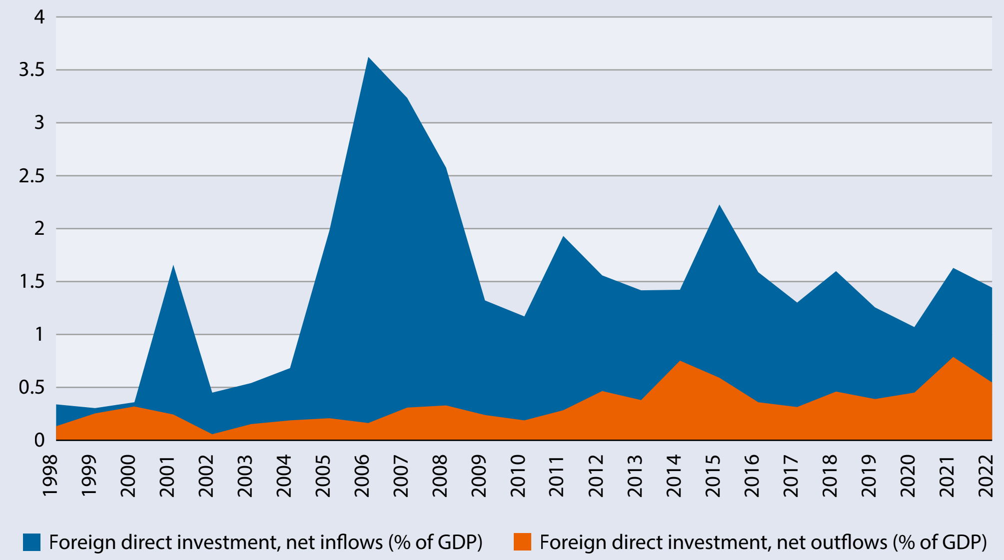
EMPLOYMENT, LABOR FORCE (15+, THOUSAND PEOPLE) AND UNEMPLOYMENT RATE (%, RIGHT AXIS)



Source: Turkstat - Labor Force Statistics [5]

FIGURE 5

FOREIGN DIRECT INVESTMENT INFLOWS AND OUTFLOWS (% OF GDP, 1998–2022)

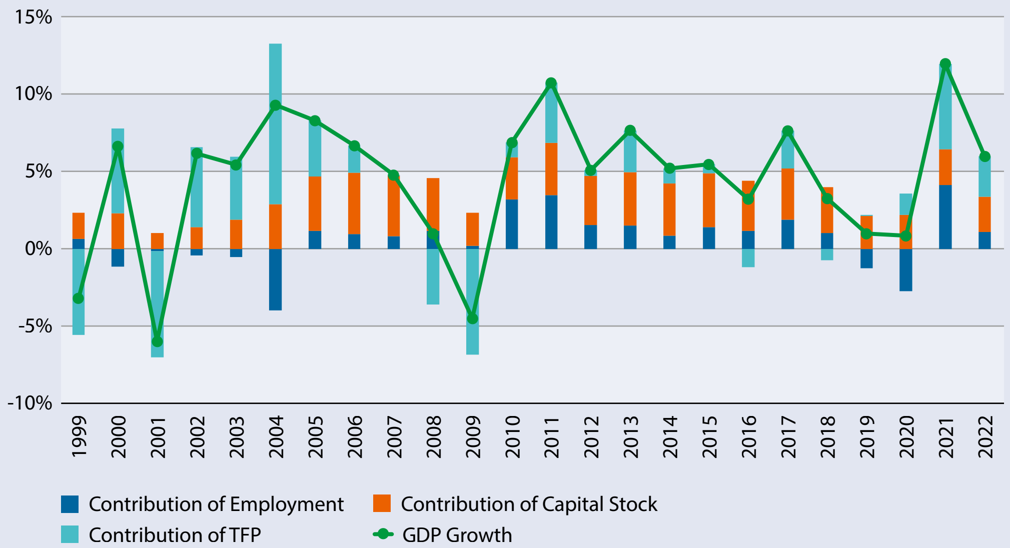


Source: World Bank – World Development Indicators [3]

1.2. Contribution to GDP Growth by Factor

FIGURE 6

CONTRIBUTION TO GDP GROWTH BY FACTOR (1999–2022)



Source: Author's Calculations based on TurkStat (Turkish Statistical Institute) Unemployment and Wages Statistics and National Accounts [5,8]

Figure 6 illustrates that the contribution of TFP to economic growth in Turkiye displays inconsistency and isn't substantial over the period under consideration. Year to year TFP average growth between 1999–2022 is 1.23%. Conversely, the contribution of capital stock stands out prominently. The accumulation of capital plays a pivotal role in driving GDP growth, indicating significant potential for enhancements in TFP.

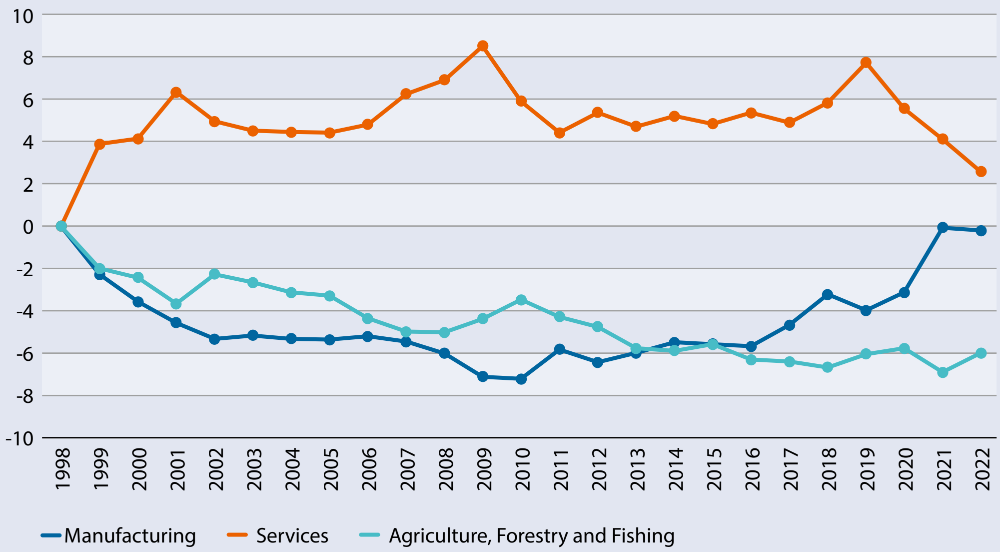
2. Deindustrialization Trends

2.1 Trends of Agriculture, Manufacturing and Services Shares in Value Added and Employment Terms

Deindustrialization can be defined as the decline in the importance of the manufacturing industry in an economy. The deindustrialization trend can be clarified by examining the course of the value added and employment shares of the manufacturing sector over time.

FIGURE 7

TREND OF SECTORAL VALUE-ADDED SHARES (1998–2022, PERCENTAGE OF GDP DIFFERENCE SERIES, 1998=0)



Source: Author's Calculations, World Bank - World Development Indicators [3]

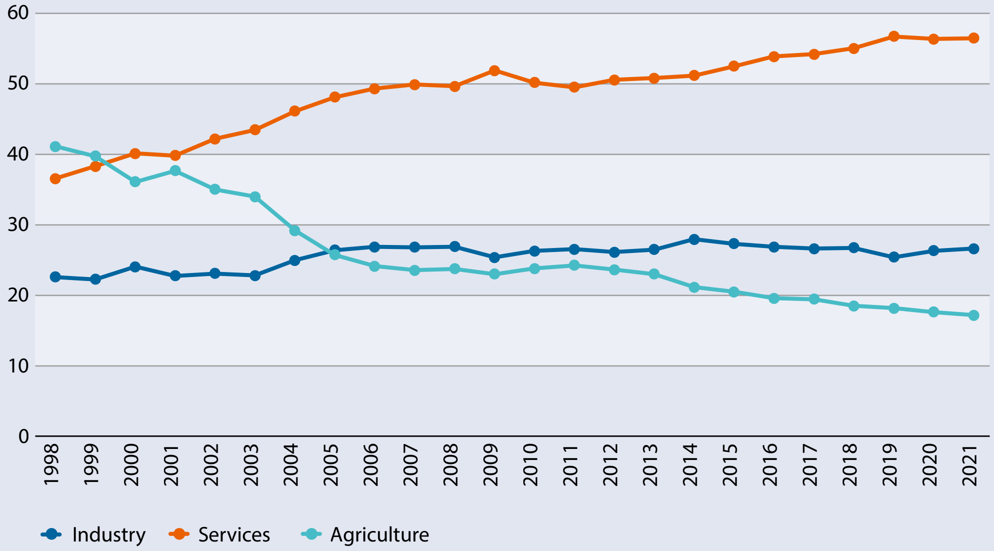
Figure 7, constructed using difference series, depicts changes over a 25-year period relative to the base year (1998=0). Initially, Turkiye exhibited a conspicuous deindustrialization trajectory; however, it appears to have reversed this trend over time. The share of manufacturing industry value added in the GDP experienced a notable decline, reaching its lowest points at approximately 15% around 2009–10. Nevertheless, by 2022, this share has rebounded to its 1998 level, standing at 22%. Upon analyzing this data, there doesn't appear to be a definitive trend towards deindustrialization in terms of value added generated by the manufacturing industry.

