



Impact of Foreign Direct Investment on Manufacturing Sector of Bangladesh

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Foreign direct investment (FDI) is one of the key factors which boost up the output production of manufacturing sector in Bangladesh. It is a direct investment in the form of a controlling ownership in a business in one country by an entity based in another country. Bangladesh attracts second highest FDI in South Asia (2021). It has made the manufacturing priority since independence so employing foreign investment into it is necessary for the enhancement of the production. The study analyzes the impact of FDI in manufacturing sector, using data from 1995-2020. The Time Series analysis has shown that there is statistically significant relationship between FDI and manufacturing sector. From the result, it can be seen that the dependent variable explained 96% of the variations in manufacturing value added, while the other independent variables are foreign direct investment (FDI), service value added (SVA), inflation (INF), exchange rate (ER). This study also shows a scenario of contribution of manufacturing sector into the GDP of the country. One of the alarming recommendations of the study is foreign investors should be guaranteed by resolving the armed opposition concerns in the nation, as disturbance everywhere will turn off foreign investment.

Keywords: *GDP, FDI, Manufacturing Sector, Time Series Analysis, Exchange Rate*

Introduction

One of the key factors of overall economic success of the nation and world, is foreign direct investment (FDI). It is a kind of direct investment made by multinational businesses or a non-resident from investing nations to grantee countries in which the investing units have the authority to decide how the investment will be made (World Bank,1996). To accommodate personal return on investment and the macroeconomic policies of the investment grantor nation, FDI emphasizes convention and acquisition in the form of equity involvement, technology transfer, and knowledge transfer, among other things. The largest amount of global capital movements since the 1980s has come from FDI flows, which have expanded three times faster than exports and four times faster than global commerce (Gray et al., 2001). Such economic development has occurred in a number of middle-income emerging nations, including Indonesia, Malaysia, Singapore, Thailand, and others. These nations' annual economic growth rates quickly increase from 4% to 10–12%. The significance of FDI on Bangladesh's financial development and extension may be favorable.

FDI takes part a vital position in the manufacturing region and has a favorable influence on its progress of the economy of the host nation. Any industry that produces goods from raw materials via the systematic division of labor and use of machines is considered to be a manufacturing industry. Manufacturing is the generally large-scale production of components or their concentration into finished products. The most important manufacturing sectors are those for ships, steel, tools and dies, chemicals, consumer electronics, furniture, computers, consumer electronics, clothes, heavy machinery, refined petroleum products, and clothing.

About 90% of exports and 17% of the value contributed to the GDP of the nation are currently generated by the manufacturing sector. The manufacturing industry's low-skilled, labor-intensive sector continues to be crucial to economic health of Bangladesh. The industry accounts for around 15% of employment in the nation, and about half of the working women under the age of 25 labor in it. From 2013 to 2021, Bangladesh's manufacturing output increased by an average of 12.10 percent, with record highs of 78.40 percent in April 2021 and record lows of -25.70 percent in May 2021. GDP of Bangladesh from Manufacturing output grew from 26072.80 BDT Million in 2020 to 27576.40 BDT Million in 2021. (Source: BBS)

Bangladesh develops an atmosphere that is favorable for FDI; among its possible advantages are the creation of jobs as well as a rise in area circulation. Manufacturing output can impact foreign direct investment, and manufacturing output can also encourage incremental foreign direct investment (Saha and Jeong 2019). As it is focused on innovation and financial acquisition, FDI has drawn a lot of interest from emerging nations. The foreigner who comes to contribute offers both and makes sure that the circulation of the sector is appropriate. Similar to other South Asian countries, FDI is commonly known as the growth engine to upgrade productivity in Bangladesh (Saha, 2022).

With the aid of FDI inflow, the production or turnover of the manufacturing sector rises. Through trade openings, the authorities of Bangladesh have promoted FDI throughout the

years, and as a result, there has been an increase in the amount of FDI entering the nation, which has also led to a greater variety of FDI further into manufacturing sectors.

Due to Bangladesh's status as the least developed nation and its lack of capital, FDI can act as a real tool for increasing material wealth, creating employment opportunities, boosting productive capacity, enhancing local laborers' skills by means of alteration of innovation as well as supervisory, and assisting in the integration of the national economy with the world market. There are benefits for FDI investors to invest in Bangladesh, and the investor countries should become interested in doing so as well.

