Bangladesh's Economic Odyssey: Milestones and Hurdles in Economy, Manufacturing, and Environmental Sustainability

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ABSTRACT

Objectives: This study aims to understand the economic growth and hindrances to gaining independence through rectifying strategies in various belts to accomplish sustainability in Bangladesh.

Methods: To identify the economic odyssey, data are secondarily collected from different government, semi-government, and private institutes, and comparisons are made on GDP, through various economic sectors, and carbon dioxide emissions from 1971 to 2021.

Results: This study highlights the significant growth of a robust manufacturing sector while addressing issues such as reliance on specific industries, environmental degradation, and a lack of diversity.

Conclusion: Obstacles continue to exist, like industrial vulnerability, environmental pollution, and a lack of efficiency and effectiveness in productivity. Overcoming these challenges would shape economic sustainability and help it emerge as an economic high-flyer.

Keywords: Economic odyssey; GDP; Sustainability; Manufacturing; SDG; NSDS

INTRODUCTION

For decades, people living in a naturally rich but economically underdeveloped South Asian region have strived for a minimum standard of living. After achieving independence in 1971, Bangladesh began its journey with a predominantly agrarian economy and limited infrastructure. In the 1970s and 1980s, Bangladesh was one of the world's poorest countries, with a high rate of hunger and poverty among its inhabitants [1, 2, 3, and 4]. Despite that, a wave of adjustments began and significantly improved many areas.

During the past 20 years, the nation has experienced impressive economic growth, reflected in various macroeconomic indicators. Bangladesh has recently been identified as a fast-expanding market and a Next Eleven developing middle-income country [5 and 6]. The country is transitioning from an agrarian to an industrial economy thanks to the expansion, fuelled mainly by manufacturing production and remittances. However, a modest living standard for a large population in a small country is still a long way off. Moreover, economic roadblocks like a nearly dysfunctional education system, a low-skilled labour force, resource shortages, poor governance, etc., will probably obstruct or reduce growth in future development.

The manufacturing industry is vital to a low-income economy's early development, as the history of economic development has shown [7]. The growth of Bangladesh's manufacturing industry would also be crucial for the country's future development. Although Bangladesh's manufacturing sector has made tremendous strides in producing finished items over the past 20 years, there is still doubt that it has the potential to spur structural changes that will boost the country's economic growth. The manufacturing sector's contribution to GDP in 2021 was 21.24%, significantly less than the service sector's 51.92% contribution. On the other hand, the manufacturing industry's current job growth trajectory is insufficient for long-term industrial growth. Only 14.82% of all jobs in 2019 were in manufacturing, a figure substantially lower than the proportion of manufacturing value added to GDP (20.1%), which shows that there are still obstacles to job growth that reflect a complex dynamic between job growth and economic growth on a broader scale in this sector. Figure 1 shows employment opportunities created in three major economic sectors from 1991 to 2021.[1]

The primary factor contributing to the relatively low employment in this sector was the low level of manufacturing activities [5]. Additionally, Bangladesh's manufacturing sector mainly depends on the apparel industry. Apparel production accounts for 84% of export revenue [2]. Hence, it is imperative to pursue diversification into promising industries to enhance the manufacturing sector's contribution to the GDP, per capita export, and overall competitiveness. This strategic move may also lead to additional employment opportunities within the manufacturing sector.

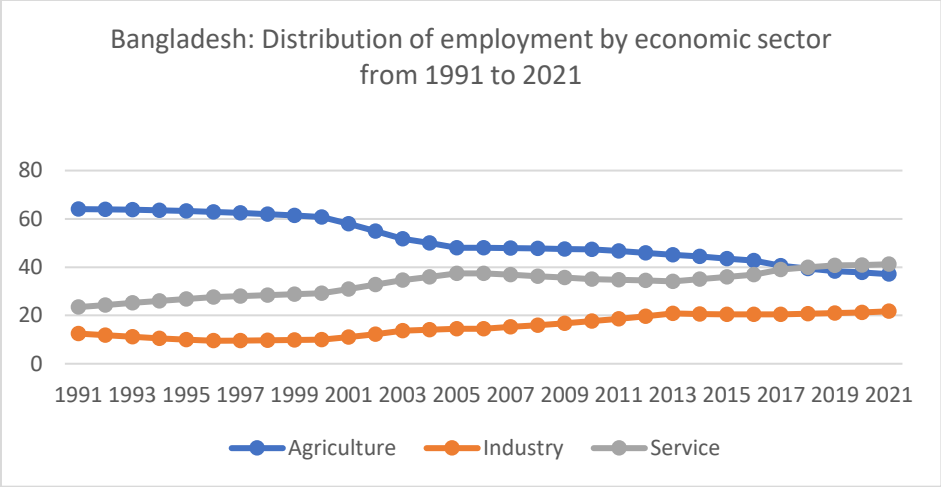

Figure 1: Distribution of employment by economic sector

Another unfavourable aspect of Bangladeshi manufacturing is the low proportion of large industries in production. High-tech sectors with mass manufacturing capabilities typically produce jobs at relatively high wages. However, cottage, micro, and small businesses dominate Bangladesh's manufacturing industry [5]. The fourth and probably the most severe drawback is the pollution that Bangladesh's industrial sector generates. Despite a low manufacturing CO2 emission per unit of value added (0.48 in 2019), the nation's CO2 efficiency is declining, as documented in the United Nations Industrial Development Organisation (UNIDO) industrial analytics platform[2].