The depicted data in Figure 8 reveals the trajectory of sectoral employment shares spanning from 1998 to 2021. The portion of industrial employment in total employment exhibited growth, rising from 22% in 1998 to roughly 27% in 2006, and maintained a relatively stable position throughout the subsequent period. The observed pattern does not decisively indicate a clear trajectory towards deindustrialization in terms of employment in Turkiye. Also, the static proportion of the manufacturing industry in overall employment could also be interpreted as evidence of concurrent enhancements in labor productivity within the manufacturing sector.

When the trends in the value added and employment shares of the manufacturing industry are evaluated together, it can be concluded that Turkiye is not currently facing the problem of deindustrialization, as there has not been a steady decline over time.

FIGURE 8

TREND OF SECTORAL EMPLOYMENT SHARES (1998–2021, % OF TOTAL EMPLOYMENT)



Source: World Bank - World Development Indicators [3]

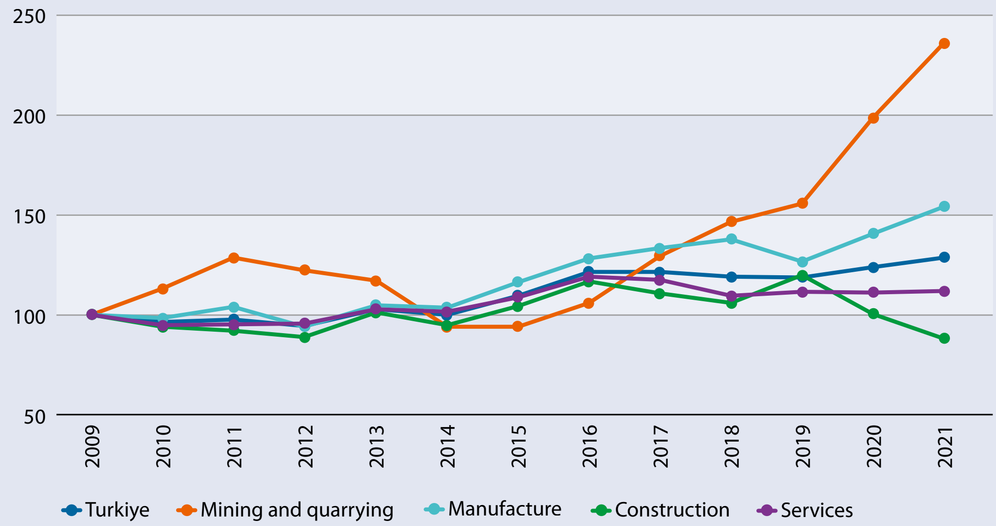
2.2 Trend in Labor Productivity by Industry

Figure 9 illustrates the trend of labor productivity across various industries from 2009 to 2021, calculated as an index of value added divided by number of persons employed. Notably, in comparison to the base year of 2009, there has been a substantial increase in manufacturing industry labor productivity, particularly evident after 2014. As implied by the static course of the ratio of manufacturing industry to total employment, there are strong productivity increases in the manufacturing industry. The static course of this trend in Turkiye is due to productivity increases rather than the deindustrialization phenomenon.

Between 2009 and 2021, Turkiye experienced an average labor productivity growth rate of 2.31%. With a growth rate of 4%, the manufacturing industry outperformed the overall national average. This ratio notably falls significantly below the average in services. During the specified period, labor productivity within the services sector was observed at 1%, indicating a rate notably lower than the average. The WB observes that manufacturing firms associated with services also tend to exhibit lower productivity in Turkiye. For example, non-exporting manufacturing firms associated with a service affiliate show 18% lower productivity than firms without a service affiliate. Similarly, exporters with a service affiliate show 9% lower productivity than exporters without such an affiliate [10].

FIGURE 9

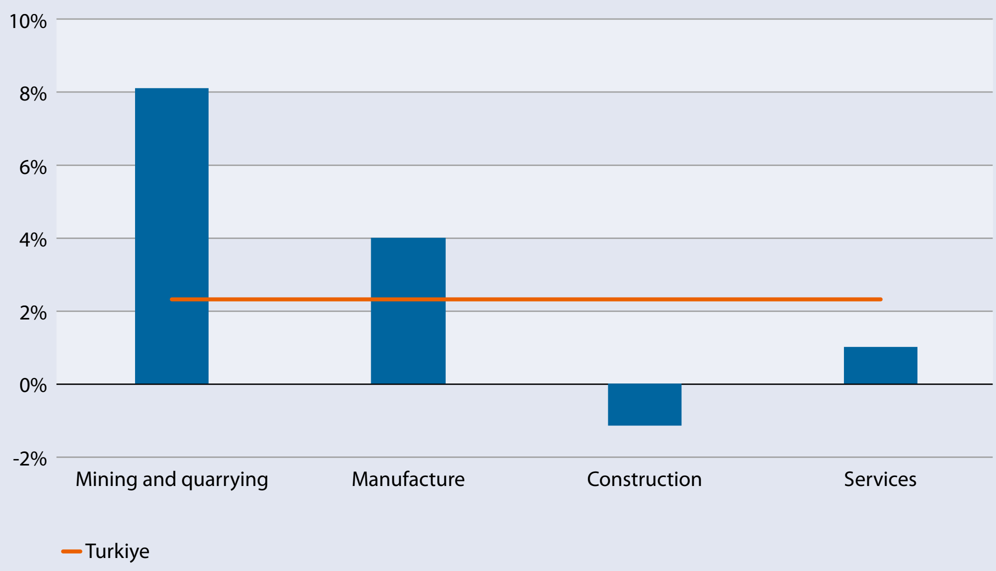
LABOR PRODUCTIVITY BY INDUSTRY (2009–21, INDEX OF VALUE ADDED DIVIDED BY NUMBER OF PERSONS EMPLOYED, 2009=100)



Source: Author's Calculations, TurkStat Annual Industry and Service Statistics [9]

FIGURE 10

AVERAGE LABOR PRODUCTIVITY GROWTH RATE (2009–21)

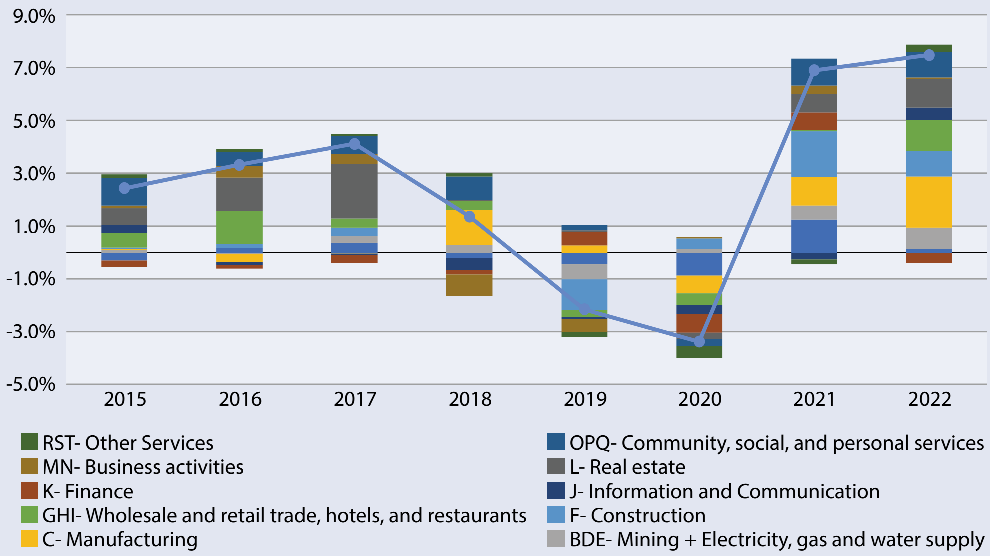


Source: Author's Calculations, TurkStat Annual Industry and Service Statistics. [9]

2.3 Decomposition of Labor Productivity by Industry

FIGURE 11

DECOMPOSITION OF LABOR PRODUCTIVITY BY INDUSTRY (2015–22)



Source: Author's Calculations, TurkStat Employment, Unemployment and Wages Statistics and National Accounts. [5,8]

Figure 11 displays sectoral contributions to the increase in labor productivity. It indicates a notable contribution from the manufacturing industry in the post-COVID-19 period. In 2022, the manufacturing industry made the most significant contribution, followed by the construction and wholesale trade sectors, respectively.