Here are several justifications for investing in Bangladesh:

- A strong growth rate of about 8% is indicative of good macroeconomic stability;
- After the BRIC countries, Bangladesh was listed among the "Next 11" by Goldman Sachs.
- A diversified and open economy;
- A youthful, highly skilled workforce at relatively cheap cost;
- A strategic and advantageous place in the global economy's value chain;
- A favorable global business climate in terms of legislation and the economy;
- A key place that serves as a gateway to nations in the Asia Pacific area.

Only four nations- the Netherlands, China, Hong Kong, and the United States—are among the biggest foreign investors in Bangladesh. Because distinct mechanisms underlie these two patterns, the fact that there are discrepancies between the global and Bangladesh-specific patterns shouldn't be perplexing.

Foreign direct investment into manufacturing sector is an emergent factor to boost the production of the manufacturing sector. Manufacturing sector in developing countries lack behind due to the adequate investment to improve it for the betterment. But when the FDI inflows into the manufacturing sector, it upholds the production activities with employing technological advancement and creating more job opportunities. When the production gets facilitated the output increases to the higher level and this increased output rise up the growth of the economy.

Scenario of FDI inflows into manufacturing sector

FDI inflows into manufacturing sector help the sector to improve the output of it by applying the FDI inflows into different innovation such as technological advancement, more capitalization and many more. These investments further boost the growth of the economy by contributing to the GDP. Here the inflows of FDI into manufacturing sector are given as time series data from 1996-97 to 2019-20, which is shown as below diagram.

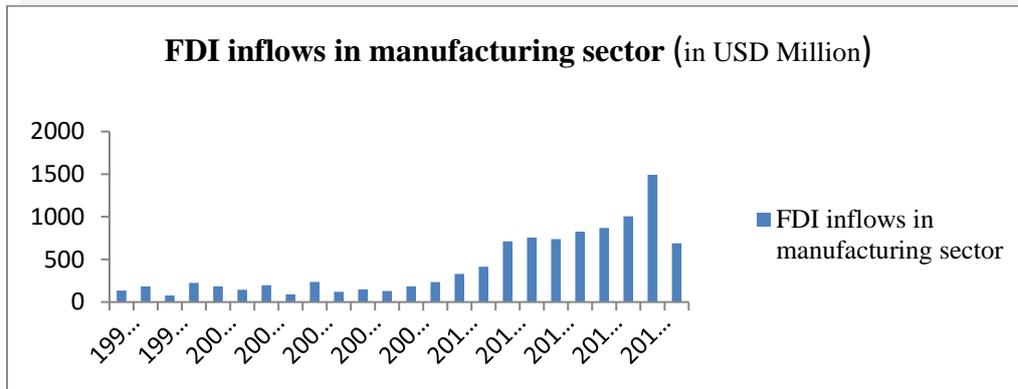


Figure: 1
Source: Bangladesh Bureau of Statistics (BBS)

The figure 1 shows the scenario of FDI inflows into the manufacturing sector of Bangladesh from 1996-97 to 2019-20. We can observe that earlier the FDI inflows into the manufacturing sector was very little, in 1996-97 it was 135.08 USD million but it started to increase after the innovation and trade openness in our nation. In 2012-13 the inflow of FDI was 712.88 USD million which raise the manufacturing output. And the highest FDI inflow was in 2018-19 with the amount of 1493.75 USD million. This highest inflow into manufacturing improves its production also along with its increased production it also contributed to the GDP of the country.

FDI net inflows are the worth of intrinsic straight investment made by foreign investors in the narrating economy. Every year our country receive various amounts of net FDI inflows to utilize it into different sectors. A scenario of net inflows is given here from fiscal year 2016 to fiscal year 2020.