The SDG9 Industry Index, developed by UNIDO, benchmarks member countries' performance on SDG-9 targets from 2000 to 2018 for 131 economies. This index enables the evaluation of a country's level of industrialisation compared to other nations. Bangladesh placed 89th on the SDG-9 industry ranking, narrowly ahead of Pakistan (92) but well below Sri Lanka (74) and India (81). Low contribution to GDP, a small proportion of sectors using medium to high levels of technology, and increased CO_2 intensity are the leading causes of this undesirable position. Additionally, wage hikes may constrain the sector's current level of competitiveness. Therefore, it is crucial to upgrade the organisational and technological aspects of manufacturing to fix the problems discussed so far. Manufacturing enterprises with internal prowess and

[1] Source: https://databank.worldbank.org
[2] https://iap.unido.org/data/sdg-9-industry?p=BGD

advanced technology are pivotal for driving consistent economic growth.

Bangladesh has been pursuing extremely ambitious development goals, which are primarily reflected in the Perspective Plan 2010–2021, which identifies the manufacturing sector as the primary source of strong economic growth and prosperity [8]. Rapid growth methods involve a variety of governmental supports for industrial sectors to grow and assemble profits, particularly for those businesses likely to produce employment and money in the shortest amount of time. Financial incentives and other benefits are regularly provided to enterprises focusing on exports, operating in EPZs, and those in thrust sectors under the industrial policies of 2005 and 2010.

The National Sustainable Development Strategy (NSDS), created to coordinate the dual goal of material development and environmental quality, is interlaced with the development process described in the perspective [8]. The NSDS established indicative targets based on a simplified framework of indicators for sustainable development, committing to eradicating poverty by 2021 and joining the middle-income country club. The strategic plan notes that the accelerated expansion will probably seriously harm the environment, and it thus urges paying close attention to pollution control and environmental management.

The NSDS outlines several strategies to make manufacturing greener, such as ensuring compliance with national environmental laws, rules, and regulations, installing emission reduction devices and effluent treatment facilities, incorporating environmental considerations into management practices, etc. The primary goal of the industry-centric plan is to boost growth while preserving natural capital, as stated in the perspective plan and NSDS. Economic indicators like the GDP growth rate, manufacturing output, employment rate, CO_2 emissions, etc., will show the progress of the manufacturing-centric growth strategy. Additionally, the UN's SDG index can be a valuable tool to assess the overall efficacy of sustainable development policies. Nonetheless, a comprehensive understanding of environmental sustainability within the industrial sector will likely remain insufficient. However, gaining insights into the industry's sustainability status may be feasible using an environmental efficiency approach measured against an efficiency frontier.

The Economy: Evolution and the Challenges

Bangladesh is a market-based emerging country, shifting from a primarily agrarian to an industry- and service-based economy. After independence in 1971, the government adopted a modified form of socialism with many state-run companies to emancipate people from hunger and poverty. However, the overall condition of the emerging country was very fragile because of the liberation war that extensively damaged the nation's infrastructure, including its roads, railways, bridges, ports, and buildings, seriously disrupting the supply chain. The salient features of the new economy included dependence on agriculture, an unskilled labour force, limited resources, and archaic infrastructure [2]. According to data from the Bangladesh Bureau of Statistics (BBS), Bangladesh's share of agriculture in GDP was 59.4% in 1972—73. The number of manufacturing factories registered in the same financial year was 3810 across the country, and the gross value of industrial production was 3090.90 million Taka,[3] equivalent to 22.73 million British pounds based on the September 2023 exchange rate. These statistics show how fragile the country's economic condition was when it started its journey.

Furthermore, the subsequent modernisation of the economy was complex due to primitive social structures and conditions. Women's participation in the labour market was discouraged by the religious belief systems ingrained in the population [3]. Low literacy, high birth rates, and inadequate education facilities restrained the efforts to bring societal changes. At the end of 1971, the country's gross domestic product (GDP) was just 8.75 billion US dollars, with a negative growth rate, while per capita income was only 128 US dollars[4]. The country was among the poorest in the world, with deficient levels of all social indicators, including literacy rate, participation of women in the labour force, healthcare spending, mortality rate, etc. [3 and 2]. In its first 20 years of independence, the nation failed to achieve observable advancements, primarily caused by the recurrent