2.4 Decomposition of Labor Productivity in Within Effect and Structural Change Effect

Following McMillan and Rodrik [11] and McMillan, Rodrik and Verduzco-Gallo [12], productivity growth is decomposed into two parts. The first part is called the within component and indicates capital accumulation, technological change or reduction of misallocation within the sectors. The second part is usually referred to as structural change and can be achieved through the movement of labor across sectors, as different sectors with different productivity levels are gaining relative weights, the overall productivity in the economy is affected.

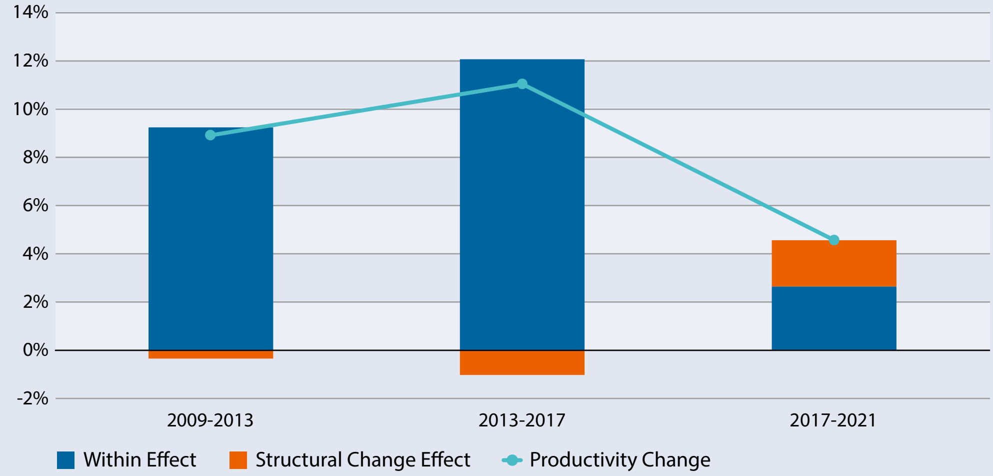
The decomposition has been done using the following formula:

$$\Delta Y_t = \sum_{i=1}^{n} \theta_{i,t-k} \Delta y_t + \sum_{i=1}^{n} y_{i,t} \Delta \theta_t$$

Where Y_t and $y_{i,t}$ indicates economy-wide and sectoral labor productivity levels respectively, and $\theta_{i,t}$ indicates the share of employment in sector i. The Δ operator denotes the change in productivity levels or employment shares between the beginning and the end of the period. The first part of the equation is the within effect component, and the second part is the structural change effect component.

FIGURE 12

TURKIYE'S PRODUCTIVITY GROWTH FROM WITHIN AND STRUCTURAL CHANGE



Source: Author's Calculations, Turkstat Annual Industry and Service Statistics [9]

The 2009–21 period that has been analyzed could be divided into three four-year periods. As seen in Figure 12, almost all of the change in labor productivity between 2009 and 2017 is due to within effect. The structural change component did not contribute, but rather reduced some of the potential productivity gains due to the misallocation of resources across sectors. After 2017, the structural change component started to contribute to overall productivity change, but in this period the within effect seems to have decreased and the total effect is limited compared to the previous periods.

2.5 Changes in Composition of Exports by Level of Technology

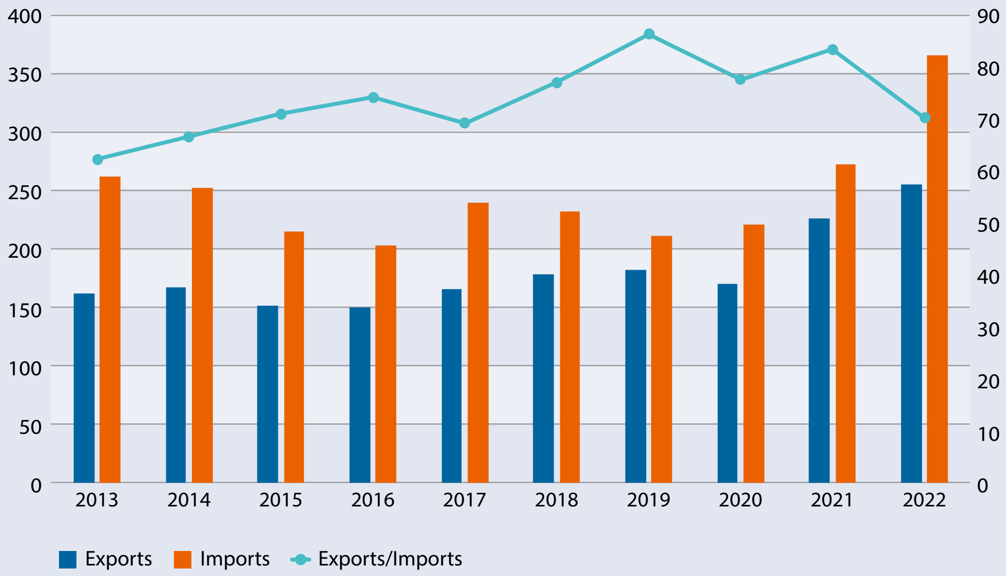
Turkiye's share in world merchandise exports is 1.02% as of 2022 [13]. Turkiye ranks 29th in exports and 20th in imports in the world. According to the WB, Turkiye has high potential for exports: Even though exports are sizeable, they are still 50% below potential, with higher technology products being particularly promising [14]. In 2022, total amount of exports was around USD250 billion, while imports were over USD350 billion. In the same year, the ratio of exports to imports was around 70%. It is noteworthy that the largest share of Turkiye's goods imports belongs to intermediate goods; in 2022, about 80% of imports consisted of intermediate goods. On the other hand, Turkish manufacturing industry's exports constitute around 95% of the total exports and the majority of the exports (approximately 40%) are directed to European Union member countries. To give an example of prominent export products, Turkiye is among the world's top 10 automotive exporters.

Figure 15 illustrates changes in composition of exports by level of technology. In 2013, approximately 30.4% of exports comprised medium-high technology products, which marginally increased to 32.9% by 2022, and the percentage of high-tech products decreased from 2.7% to 1.9%, indicating a lack of substantial structural transformation within the manufacturing sector exports over the past decade.

In Turkiye, 71% of employment, 35.5% of value added, 30.4% of exports and 27.1% of R&D expenditures are made by small and medium-sized enterprises (SMEs). A comparison between the first and second 500 largest industrial firms in terms of the distribution of value added generated according to technology intensity is also noteworthy.