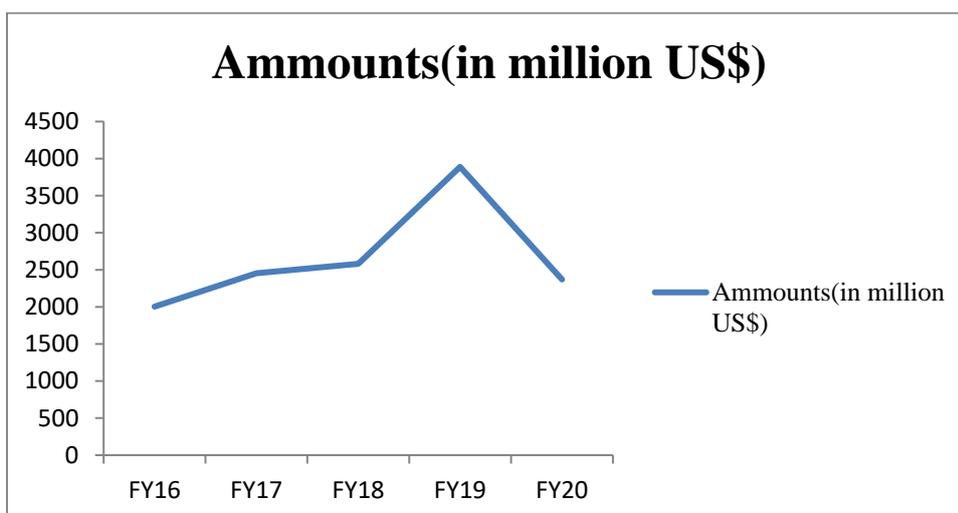


Figure: 2
Source: BBS

Figure 2 shows the time series data on yearly net FDI inflows in line chart. We can observe here that in FY 2016 2003.53 million USD, which increases to larger amount during the next fiscal years. The highest net FDI inflow was in FY19 of amount of 3888.99 million USD. But it decreases again due to the decline in two major components, one is equity capital and the other is intracompany loans.

From the result we see that variance inflation factor is shown for all the variables. VIF is less than 10 that indicates explanatory variables are not correlated. So, it can be concluded that the multicollinearity problem is not present in the problem.

Between 2007 and 2019, Bangladesh's economic growth hovered around 7%. The manufacturing industry, which grew at a 10.1 percent annual rate after this point, was largely responsible for this. Bangladesh's construction industry has seen progress that has consisted of equally slave labor and subsistence. Between 1995 and 2012, Bangladesh's exported manufacturing commodities doubled, making it the only smaller country with a high proportion of industrial goods in trade. Throughout 2002/03 and 2013, Bangladesh created 75% of new jobs that were not in the farming industry, with 37% of those positions being in the industrial sector (Khan 2019).

The expansion of Bangladesh's industrial sector was further heavily influenced by the textile industry. Bangladesh is currently the world's second-largest manufacturer of artisanal clothing behind China, with shipments rising from US\$27.95 billion in 2020 to US\$35.81 billion in 2021. About 4 million people are employed directly by the sector, while another 10 million are unintentionally generated throughout the country. Over the previous eight years, the RMG industry, which accounted for nearly one-third of all industrial production, experienced annual average growth of 10.5 percent. Other industrial subzones have expanded rapidly in the past decade as well (Khan 2019). This double annual growth has indeed been recorded in the industrial production index for large- and medium-sized manufacturing businesses.

Bangladesh dropped to second place as a supplier of garments to Vietnam in 2020 after earning \$27.47 billion instead of \$29.80 billion. But in 2021, it reclaimed its prior rank. Bangladesh made \$35.81 billion in revenue in 2021, whereas Vietnam made \$32.75 billion in revenue during the same time period, as reported by the Export Promotion Bureau (EPB).

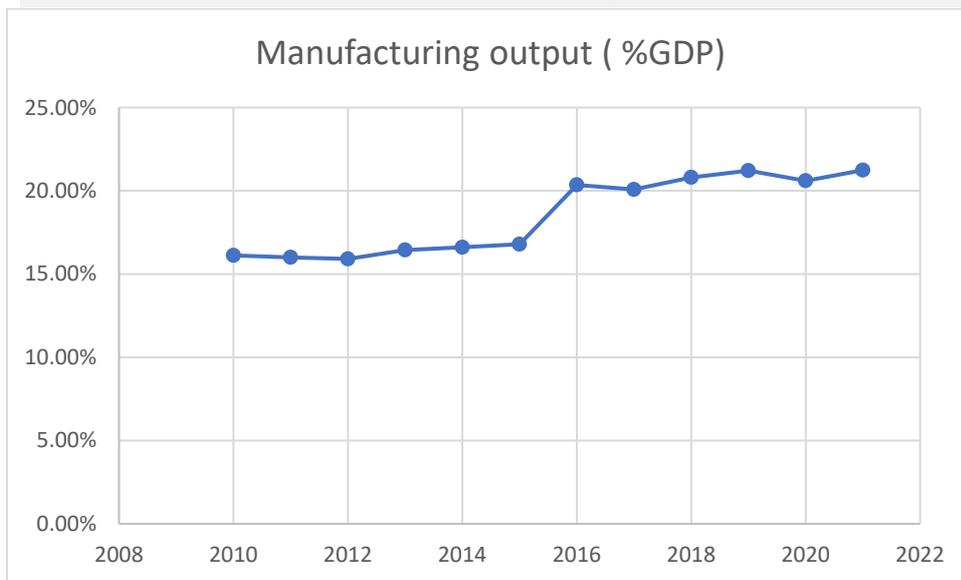


Figure 3

Source: World Bank

The above figure 3 illustrates the scenario of manufacturing output as % GDP. We can see in 2010 it was 16.12% of GDP which decreases in 2011 to the amount of 16.00% and in 2012 it went to level of 15.91%. But after that it began to increase to higher level. In 2021 it is now 21.24% GDP.