[3] Monthly Statistical Bulletin of Bangladesh, July 1972, BBS

[4]Source: https://www.macrotrends.net/ (https://www.macrotrends.net/countries/BGD/bangladesh/gdp-gross-domestic-product'>Source)

political upheaval that persisted in the 1970s and 1980s. After the nation's founding leader was assassinated, the political government was changed, and in the late 1970s, a slow retreat from the socialist system started [9]. The 1980s were a decade of policy reforms for Bangladesh, mainly guided by the IMF-introduced Structural Adjustment Programme (SAP) policy package. The fundamental tenets were fiscal restraint, rearranging public expenditure priorities, tax reform, liberalising interest rates, competitive exchange rates, opening trade and foreign direct investment, privatisation, and deregulation [10]. A significant step in private sector development was the Foreign Private Investment Act of 1980, which provided government support for investing in the country [9]. Another critical step toward capitalism was the statement of an industrial policy in 1982 that encouraged private enterprises and facilitated the denationalisation of state-owned businesses. In addition, foreign direct investment was welcomed under specific guidelines. However, despite numerous experiments to implement the Bretton-Woods institutions' recommended policies, the nation failed to improve its citizens' economic and social conditions and had a relatively slow pace of progress until a massive political upheaval for democracy in 1990. A decade-long fight against the military dictator's autocratic reign helped the country transition to a democratic administration and a market-based economic structure. Massive economic reforms put the economy on track in the 1990s, leading to steady growth and industrialisation [11].

The economic policy package of the Bretton-Woods institutions was transformed into a Poverty Reduction Strategy Paper in the late 1990s, with recommendations of dismantling large national companies, removing import tariffs, promoting export-led growth, withdrawing agricultural and energy subsidies, etc. The multi-party democratic regimes initiated in 1991 acted in favour of creating an environment that helped grow a robust private sector to lead the economy and attract foreign direct investment. After prolonged low growth and stagnation, the democratically elected political leaders finally brought the economy out of its inertia.

Despite many unfavourable conditions and limited resources, Bangladesh has made notable economic and social progress in the first two decades of the twenty-first century, earning accolades from numerous experts and organisations [1]. The most impressive improvement has been made in the growth of per capita income and gross domestic product (GDP), distinct in time series plots of the population, GDP, per capita income, and growth rate (Figure 2), which shows that the country's population has been growing steadily until 2000. On the other hand, GDP and per capita income are both increasing. The expansion of GDP and per capita income primarily began in the 1990s, and after 2006, both curves became steeper, pushing the growth rate above 6%. Except for 2020, the pandemic year, Bangladesh has maintained growth rates above 6%.

The spectacular economic progress comes primarily from three sources: increased manufacturing production (especially from ready-made garments, which earn most of the export revenues), remittances, and higher agricultural productivity (1 and 2). In the 1990s, policy support and changes in the global economy created great opportunities for Bangladeshi business owners to establish apparel companies focused on exports and dominate the clothing market by utilising low-wage labour. Another way for Bangladeshis to make money abroad was made possible by the need for workers in the Middle East and European nations. Finally, the key to success in garment production and remittances was the efficient reallocation of surplus labour from the agricultural sector to the manufacturing sector and abroad. As a result, the country's foreign reserves increased favourably due to higher export revenues and remittances. In addition, agriculture subsidies, investment in research, improved irrigation methods, and other appropriate governmental support helped increase agricultural output and guarantee food security.

In addition to its economic success, the nation made notable progress in its social spheres. The country now provides free primary education; over 97% of children are enrolled in primary schools. Women's empowerment is another noteworthy national development: Several laws have been enacted to protect women from social and family abuses that tempt them out of the workforce. Consequently, women's participation in the labour force increased from 24.73% in 1990 to 36.42% in 2019. The average population's life expectancy increased from 46 years in the year of independence to 72 years in 2019. At the same time, birth, death, and infant mortality rates have decreased massively. The poverty rate has declined from 80% in 1971 to 20% in 2019. A rise in agricultural production that resulted in food self-sufficiency has almost entirely eradicated extreme hunger. In 2020, total food grain production reached 45.4 million metric tons, more than 4 times what it was in 1971. The immunisation programme against serious diseases offered to all children is another example of the nation's success stories.