FIGURE 13

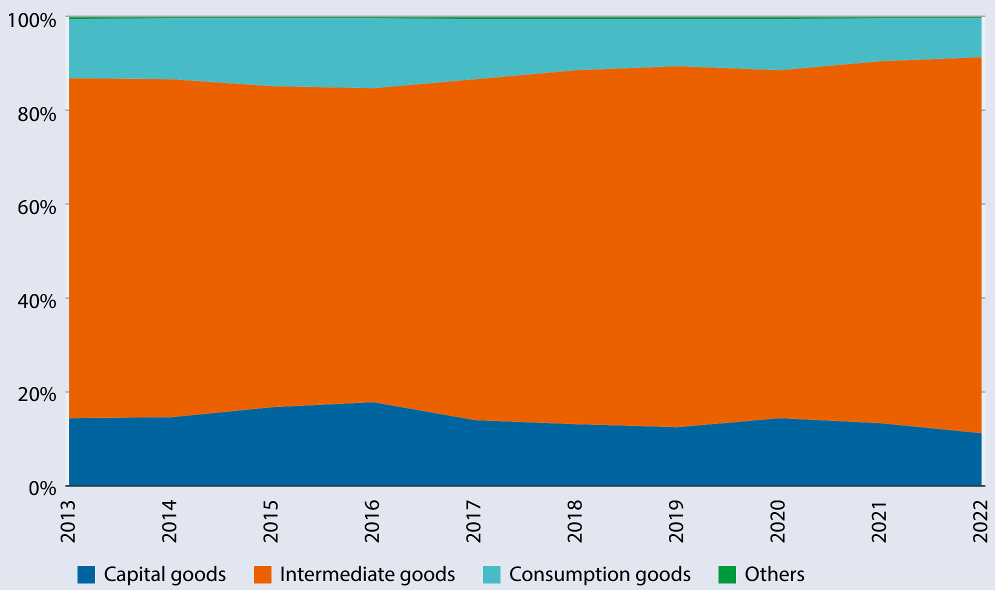
TURKIYE'S EXPORTS AND IMPORTS (2013–22)



Source: Turkstat - Foreign Trade Statistics [15]

FIGURE 14

TURKIYE'S IMPORT COMPOSITION

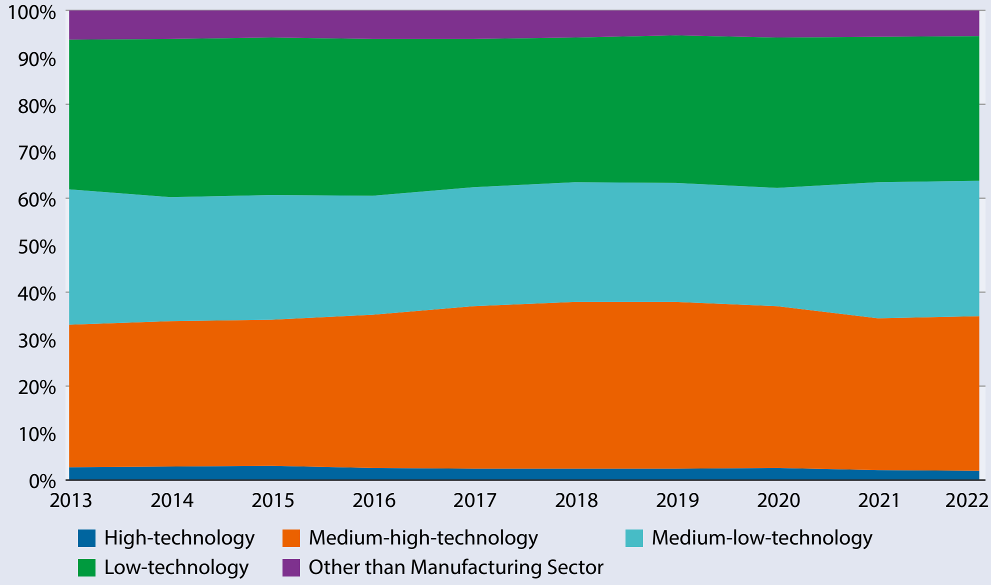


Source: Turkstat - Foreign Trade Statistics [15]

Figure 16 illustrates the distribution of value added generated by Turkiye's largest first and second 500 industrial firms based on their technological intensities. Within the first 500 companies, the majority of value added (37.7%) was generated by medium-low technology sectors. Notably, there

FIGURE 15

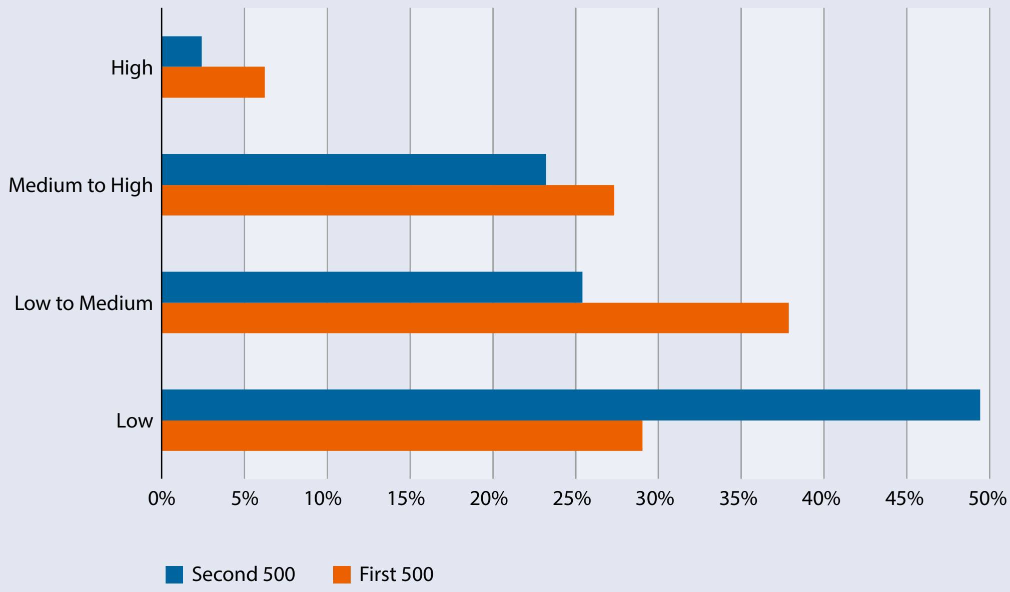
CHANGES IN COMPOSITION OF EXPORTS BY TECHNOLOGY INTENSITY (2013–22)



Source: Author's Calculations, TurkStat Foreign Trade Statistics [15]

FIGURE 16

DISTRIBUTION OF THE VALUE ADDED GENERATED BY TURKIYE'S LARGEST FIRST 500 AND SECOND 500 INDUSTRIAL FIRMS BY TECHNOLOGY INTENSITY (2022)



Source: İstanbul Chamber of Commerce [16] has been a shift observed in recent years from low technology towards medium-low technology within this group. In contrast, among the second 500 largest industrial firms, the largest share (49.2%) significantly belongs to the low technology group. SMEs have important value added and employment roles in the Turkish economy, but they lag significantly behind large firms in terms of productivity and technology. In this context, the difference between Turkiye's top 500 companies and the second 500 is striking.

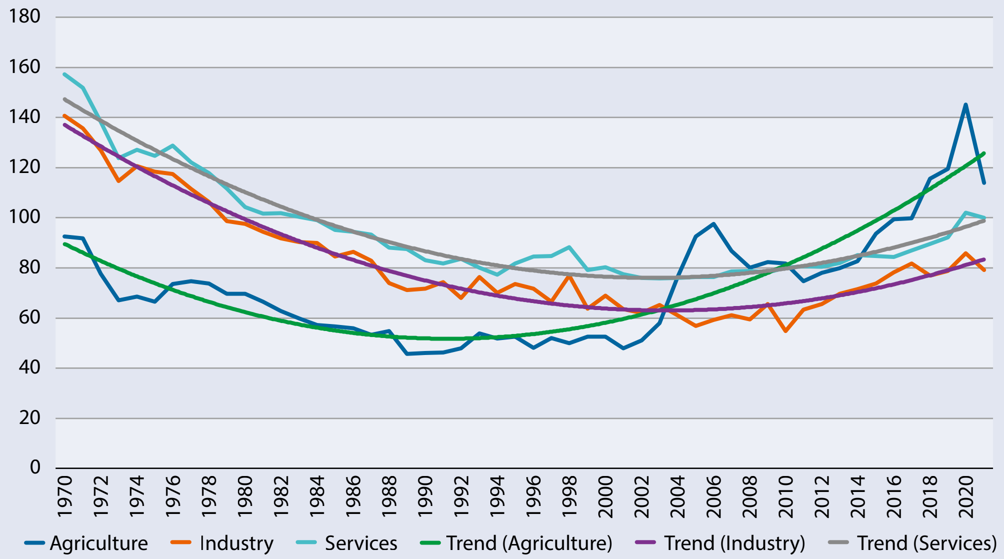
2.6 Sectoral Labor Productivity in Relative to High Income Countries

Japan is taken as a comparison country due to its income level; in terms of volume of the economy and the GDP per capita levels, Japan can be taken as a benchmark for economies. Productivity levels are calculated using APO Productivity Database; GDP by industry at constant prices, using 2017 purchasing power parities (PPPs), reference year 2020 is taken as output and employment numbers are taken as input, both at sectoral level. In each year and for each sector Japan's and Turkiye's sectoral productivity levels are compared, and Japan's level is taken as 100 for each year.