The manufacturing industry may boost productivity through encouraging creativity and technological integration among businesses. Fundamentals were recognized in the research as being essential for this: the capacity of leaders and staff, linkage to global markets, and beneficial industries as well as agencies. Firms will recover industry may boost productivity through encouraging creativity and technological integration among businesses. Fundamentals were recognized in the research as being essential for this: the capacity of leaders and staff, linkage to global markets, and beneficial industries as well as agencies. Firms will recover from the COVID-19 disaster more quickly if they implement new technologies and operational procedures. “Bangladesh’s achievement in exporting ready-made clothing (RMG) also fueled productivity expansion and produced around four million jobs. But as a result of automation, job growth in the RMG sector has recently slowed, and in a post-pandemic environment, this trend is expected to pick up speed.

Administrative and technical skills are essential for recovery. A little over 50% of such industrial companies are managed by semi-graduates. The level of technology in companies with college-educated management is 10% greater than that of these companies. The dissemination of innovation is also aided by global connectivity. Organizations that conduct business with global corporations employ more sophisticated software than those that are confined to operating locally. It will be essential to diversify exports beyond the ready-to-wear



(RTW) industry. Export-led development may be diversified by lowering trade and investment barriers from abroad, facilitating the duty-free import of raw materials for businesses outside the RMG industry, and upgrading special economic zones.

One of Bangladesh's top policy objectives is to provide many more better employment opportunities. By implementing improved technology, an export-driven economic growth may generate long-lasting and higher-paying employment, according to Siddharth Sharma, a chief analyst at the World Bank and a founder of the paper. "Improving business efficiency remains important to planning for the future of manufacturing," says the World Bank. "As Bangladesh attempts to expand its product portfolio, move up the value chain, and generate stronger employment.

It is commonly understood that in order to achieve the fundamental objectives of national economic growth and the reduction of poverty, a major structural adjustment in the industry that favors the manufacturing sector must be made (Different Plan Documents of Bangladesh). The function of formulating a commercial growth method efficient of managing the materializing difficulties, not only domestically but also globally, has turned into crucial for Bangladesh's successful growth given the country's bounded property ground, cheap automation and profitability ground base, limited merchandise combination, internal market hindrance, pressurize from a growing labor force to achieve employment, and growing opportunity to use the increasingly globalized possibilities.

The manufacturing industry is exceptional in that it benefits from rising demand upon size. The growth of the agricultural and service sectors, which rely on reverse-then-forward connections with industry, also serves to emphasize the importance of production. Most capital products, most ingredients, and the majority of commodities are produced by manufacturers. According to Weiss (1988), manufacturing is the area that drives expansion the most actively, and it "withholds the attributes of a mechanism of ever-growing capacity increase, energetic growing returns to scale, quick technical substitute, as well as numerous moving consequences." In the first five years following the country's freedom, the growth of manufacturing was firmly established as a crucial component of Bangladesh's growth plan to boost growth and combat poverty.

A country like Bangladesh, the concern focuses on how to do so for fulfilling the essentials requirements of a sizable population regarding foods and other items, preserve money to fund extra, attain currency trade-off, as well as hire a rising manpower which is not being consumed in cultivation or the employment region. The finding demonstrates that Bangladesh's manufacturing sector has been very slow to boost the country's GDP over time and is among the least productive among comparable countries in regards to its contribution to GDP and rate of expansion.

The Bangladesh Management Perception 2010–2021 has placed a strong emphasis on the necessity of accelerating industrialization in order to meet the economic growth targets of 8%

growth by 2015 and 10% growth by 2021. According to the document of Perspective plan, the overriding objective for the nation's development is to increase the manufacturing sector's part of GDP to 40% over the following ten years, with a share of 30% going to industry. The 2010 Actual Implementation of Bangladesh recognized the value of production for raising overall productive capacity and broadening the nation's economic structure.