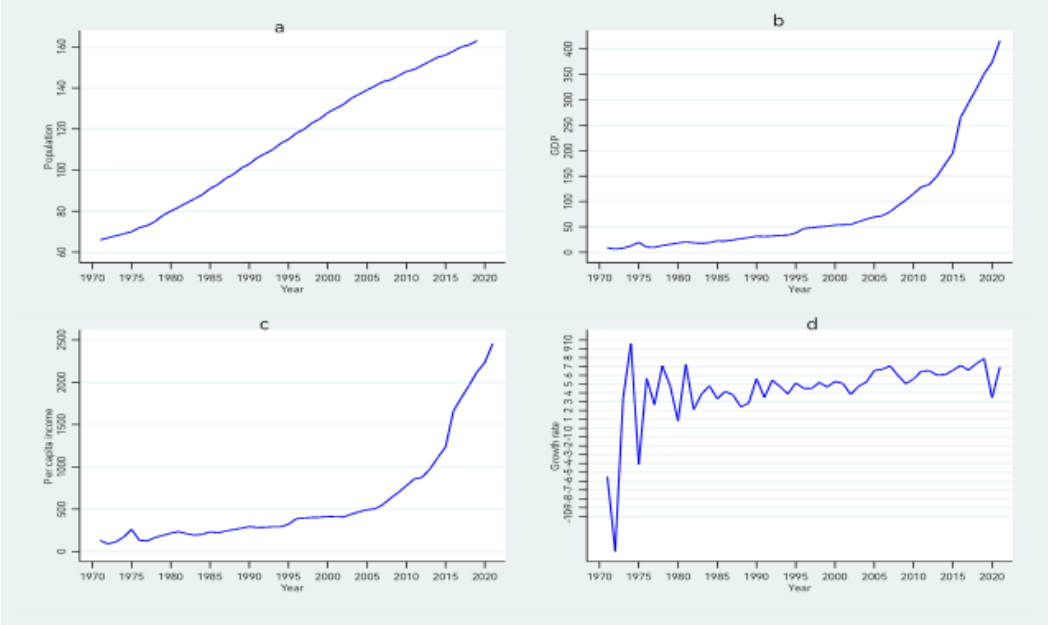

Figure 2: Bangladesh's Population (a), GDP (b), per capita income (c), and growth rate (d) over time[5]

All the information above generates the immediate impression that an agrarian economy with immense colonial remnants and undeveloped infrastructure has made notable progress towards modernisation. The country transitioned to a lower-middle-income country in 2015, categorised by the World Bank [12]. By evaluating the altering patterns of different sectors' share of GDP, it is better to comprehend the structural evolution of Bangladesh's economy. Figure 2 displays how, in the post-independence era, industry and services have escalated their share of GDP while agriculture's share has progressively fallen.

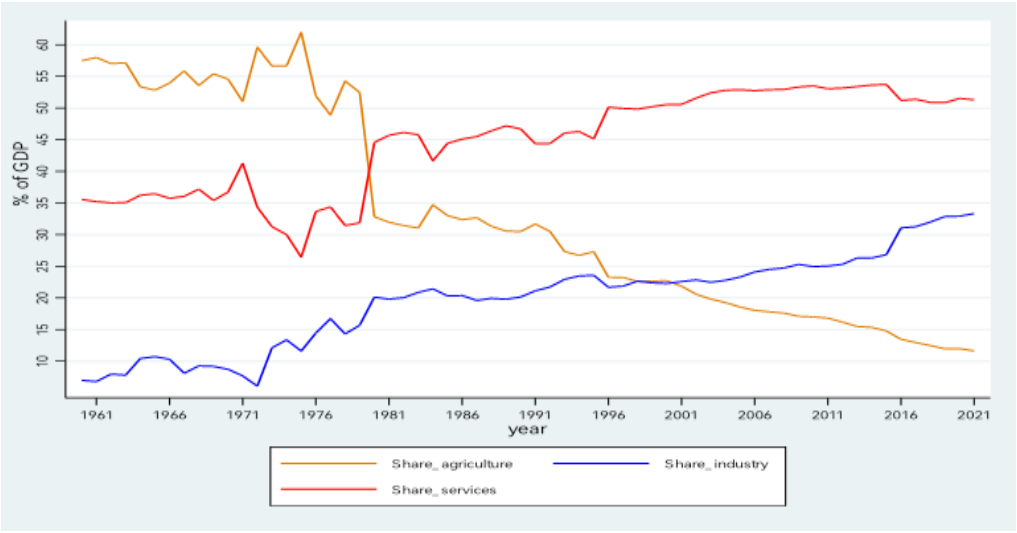

Figure 3: Shares of agriculture, industry, and services to GDP over time

Although Bangladesh has been identified as the fifth-fastest-growing economy in the world, and the World Bank anticipates it will become a future economic power, numerous concerns still need to be tackled. The most alarming issue is income inequality: The income share held by the lowest 10% of the population was 3.7% in 2016, down from 3.9% in 2010. In contrast, the income share held by the highest 10% tends to increase in recent years, standing at 26.8% in 2016[6]. The GINI coefficient, which measures income inequality, shows a dramatic increase from 1980 to 2016, even though data are unavailable for all the years (Figure 3).

[5] Source: https://www.macrotrends.net/ (https://www.macrotrends.net/countries/BGD/bangladesh/gdp-gross-domestic-product'>Source)

[6] https://knoema.com/atlas/Bangladesh/topics/Poverty/Income-Inequality/GINI-index; accessed on 29 March 2023

The progress in economic development cannot improve the livelihood of the masses without reducing the income disparity.