Solid lines in Figure 17 show trend lines of sectoral productivity comparisons calculated as second-degree polynomials. All trend lines indicate u-shape structures. Between 1970 and 2020, Turkiye's sectoral productivity experienced a relative decline. Starting at different periods, sectoral productivity ratios presented a structural change and at the end of the comparison period industry productivity ratio came to 80% and service productivity ratio came to almost 100% levels. By 2020, productivity in industry had reached approximately 80% of Japan's level, and productivity in services had reached 100% of Japan's level.

FIGURE 17

TURKIYE'S SECTORAL PRODUCTIVITY COMPARED TO JAPAN (%, JAPAN=100)



Data Source: Author's Calculations, APO Productivity Database [17]

3. Impact of Premature Deindustrialization on Productivity Performance

3.1 Assessment of Premature Deindustrialization Risk

Turkiye appears to have arrested and reversed the observed trend of deindustrialization in the last decade, the decline in the contribution of manufacturing industry value added has been halted, rebounding to 22% by 2022. There doesn't appear to be a definitive trend towards deindustrialization in terms of value added. On the other hand, the share of industrial employment in total employment rose from 22% in 1998 to around 27% in 2006, and subsequently maintained a relatively stable position throughout the subsequent period. The observed pattern does not decisively indicate a clear trajectory towards deindustrialization in employment terms. Concurrently, the share of employment in agriculture has decreased from approximately 41% in 1998 to around 17% in 2021. Based on these two indicators, it can be concluded that Turkiye is not facing an immediate deindustrialization risk.

Labor productivity growth in Turkiye's manufacturing industry has been much higher than in the services sector. Hypothetically speaking, in the event of a deindustrialization, the overall trajectory of productivity growth becomes increasingly reliant on advancements in the services sector. The manufacturing industry serves as a cornerstone for fostering sustainable productivity enhancements. A decline in the manufacturing sector significantly impacts crucial economic facets such as capital accumulation, employment rates, income levels, and overall economic growth. Disparities in productivity growth rates between the services sector and the manufacturing industry underscore the potential risks associated with this scenario.

While Turkiye does not seem to be at risk of deindustrialization, it appears prudent to implement measures aimed at fortifying the manufacturing industry which exhibits comparatively higher rates of productivity growth. Over the past decade, the composition of exports within the manufacturing industry has not undergone the desired transformation toward high-tech products. The decrease in the proportion of high-value-added high-tech products in exports signifies a negative impact on the value added by the manufacturing industry.

3.2 Country Case Study on Specific Issue Relating to Premature Deindustrialization

In the 1930s, in line with the young republic's ambitious growth and industrialization targets, active industrial policies were pursued primarily to produce basic consumer goods and industrial inputs. This active policy stance maintained until the late 1970s. Post-1980, Turkiye underwent a notable shift in its industrial policies, transitioning towards more indirect approaches compared to prior periods, aligning with the tenets of liberalization and globalization. During this period, the economic policy in focus centered around adopting a flexible exchange rate regime, liberalizing the capital market, reducing trade barriers, supporting exporters, and encouraging FDI. Turkiye joined the WTO in 1995, furthering its commitment to global trade. Additionally, in the mid-1990s, the customs union established with the EU played a pivotal role in reducing trade barriers and fostering economic integration. Although the transportation and communication infrastructure investments of the period indirectly supported industry, the shift in focus to non-industrial sectors has led to a noticeable decline in the contribution of the industrial sector to the economy. The shift of focus away from the manufacturing industry in this period seems to have brought about deindustrialization. This is evident in the value-added share of manufacturing especially between 1998 and 2010.

The 2008 crisis was a turning point for industrial policy and rendered the growth based on the service sector questionable. The banking and financial crises and the recession have shown that the services sector cannot be a remedy for stable growth. On a global scale, the share of industrial policies in total policies doubled between 2009 and 2019 [18]. Turkiye has not remained out of these developments and changed its industrial policy stance accordingly.

The 2011–14 Turkish Industrial Strategy Document was an indicator that industry has been brought back into focus with the main objective of 'becoming the production base of Eurasia'. In its recent five-year development plans Turkiye has delineated priority sectors within the manufacturing industry and targeted some technological domains. The 10th Development Plan [19], that covers the years 2014–18, identified 25 priority areas for transition, such as productivity enhancement in production or mitigation of dependence on imports. These programs emphasized increasing productivity in the industrial sector, encouraging the production that will increase domestic added value, concentrating R&D, innovation and design activities in medium-high and high technology products. The 11th Development Plan [20] and 12th Development Plan [21] prioritized sectors such as chemicals, pharmaceuticals and medical devices, electronics, machinery, electrical equipment, automotive, and rail system vehicles. As embodied in the 2023 Industry and Technology Strategy [22] document, covering years 2019 and 2023, emphasizing domestic and national production has become a central focus, culminating in tangible steps forward. This shift signifies a transformation from a previously passive policy stance to a partially active one, evidenced by the recent adoption of more proactive measures in specific domains. A notable instance includes the production of electric cars (TOGG), also supported by a public procurement guarantee, stimulating demand. Similarly, the production of unmanned aerial vehicles (UAVs) represents another significant venture. The Technology Focused Industrial Move Program [23] developed in line with the 2023 Industry and Technology Strategy executed as a substantial incentive scheme to foster high value added, mid-high and high technology indigenous production. R&D and investment support, along with incentives extended to the manufacturing industry, are streamlined through a unified platform within this program. These resources are directed toward the production and advancement of prioritized product categories or technologies identified within the program, leveraging domestic resources and national means. Machinery, Mobility, Structural Transition in Production, Health and Chemical Products, and Digital Transformation calls were opened and accepted projects with a total investment of more than USD2.5 billion were supported, and preparations are underway to launch a call for disruptive technologies for 2024.

Developments briefly described above indicate that policies aimed at halting the trend of deindustrialization have been implemented in accordance with the specified plans and programs. Owing to these policies and programs, the manufacturing industry has entered a rapid and permanent strengthening phase.

Although the Turkish manufacturing industry currently demonstrates the capacity to produce and export mainly medium and medium-high technology products, it faces challenges in transitioning to further stages. Factors such as digital and green transformation and resilience to external shocks are poised to become primary determinants of structural changes in the industry moving forward.

Digital transformation was highlighted in 2023 Industry and Technology Strategy as one of the main drivers of productivity policy. The Technology Focused Industrial Move Program-Digital Transformation Call was launched in 2021. A recent study conducted by European Central Bank concludes that digitalization is only transformative for a small group of already highly productive firms, while for the vast majority it is secondary and therefore, it cannot be said that digitalization is a universal strategy that is necessary for all firms. Using a large panel dataset of 19.3 million firm-level observations of 2.4 million different European firms, the study highlights the difference between the needs of firms in this respect [24]. Competency and Digital Transformation Centers (Model Factories) in Turkiye, coordinated by Ministry of Industry and Technology answer needs of SMEs in terms of core production capabilities and also digitalization. Model Factories are well-designed training centers, which include a real manufacturing learning environment and specialized training programs to improve the manufacturing processes within a “transformation” context. There are currently 8 Model Factories in operation and 6 more are underway. Another measure by Ministry of Industry and Technology regarding digital transformation is the DDX Digital Transformation Assessment Model [25]. Model aims to guide firms on their digital transformation process by bringing them together with Digital Transformation Consultants in the DDX Consultant Pool. Digital transformation maturity levels of firms are evaluated using the Digital Transformation Assessment Tool (D3A), and after the maturity level is determined, a report containing a digital transformation roadmap specific to the firm is prepared, considering the competitive advantage, strategic priorities and goals of the firm. SMEs are supported to benefit from the digital transformation assessment model.

Approximately half of Turkiye’s foreign trade occurs with the EU, and a significant proportion of incoming foreign investments also originate from the EU. Turkiye ratified the Paris Climate Agreement and committed to net zero by 2053. Alignment with the Green Deal remains a pivotal agenda item. Turkiye is expected to face rising costs as a result of the implementation of the Carbon Border Adjustment Mechanism, potentially impacting competitiveness and resulting in short-term repercussions on GDP growth and employment [26]. Turkiye has implemented various measures to ensure compliance with the green deal and to facilitate green transformation in industry in general. For example, the Green Deal Action Plan was put into practice in 2021 to address the impact of the EU Green Deal on Turkey’s industrial, agricultural, energy and transport policies in relation to Turkiye’s foreign trade and to ensure adaptation to the changes brought by it [27]. The Turkiye Green Industry Project, funded by the WB, aims to accelerate green transformation in industry, intensify decarbonization efforts and improve technical capacity. Launched in early 2024, the project has a budget of USD450 million and is planned to last for 6 years [28].