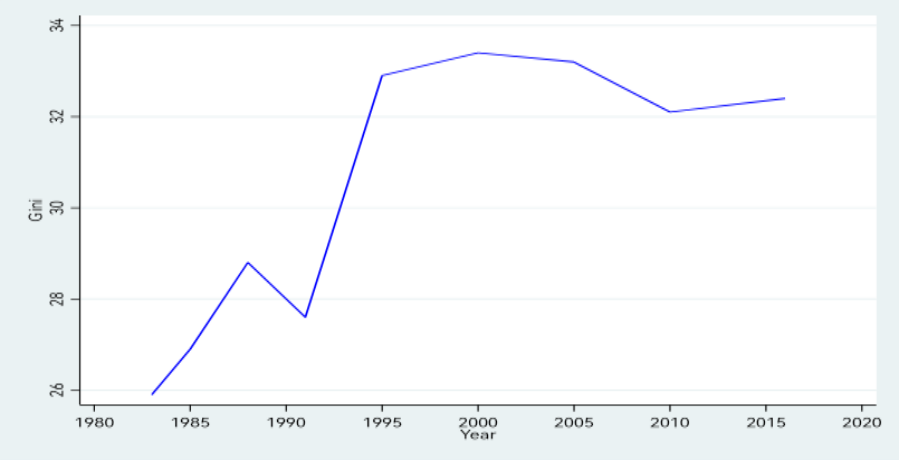

Figure 4: Trend of Gini Coefficient in Bangladesh

Another severe economic drawback of the country is the tax revenue as a percentage of GDP. Since the government's capacity to invest in infrastructure and provide services for citizens and businesses depends on collected public revenues, tax revenue is crucial to sustained economic growth, which shows that a minimum tax-to-GDP ratio is associated with a significant acceleration in the growth and development process [13]. They recommend that countries collect at least 15% of their GDP in taxes to meet the basic needs of their citizens and businesses. According to their research, even slight changes in tax rates close to the tipping point can cause economies to shift from one equilibrium to another. This can lead to significant growth discrepancies as some nations attain a high growth equilibrium while others remain low. Unfortunately, Bangladesh's tax collection as a share of GDP has historically fallen significantly short of the suggested benchmark. Figure 5 contrasts Bangladesh's tax revenue as a percentage of GDP with Malaysia, a rapidly advancing country[7]. While the gap between these two nations has decreased in recent years, Malaysia maintains a tax-to-GDP ratio exceeding 11%, whereas in the case of Bangladesh, it remains below 8%.

The country's export revenue is susceptible to external shocks, mainly due to its high reliance on the ready-made garment (RMG) industry. Therefore, the stability of the nation's finances can be severely affected by economic disturbances in the countries that import clothing from Bangladesh. In addition, the poor quality of education, which is still causing a mismatch between the skills required in the labour market, is another issue that needs to be addressed immediately [4].

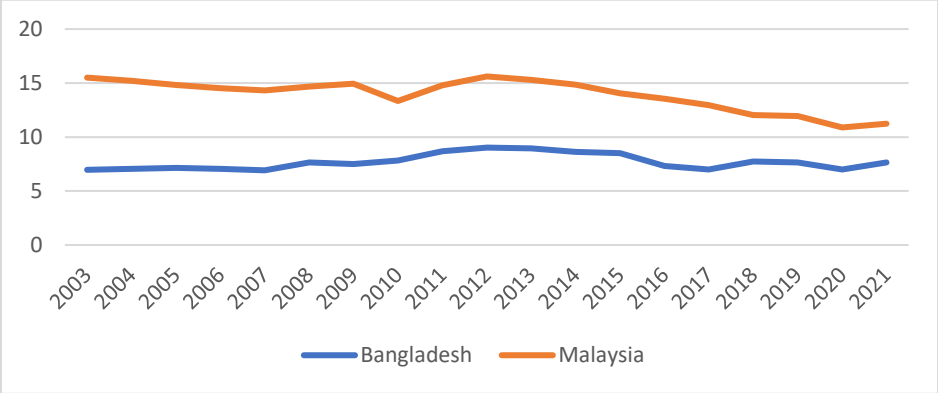

Figure 5: Tax revenue as a percentage of GDP

Rapid urbanisation caused by sustained economic growth raises demand for jobs, energy, and urban amenities.

[7] Data source: World Development Indicators: https://databank.worldbank.org/reports.aspx?source=world-development-indicators

However, a practical management framework and significant investment must facilitate the forthcoming urban expansion [14]. Given the low tax revenue, it is unlikely to support urbanisation as desired. Another difficulty Bangladesh would soon face is lessening any potential adverse effects of climate change. The country is highly vulnerable to climate change and prone to natural disasters caused by its geographic location. By taking appropriate precautions and preparing, the economic effects of natural disasters can be kept to a minimum to end poverty sustainably. Good governance and political stability, vital for economic progress, are not Bangladeshi traits currently [15].

In conclusion, the Bangladeshi economy is advancing despite the absence of a potent catalyst capable of harnessing sustained expansion. Country policy papers rely on manufacturing output to generate employment, accrue foreign exchange, and establish a foundation for sustainable progress [16]. A robust manufacturing industry comprises various sub-sectors and individual enterprises that efficiently utilise economic, societal, and ecological resources to produce outputs. This study will explore multiple facets of production efficiency within Bangladesh's manufacturing sphere, offering insights to forthcoming policymakers in transforming industrial production into the impetus for growth.

The Manufacturing Sector: Contributions and Deficiencies

Manufacturing growth, driven mainly by the private sector, has been a critical factor in Bangladesh's economic growth over its 50 years of independence. Visually analysing historical data makes it simple to spot the interdependency between manufacturing production and GDP (Figure 2.2.1—2.2.2)[8]. These Figures show that manufacturing production began to rise in the 1990s (the decade that saw the establishment of a democratic government) and that the trend was followed by GDP growth. However, in contrast to agriculture, the manufacturing sector's contribution in the early independence years was relatively small (Figure 2.1.2). The national strategy encouraged import-substituting Industries to safeguard infant enterprises in the 1970s. As a result, industrial production during that period was at an all-time low under a planned economic system.

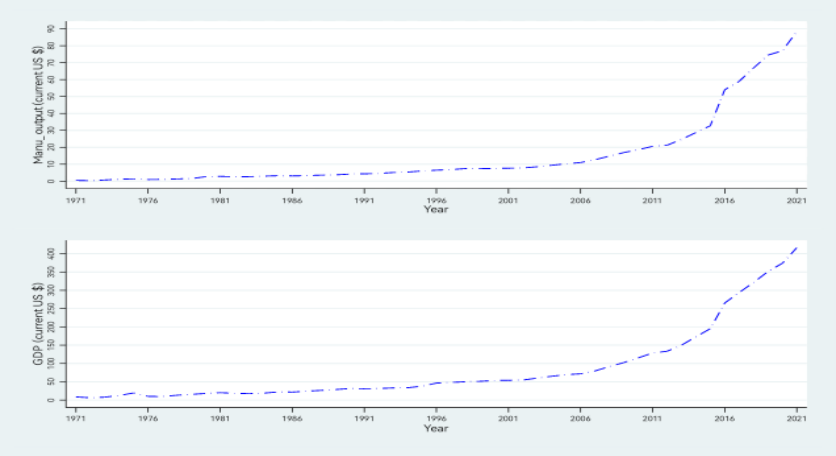

Figure 6: Time series plots of manufacturing output and GDP

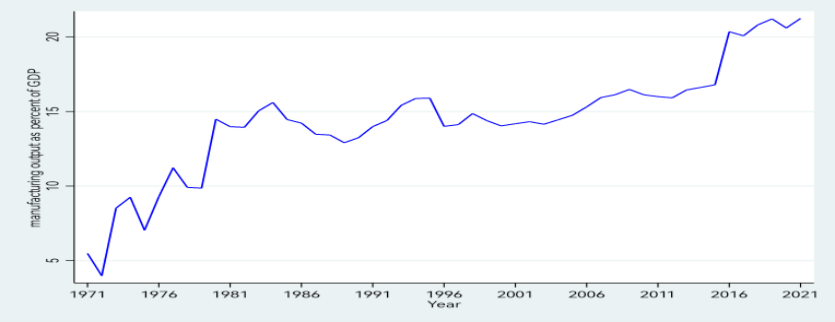

Figure 7: Manufacturing output as a percentage of GDP

[8] Source: macrotrends.net (https://www.macrotrends.net/countries/BGD/bangladesh/manufacturing-output)

The industrial sector reforms of the 1980s and 1990s, particularly the denationalisation of state-owned businesses and the policy backing for private companies, contributed to the explosion of manufacturing businesses [11]. In addition, abundant low-wage workers created opportunities for the RGM industry to expand rapidly, which was the key to the nation's economic development.

However, even though Bangladesh earns much foreign currency from the production and export of RMGs, the net benefit to the economy is only a tiny portion of export revenues because most of the resources used in garment manufacturing, including fabrics, are imported. Nevertheless, the value added by labour in the RMG sector helped energise the economy, and many backwards and forward-linkage businesses proliferated in the country. In addition, the government gave policy incentives to export-oriented production, such as tax rebates, back-to-back LCs, bonded warehouses, and building export processing zones, which helped achieve a notable increase in export revenues. As a result, 84% of Bangladesh's current export earnings come from the RGM sector.

Nevertheless, advancements have not just been accomplished in the RMG sector; a few other industries, including leather and footwear, pharmaceuticals, textiles, food and beverage, and jute textiles, have also grown. As a result, the total number of manufacturing units climbed to 46291 in 2019, a 12-fold increase from the 3810 units in 1971. Additionally, from 0.48 billion in 1971 to 88.40 billion in 2021, the value of manufacturing outputs has expanded 184 times in current US dollars.

Table 1 displays a recent shift in the nation's manufacturing landscape. Between 2012 and 2019, the sector's size increased by more than 8% in the number of firms, with 17% additional workers. Net fixed assets increased by 173%, with a higher manufactured value added by more than 96%. According to Table 1, raw material usage has declined despite increased production units, employees, net fixed assets, and output values.