These examples illustrate that Turkiye has implemented various policies and measures on digital and green (twin) transformation. While these rather reactive policies and measures have a certain impact in terms of ensuring adaptation, Turkiye is considered to be at a level where it can pursue a more active policy on the twin transformation, for example, going beyond the adaptation target and endeavoring to develop indigenous twin transformation technologies.

In recent years, the Turkish economy has endured local and global crises. Having demonstrated the ability to respond very quickly to crises in the past decades, it needs to improve this ability and make its manufacturing industry more resilient to multiple crises such as pandemics, wars, earthquakes, increases in energy and input prices, breaks in supply chains, etc.

Preserving the significance of the industry, making it more resilient and facilitating green and digital transformations will be fundamental in mitigating the risks associated with deindustrialization.

3.3 Policy Recommendations

Based on data and analyses pertaining to Turkiye, prioritizing the following aspects would be beneficial for Turkiye to further strengthen manufacturing, increase medium-high and high technology exports, and effectively address digital and green transformation challenges:

1. Continuation and reinforcement of the recent trend observed in Turkiye, favoring relatively more active policies to prevent a decline in the manufacturing sector.

As evident in the value-added share of manufacturing especially between 1998 and 2010, the shift of focus away from the manufacturing industry in 1980s and 1990s in Turkiye seems to have brought about deindustrialization. Owing to increasingly more active policies and programs implemented in the period following the 2008 crisis, the manufacturing industry has entered a rapid and permanent strengthening phase. This policy stance should be maintained and strengthened towards proactive, rather than reactive policies. For example, in addition to the existing (and rather reactive) adaptation policies in the field of green and digital (twin) transformation, it may be useful to implement more active policies directly aiming the development of indigenous twin transformation technologies.

2. Increasing resilience of the manufacturing industry in response to polycrisis.

The pandemic has raised awareness on the need to be ready for possible global shocks and risks related to climate change and the importance of green transformation. The Russia-Ukraine war was another development that led to uncertainty in the global economy, which entered a rapid recovery period after the pandemic. In the first months of 2022, the global recovery was disrupted as a result of the conflicts that broke out, and increases in energy and commodity prices accentuated the inflation trend at the global level. In addition to the Russia-Ukraine war, the possible repercussions of the developments in Gaza in October 2023, US-China trade tensions, increasing regional and geopolitical risks, the acceleration of the transition from globalization to a multipolar world order, access to and pricing of energy resources, the effects of climate change, and the possibility of a new earthquake disaster in Turkiye hitting industrial regions stand out as important factors that increase uncertainty. It has become essential to increase the resilience of the manufacturing industry against all these uncertainties. In this context, measures such as the preparation of needs analyses and road maps and determination of relocation or diversification strategies for the supply of raw materials and intermediate goods, including establishment of strategic cooperation with third countries and also preparation of national, regional, and sectoral resilience strategies for industrial production, technology development, and R&D activities may be useful.

3. Rigorous evaluation of the impacts of existing support and incentives, utilizing more detailed methodologies to inform the dynamic design processes of support programs.

Support in the field of industry and technology in Turkiye continues to be diversified and intensified within the framework of the previously mentioned change in policy stance. However, it is necessary to identify the reasons for the failure to fully realize the export potential of the manufacturing industry, and to this end, to conduct impact analyses of the supports. This assessment should encompass parameters such as employment, technological advancements, productivity, and especially exports. Despite advancements in manufacturing output and high-tech production, the proportion of high-tech products (thus, high-value-added items) in the export composition has decreased, whereas the percentage of medium-high technology products has shown slight growth. Emphasis should be placed on incentivizing high-technology content and value-added industrial exports as well as digital and green transformation. Results of rigorous impact analyses would be reflected in the design of the support programs and the efficiency and effectiveness of the supports would be increased. There are promising initiatives on impact analysis in Turkiye, however, these initiatives need to be developed and taken further for better results. Ensuring a regular and complete flow of information between the public and private sector is an important component of this measure.

4. Creation of new and quality jobs, particularly aiming to increase employment in the highly productive manufacturing industries.

The portion of industrial employment in total employment has remained roughly the same since 2006 in Turkiye. It is crucial to create new and quality employment opportunities and redirecting employment away from agriculture toward the manufacturing industry, rather than into sectors like services that exhibit relatively lower productivity growth rates. Improving the quality of the labor force, in particular formation of green and digital skills, is an important component of this measure.

5. Recognition of disparities in preparedness for digital and green transformation, technology, and productivity between large-scale firms that integrated into global value chains and smaller firms.

As evident in the distribution of value added generated by Turkiye's largest first and second 500 industrial firms based on their technological intensities, policy makers need to consider the important difference between the capabilities and needs of large and smaller firms. Smaller firms that lag significantly behind larger firms, might face greater challenges in adaptation and change. By strengthening the steps already taken in this direction, disseminating some of the existing maturity assessment tools and creating new ones, it will be possible to identify the needs of firms more accurately and therefore facilitating necessary transformation more efficiently.

6. Facilitation of a conducive environment for attracting large-scale qualified FDI contributing to technological advancement and industrialization.

As a complementary measure, it remains important to increase predictability and attract qualified FDI to Turkiye that will contribute to Turkiye's industrial-based, green and high-tech production capacity. Measures such as investment tax credits or tax exemptions, as well as establishment of special science parks, would be incentives for inward FDI. On the other hand, outward FDI in selected technologies can also contribute to the establishment of a two-way ecosystem.

Conclusion

The manufacturing industry is the sector that permanently boosts growth, where R&D, technological development, and innovations that create high added value are realized and linkages that spread throughout the economy are established the most. It has been the driving force of the increase in production, employment, and technological development and has maintained its role in the long-term sustained growth of countries. Productivity growth is higher and tends to increase faster in the manufacturing industry than in the services and agriculture sectors.

On the other hand, deindustrialization is anticipated to have adverse effects on the potential for maintaining long-term economic growth. Specifically, premature deindustrialization is anticipated to negatively impact the aspirations of developing nations in achieving structural transformation and continuous growth in productivity, which are essential for narrowing the gap with advanced economies.

This study discusses the existence of deindustrialization in Turkiye through both quantitative and qualitative analyses. Between 1998 and 2010, Turkiye exhibited a conspicuous deindustrialization trajectory especially evident in terms of the share of manufacturing industry value added in the GDP. The most prominent reason for this trend is the loss of the focus on industrialization within the framework of liberal policies followed after 1980 extending well into the 1990s. The 1980s were a turning point in the industrialization process of developing countries and Turkiye was no exception. Although post-1980 liberal policies led to a short period of deindustrialization, it cannot be said that Turkiye is facing an immediate risk of deindustrialization today. After the 2008 crisis, industrialization-oriented policies were resumed in line with the global trend and the risk of deindustrialization was swiftly mitigated. Although deindustrialization has been halted and the trend has been reversed, this improvement has not yet been fully reflected in the composition of exports. Turkiye still needs to sustain and reinforce its policy stance, favoring more active policies to maintain and strengthen the manufacturing industry and increase the sophistication of manufacturing exports.

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CONCLUSIONS AND RECOMMENDATIONS

1. Conclusion

1.1 Deindustrialization and Causes

Based on the data collected from the nine countries under study, it is evident that the majority have encountered varying degrees of deindustrialization. However, Cambodia and Bangladesh stand out as exceptions due to factors such as the redirection of global supply chains resulting from the US-China trade war. In these cases, the flourishing manufacturing sectors in these countries may obscure any overt signs of deindustrialization, making the phenomenon less conspicuous. Conversely, countries like Malaysia, Turkiye, and Thailand have undergone deindustrialization to varying extents over time, while others, such as the Philippines, India, and Pakistan, continue to grapple with persistent issues related to deindustrialization.

Diverse factors contribute to the phenomenon of deindustrialization across different regions. ASEAN countries, including the Philippines, Thailand, and Malaysia, have encountered challenges such as the 1997 Asian financial crisis, the 2008 global financial crisis, intensified competition from China following its accession to the WTO, and governmental policies that may have overlooked the importance of industrialization.

Similarly, countries in South Asia, such as India, Pakistan, and Sri Lanka, have been affected by a combination of factors including the 2008 global financial crisis and internal economic shifts. Additionally, the outbreak of the COVID-19 pandemic in early 2020 exacerbated existing challenges and precipitated serious deindustrialization issues.