Table 1: Key changes in the manufacturing landscape

Feature	2012	2019	% Change
Total number of firms	42792	46291	+8.18
Total Persons Employed	5015936	5879844	+17.22
Net fixed assets (Mil. Taka)	1188108	3247082	+173.30
Raw materials and other supplies (Mil. Taka)	3445073	3402580	-01.23
Manufactured value added (Mil Taka)	2857440	5612205	+96.41

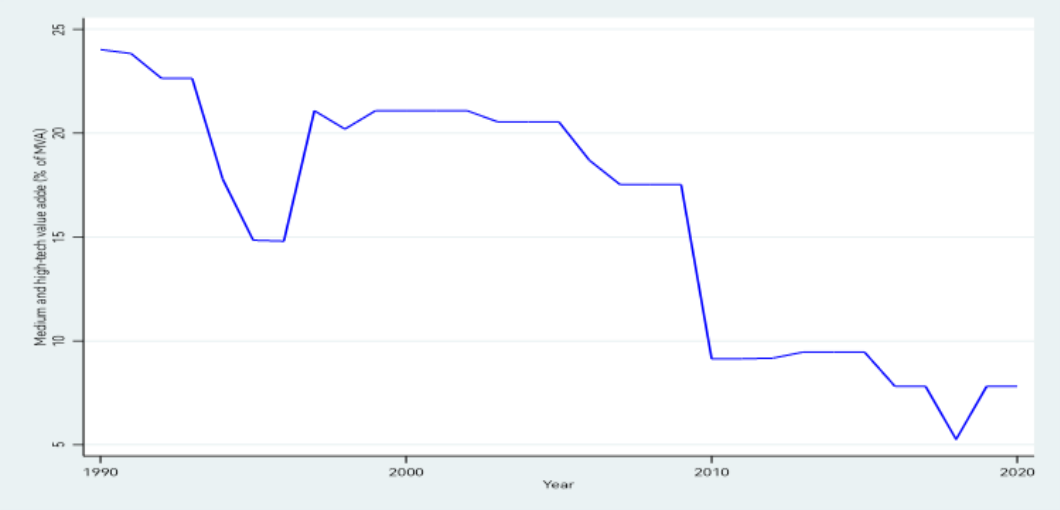

Figure 8: Medium and high-tech value added (% of MVA)

Although there are many encouraging signals in the country's manufacturing sector, a few shortcomings raise concerns about its ability to withstand the force of future growth. First, textiles and apparel, susceptible to disruptions in international markets, comprise the majority of manufacturing value addition. These two subsectors represent 51%, 57% and 57% of the total MVA in 2012, 2018, and 2020, respectively. This might be interpreted as a lack of firmness in the manufacturing sector to external shocks. Second, since the country's economy began to improve, the proportion of medium and high-tech manufacturing enterprises to the overall MVA has declined (Figure 2.2.3). High-tech businesses are regarded as critical economic drivers because of their potential to increase employment and productivity [5].

Third, the manufacturing sector is not creating jobs at the rate required to accommodate the influx of new job seekers that enter the market each year [5]. Fourth, firms are not paying enough attention to managing environmental degradation by industrial production. For example, air pollution significantly impacts human health in industrial areas such as Dhaka, Narayanganj, Gazipur, and Chittagong [20].

Table 2: Some business-supporting factors

Factor name	2007	2013
Firms expected to give gifts in meetings with tax officials (% of firms)	54.4	41
Firms experiencing electrical outages (% of firms)	99.2	73.4
Firms formally registered when operations started (% of firms)	..	86
Firms offering formal training (% of firms)	..	21.9
Firms that spend on R&D (% of firms)	..	17.3
Firms using banks to finance investment (% of firms)	24.7	19.8
Firms using banks to finance working capital (% of firms)	43.1	29.9
Firms visited or required meetings with tax officials (% of firms)	61.1	59.4
Firms with female participation in ownership (% of firms)	16.1	12.7
Firms with the top female manager (% of firms)	1.3	4.8

Source: World Development Indicators, 2021

Table 2 lists some business-supporting factors for 2007 and 2013 that influence the overall business setting. As shown in the table, nearly half of the enterprises provide gifts to tax officials, which signifies tax evasion and corruption. Most businesses frequently endure power outages. Few companies offer training for their personnel. The country's banking channels are not widely used. Businesses perform research and development efforts in just 17% of cases. Women make up a tiny percentage of business owners and top executives.

Finally, because no thorough study has ever tried to explore it using a sophisticated method, the economic or environmental performance of Bangladeshi manufacturing enterprises or subsectors is barely known.

The Environment: A Long Way To Go

Although the nation has experienced rapid economic growth, several environmental degradations, such as urban air pollution, deforestation, pervasive water pollution, and the decline of wetlands and open spaces, severely affect the country and make the overall environmental situation alarming [19]. Despite various environmental laws, policies, norms, and regulations, the nation's institutional ecological governance and management framework is nevertheless ineffective [17 and 18]. The nation's most important law for ecological management is the Environmental Conservation Act of 1995, which assigns the government the right to

compel any person, organisation, or body to harm the environment. Issuing an environmental clearance certificate and imposing a fine if pollution or emissions exceed the permitted level are two essential tools the concerned government body, the Department of Environment (DoE), uses to manage environmental pollution.

Nevertheless, the environmental situation has shown no improvement over the last decade. Bangladesh remained one of the top ten polluting countries in the world from 2012 to 2020, according to the pollution index measured by Numbeo, a global database[9]. Moreover, production-based CO_2 emissions per capita are increasing faster than GDP per capita, as shown in Figure 9[10].

Untreated industrial effluents are one of the significant sources of environmental degradation in urban and suburban areas [14]. Nearly all water bodies, including the four rivers Buriganga, Turag, Balu, and Sitalakhya surrounding the capital city, are severely polluted due to the massive discharge of industrial pollutants, ruining the local ecosystem. The scene resembles that of the country's other large metropolitan cities.

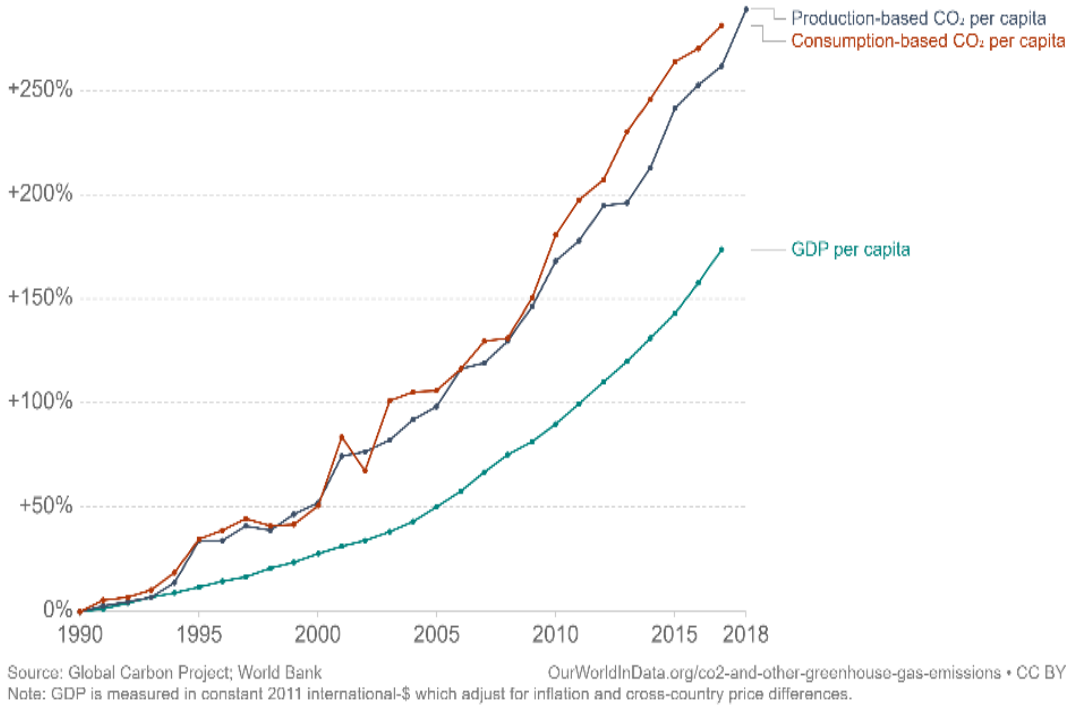

Figure 9: A comparison of CO_2 emissions and GDP growth rates

The ominous pollution prospects demand that the vital polluting sectors, such as manufacturing, be examined using modern techniques and checked for elements that could make them more environmentally friendly. Authorities should increase the range of policy choices in their toolkit to encourage companies to embrace sustainability practices. Alternative instruments for pollution management may be provided by a complete examination of businesses' productivity efficiency, including their interactions with the environment and their influencing factors.

CONCLUSIONS

Bangladesh has experienced economic advancements since 1971, propelled by reforms and sustained growth, leading to significant achievements in diverse sectors. However, challenges continue to exist, including industry-specific vulnerabilities, environmental concerns, and productivity deficiencies. This study underscored the significance of a robust manufacturing sector while pointing out issues like dependency on specific industries, ecological degradation, and insufficient diversity. Addressing these challenges is essential for Bangladesh's ongoing growth and resilience as it strives to emerge as an economic powerhouse.

[9] https://www.numbeo.com/pollution/rankings_by_country.jsp
[10] https://ourworldindata.org/ CO_2/country/bangladesh?country=~BGD

Ethical Considerations

Ethical Approval

Samples for this study were collected from different secondary platforms. The study did not involve human participants or animals and thus did not require ethical approval.

Conflict of Interest

I have consent from the other authors to declare that we have no known competing financial interests or personal relationships that could have appeared to influence the article in this paper.

Data Availability Statement

The reference links to each data set are given as a footnote for each figure and table. Mohammad Alamgir Hossain contributed to problem identification, concept development, model establishment, and writing. S. M. Rifat Hassan and Asaf-Ud-Daula contributed to the literature review, concepts, and analysis.

Dr. Md. Farouq Imam contributed to data interpretation and overall standard-keeping of this paper. All authors read and approved the final manuscript.

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