1.2 Whether deindustrialization should be considered a problem and concerns about the increasing share of the service industry

While most Southeast Asian countries, along with Turkiye, express apprehension regarding the phenomenon of deindustrialization, South Asian nations including India, Pakistan, Sri Lanka, and Bangladesh hold a different perspective. They argue that the increasing prominence of the service sector, at the expense of manufacturing, does not raise significant concerns, as productivity levels have not experienced a marked decline. Despite the current modest productivity levels, the adoption of emerging technologies such as AI, big data, and financial technology is deemed sufficient to bolster competitiveness. For example, the Philippines views information services and outsourcing services as sources of job opportunities, thus viewing the adoption of new technologies as an alternative avenue for economic development in lieu of manufacturing.

Our concern arises from the fact that certain service industries operate within illegal or irregular work environments, such as the underground economy, which may result in diminished productivity. While the adoption of new technologies such as AI and financial technology can enhance productivity and competitiveness, it may also lead to unemployment. Additionally, the inherent characteristics of the service industry, including the polarization of high-end and low-end employment opportunities, may exacerbate income inequality.

Furthermore, the limited upstream-downstream linkage effects in the service sector may lead to reduced long-term output and employment opportunities. The absence of a certain proportion of manufacturing may potentially impact the economy’s long-term competitiveness, warranting attention. Moreover, the presence of partial monopolistic power in certain service industries raises questions about whether the productivity gains from technological adoption will translate into benefits for consumers, underscoring the importance of ongoing monitoring.

1.3 Government policy measures in response to deindustrialization

The following is a brief summary of several countries’ broad strategies to respond to the decline of the industrial sector:

(1) Thailand: The Eastern Economic Corridor (EEC) policy aims to balance the regional disparities in industrial development. Additionally, through targeted initiatives such as digitalization and sustainability, efforts are made to enhance the manufacturing sector’s involvement in research and development (R&D) and smart investments.

(2) India, Pakistan, and Sri Lanka: There is a general belief that the rise of the service sector can address some of the decline in manufacturing, while the introduction of new technologies is deemed capable of addressing the issue of lower productivity in the service industry. However, if service industry players hold monopolistic power, it may not necessarily be beneficial for consumer welfare.

(3) Thailand, Malaysia and Cambodia: These countries are focusing on industry upgrading through increased investment in R&D and attracting foreign investment, particularly in activities related to electric vehicles, semiconductors, digitalization, and sustainable development.

(4) The Philippines: The electronics industry dominates, highlighting the urgent need to develop another new industry to address the lack of diversification in the sector. However, attracting foreign investment and industries from abroad also significantly impacts domestic industries, leading to another challenge. Developing emerging industries without relying on foreign investment necessitates protection (referred to as infant industry theory). However, protection, tax incentives, and subsidies must have a sunset deadline; otherwise, long-term subsidies may hinder self-reliance and the establishment of competitiveness.

Simultaneously, a variety of policy tools must be employed (policy mix) for effectiveness. Alternatively, a certain amount of foreign investment could be introduced, with a specified period of franchise or tax incentives, which would be phased out over time, allowing domestic industries room for future development.

1.4 Policy discussion

In policy discussions, many countries tend to prioritize supply-side interventions, focusing on aspects such as skilled manpower, funding, and technology support. However, there is often less emphasis on the demand side, including government procurement, contract research, and public-private partnerships (PPP), as well as environmental factors such as intellectual property protection, patent protection, tax incentives, and regulatory relaxation.

Furthermore, the development of macro or mega policies that encompass more detailed policies is crucial. Examples include Thailand's Eastern Economic Corridor (EEC) plan and India's Make in India initiative, which represent high-level policy frameworks. Additionally, the implementation of large-scale project plans can facilitate cross-ministerial integration and coordination, fostering national cohesion and providing direction for collective efforts.

After comparing the experiences of various countries, we have compiled and organized the evidence for and against deindustrialization, the reasons behind it, and its possible empirical impacts in Table 1, and the policies and future proposals for deindustrialization in various countries are compiled and organized in Table 2 for reference.

TABLE 1

OBSERVATION ON WHETHER COUNTRIES HAVE DEINDUSTRIALIZATION PHENOMENON

	1. Is there deindustrialization?	2. Support data	3. What are the main reasons?	4. Economic impact (positive and negative)
Bangladesh	• Hidden worries, not for the moment.	• Needs more information.	• Globalization, industrial structure change, labor force problem.	• Employment declines, economic strength↓, income inequality. • Labor quality declines, trade imbalance. • Social, political unrest. • Regional imbalance.
Cambodia	• Not now, and not for next few years.	• The share of manufacturing GDP / total GDP↑.	• US-China trade war & supply chain relocation. • FDI increase.	—
India	• Yes. • The share of manufacturing industry.	• The share of manufacturing industry decreases. • Service industry share increases. • Manufacturing industry's productivity increases.	• The cap of foreign capital's share is limited <12%. • The growth rate of manufacturing industry continuously declines in the last 20 years.	• The productivity of manufacturing industry still increases. • Manufacturing industry's productivity > service industry. • Release labor force to service industry.
Malaysia	• Yes, the share of manufacturing continuously declines since year 2000, however, it's improving now.	• The share of manufacturing industry is decreasing since year 2000. • Comparing with advanced countries' declining manufacturing industry's share, Malaysia's per capita GDP is relatively low.	• 1985 commodities' price decline crisis. • Global financial crisis in year 2009. • Globalization in year 2019-2020 depress Malaysia's manufacturing industry.	• Unfavorable to GDP growth, technology level, wage level.

	1. Is there deindustrialization?	2. Support data	3. What are the main reasons?	4. Economic impact (positive and negative)
Pakistan	• From agriculture to manufacturing industry to service industry, it's a natural phenomenon.	• The share and productivity of manufacturing industry decreases.	• Unstable policy. • Energy crisis. • Globalization and short sight industrial policy.	• Trade imbalance. • Heavily dependent on low level manpower and service industry. • The output of manufacturing industry and GDP stagnant.
Philippines	• Since 1982, manufacturing industry's share declines from the peak.	• Manufacturing industry's share declines. • International comparison, the Philippine's manufacturing industry's share decline in lower per capita GDP comparing to advanced countries.	• Political incidents (Aquino assassination) resulted in capital flight. • Insufficient infrastructure.	• Per capita GDP decreases. • Economic development slows down.
Sri Lanka	• It's early to tell premature de-industrialization.	• The share of manufacturing industry declines, service industry's share increase. • However, it is still too early to tell de-industrialization.	• Skilled labor shortage. • Lacking national innovation system. • Lacks industry diversification. (too dependent on apparel industry.)	• Productivity declines. • Innovation / technology level↓. • Challenge for employment / trade balance. • Fraile economic system.
Thailand	• Yes, manufacturing industry's share declines since year 2010.	• Share of manufacturing industry ↓ since 2010. • Global value chain's global share ↓ since 2009.	• China joined WTO in 2002, bringing more competition. • Unbalanced policy results in region unbalanced.	• Trade growth decreases. • Employment declines. • International division of labor ↓.
Turkiye	• Yes, in 1998–2003; 2008–10. • But it is improving now.	• The share and productivity declines.	• Policy changes, not paying too much attention to manufacturing industry.	• Value-added rises. • Employment number does not significantly declines. • Influence long-term economic growth.

Data: from countries report.

TABLE 2

COUNTRIES' COUNTERMEASURES TO DEINDUSTRIALIZATION

	1. Government countermeasures against deindustrialization / policies to improve manufacturing industries	2. Do the manufacturing and service industries have complementary effects?	3. Future recommendations
Bangladesh	• Improve infrastructure. • Strengthen industrial policy. • Export-oriented economic growth.	—	• Invest in education and human resources development. • Strengthen infrastructure construction, investment, and technology introduction. • Financial support and establish innovation cluster.
Cambodia	• Improve technology-intensive industries. • Increase investment in automation.	—	• Supply side: talent training/labor quality increases. • Demand side: establish PPP (public-private partnerships). • Environment: setting up technology demonstration center and facilitates technology transfer.
India	• Production-linked incentive plan. • Make in India initiative.	• Introducing technology into the service industry to improve productivity and create more job opportunities. • However, whether it will affect the long-term competitiveness of the economy is worth noting.	• Public procurement for small and medium-sized enterprises. • Logistics and supply chain integration. • National Industrial Corridor Development Plan. • Plan to strengthen the competitiveness of small and medium-sized enterprises.
Malaysia	• Revitalize the manufacturing industry. • Attract more foreign direct investment (FDI).	—	• Short term: reduce corporate taxes, strengthen technology / innovation investment/ improve labor environment, technical and vocational education. • Medium and long term: (1) 2023 New Industrial Master Plan; (2) Improve productivity through manufacturing / innovation. • Increase the export proportion of medium and high-tech manufacturing industries.

	1. Government countermeasures against deindustrialization / policies to improve manufacturing industries	2. Do the manufacturing and service industries have complementary effects?	3. Future recommendations
Pakistan	• Strategic industrial development policy. • Protect local industries and promote diversification of manufacturing industries.	• Believes that manufacturing and service industries are currently complementary. • However, it remains to be seen whether deindustrialization will affect long-term economic competitiveness.	• Improve labor environment and attract young people to join the manufacturing industry through performance bonuses. • Tax reduction and exemption to reward new enterprises. • Encourage export-oriented policies.
Philippines	• Attract foreign investment and trade liberalization. • But import competition replaces part of the domestic manufacturing industry. • Reform education. • Reform electricity regulations.	• Information technology services/business outsourcing services have become the main force of economic growth. • However, the increase in service industry exports has taken away partial manufacturing manpower (Dutch disease).	• Technology introduction. • Improve infrastructure and technical education. • Improve labor quality.
Sri Lanka	• Strengthen local area / attract foreign investment. • R&D Industrial Policy. • Attract investment in technology-intensive industries.	• The proportion of the service industry has increased, but still worried about the deindustrialization.	• Industrial policy support. • Education / Technology Policy. • Infrastructure / Energy Security.
Thailand	• Attract foreign investment. • R&D, innovation, and technology introduction. • Regional investment incentives, providing industrial zone land, special economic zones, science parks.	—	• Issue type: Upgrading and transformation of issues such as wisdom and sustainability. • Related infrastructure investment. • Strengthening the quality of human resources is conducive to improving manufacturing productivity.
Turkiye	• After 2008, manufacturing policies were strengthened and support for the manufacturing industry. The policy has been quite effective.	—	• Review the current policy strengthening and manufacturing support. • Promote job opportunities in high-productivity industries. • Strengthen digital / green transformation. • Integration into global value chain (GVC). • Attract FDI.

Data: compiled from countries report.

2. Policy Recommendations

Based on the previous analysis, we put forward the following policy recommendations:

2.1 Formulate stable policies to increase the degree of industrial production

The manufacturing industry, characterized by its significant inter-industry linkages, plays a pivotal role in driving economic development. It not only fosters the development of upstream and downstream sectors but also generates foreign exchange through exports and creates numerous employment opportunities. Moreover, the expansion of the manufacturing sector leads to increased income levels, thereby creating a market for future technology-intensive industries and the service sector. Given its crucial role, it is imperative to maintain a certain proportion of manufacturing within the economy. Governments can stimulate the development of the manufacturing sector through various policy measures, including tax incentives, subsidies, establishment of industrial parks and science parks, and attracting foreign investment. These policies aim to uphold a balanced ratio of manufacturing within the economy, ensuring its continued contribution to economic growth and development.

2.2 The development of the service industry can replace part of the decline in manufacturing ratios and the decrease in manufacturing employment, but whether productivity and employment can be maintained must be observed for a longer period of time

The emergence of the service sector in certain South Asian countries has filled the void left by the decline in manufacturing and employment, thereby contributing to maintaining economic stability. Looking ahead, there is potential to enhance the productivity of the service sector through the adoption of new technologies, offering an alternative to deindustrialization, especially in countries with larger markets. While the introduction of new technologies into the service sector has the potential to boost productivity, questions persist regarding its long-term sustainability. Moreover, the adoption of new technologies in the service sector may result in a reduction in employment opportunities, necessitating ongoing scrutiny by governments worldwide.

2.3 Proposing slogans through high-level policies to connect various industries, or using large-scale projects to encourage increases in industrial production ratios are worthy of serious attention

Higher-level policies or mega projects are helpful for cross-ministerial coordination and integration, and can build consensus among the people and promote them together. Integrating resources for large-scale projects can achieve greater synergy.

2.4 Different purposes require different industrial policy tools to achieve the goals

For instance, in economically disadvantaged areas where industrial development lags, policymakers can employ tax incentives to encourage large-scale industries to relocate to these regions. Additionally, the encouragement of local industry development can be facilitated through guidance from domestic technical institutions. Furthermore, promoting the development of technology-intensive industries can be achieved by offering incentives such as five-year tax exemptions, investment deductions for R&D, talent training programs, automation, and initiatives aimed at achieving net zero emissions. These incentives serve to attract foreign investment and foster the growth of high-tech industries.

2.5 Market-friendly policies are better than policies with government's direct involvement

Government direct involvement in civil R&D may be susceptible to failure due to issues such as information asymmetry and rent-seeking behavior. In response, market-friendly policies are often considered preferable for assisting industrial upgrading and transformation without excessive market distortion. Such policies may include the establishment of science parks, provision of infrastructure, promotion of industry-university collaboration, and setting up incubation centers to foster entrepreneurship among start-up firms.

2.6 Focus and concentrate resources in key areas

In the context of a small country with limited resources, it becomes imperative to allocate resources to sectors where the nation enjoys a comparative advantage, akin to the Republic of China's emphasis on the IT sector. The adoption of the right policy mix, which may encompass measures such as tax breaks, subsidies, the establishment of science parks, and incubators, is crucial to enabling industries to achieve economies of scale and make breakthroughs (Rothwell and Zegveld [1]; Lee and Wang [2]).

2.7 Different industrial development stages should have different policy tools

During the stage of exporting labor-intensive products, incentives such as tax breaks, low-interest loans, and tax incentives for local and foreign investments should be provided to encourage investment in the manufacturing sector, particularly through export processing zones and domestic investment initiatives. As the economy progresses towards technology-intensive industries, concerted efforts should be directed towards technology transfer from research institutions to enterprises. Establishing science parks to create conducive environments and fostering clustering effects for technology-intensive industries are essential steps in this transition. Additionally, government cooperation funds can be leveraged to reduce the capital costs of investment for businesses.

2.8 In addition to supply-side policy tools, it is also necessary to strengthen demand-side and environmental policy tools

Promoting robust infrastructure and fostering a favorable investment environment are essential to encourage both domestic and foreign investment. Government policies focusing on demand-side factors such as green procurement, innovation procurement, and contract research can provide additional incentives, encouraging corporate investment (see Figure 1).

FIGURE 1

TAIWAN'S INNOVATION POLICY MEASURES AND RESPONSIBLE AGENCIES

Innovation Policy Measures			
Supply-side Policy Measures	(1) Financial Assistance	(a) Subsidies…………………...	Industrial Development Bureau (IDB)
		(b) Loans………………………	Bank of Communications, Small and Medium Enterprise Bank
		(c) Venture Capital……….….	Bank of Communication, Ministry of Finance
	(2) Manpower Assistance	(a) Education…………………..	Universities
		(b) Training……………………	Council of Labor Affairs
	(3) Technical Assistance	(a) Technical Assistance……….	IDB
		(b) Government-owned………..	Industrial Technology Research Institute (ITRI) Research Institutes
		(c) National Science and …… Technology Projects (NSTPs)	Bureau of Technology
Demand-side Policy Measures		(a) Contract Research……………………………	National Science Council (NSC)
		(b) Government Procurement……………………	Government Agencies
Environmental Policy Measures		(a) Tax Incentives ………………………………	IDB, Ministry of Finance
		(b) Patent & Intellectual Property Rights………..	Ministry of Economic Affairs
		(c) Science Park …………………………………..	National Science Council (NSC)
		(d) Incubator Centers ..…………………………..	Small and Medium Enterprise Administration
		(e) Open Laboratory ……………………………	ITRI
		(f) Industrial Automation..…………………….......	National Information and Communication Initiative

Source: Rothwell & Zegveld (1981), Wang & Mai (2001).

2.9 Encouraging FDI with incentives but need to have a sunset clause without hurting local industry's room for survival

In the case of the Philippines, FDI promotion may hurt local industry. Hence, using tax incentives or other grants requires a deadline. As time goes by, the tax incentives or subsidies must phase out; otherwise, it will hurt local industry's future development space. Moreover, if governments worry that FDI may hurt local industry, they can draw up guidelines and only welcome FDI which complements local industry, or where local industry does not exist.

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