The manufacturing sector is crucial to Bangladesh's economic transition since it helps to increase productive capacity, expand the economy, and enhance economic benefits, all of which assist the nation in overcoming its budget deficit. The overall destination of 8% expansion by 2015 and 10% expansion by 2021 for the realization of Vision 2021 calls for boosting the production sector's share of GDP to 30% over the coming ten years. Agriculture's portion is predicted to decrease from 22% in 2009 to 16% at the end of the 6th Five Year Plan and 15% by the edge of the 7th Five Year Plan as economic growth undertakes business strategy economic change, while manufacturing's percentage is expected to increase from 18.5% in 2010 to 22% in 2015 and 30% in 2021.

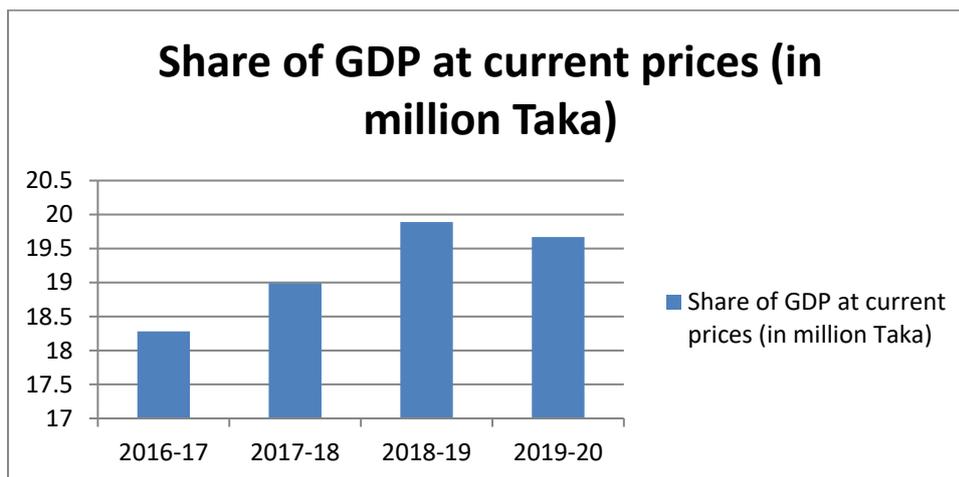


Figure:4

Source: BBS

The Figure 4 shows the share of manufacturing sector to the GDP at current prices. In FY 2016-17 it was 18.28 million Taka. It increases for the next year; the highest share was in 2018-19 of amount of 19.89 million Taka. But it decreases in FY 2019-20 due to low investments and other reasons.

Objectives of The Study

The primary goals of FDI plans are to increase technological proficiency, productivity, and the export-oriented manufacturing sector.

1. The effect of FDI on the manufacturing sector;
2. The manufacturing sector's impact on economic growth.

Literature Review

The study reveals the impact of foreign direct investment on manufacturing sector in Bangladesh. Manufacturing sector is one of the major sectors that contributes to the growth of the economy or share to the GDP of the country. So, it is obliged to improve the sector with better opportunities and scope. FDI is one of the key factors that contributes to the manufacturing sector to improve production with better technology and advancement.

Ambadkar (2019) uses organization data from years 2010 to 2018 to look into the link connecting the profitability and asset formation of outward-FDI businesses operating in the Indian manufacturing sector. Multiple regression modeling was utilized for the purpose of analyzing the effect of liquidity on profitability. The analysis comes to the conclusion that the cost of capital has a substantial bearing on productivity and that international investment companies' success in the Indian manufacturing sector may be influenced by their decision to borrow funds.

Fernandes and Paunov (2008) studied Chile's rise in investment from abroad in production and services between 1992 and 2004. They calculated an upgraded function that takes into account input growth and a balanced measure of FDI in industries. The econometric findings indicate that FDI in industries has a favorable and drastic impact on the output development of Chilean production facilities. This finding is resilient to several tests. Chile experienced a 5% increase in production economic growth.

Liu and Daly (2011) conducted research on overseas trade in China's manufacturing sector. It shifts production from a constrained to a growing sector. It was determined through analysis that successful exploring FDI in China has sparked a transition from a minimal to an increased sector, and that this migration is positively associated with developmental projects and worker efficiency but adversely regarding labor expense. Enhancing R&D and facilities will increase the appeal of China's coastal area to FDI.

Aftab and Parikh (2018) compare the effects of FDI, trade, and manpower on the expansion of India's industrial sector. The purpose of this research is to evaluate the influence and connection between expansion and FDI at the production level. The panel co-integration test and model of random effects are used to analyze the impact. The Granger causality test is also applied for

dictating the connection between each of them. The findings show that at the production level, industrialization and FDI have a considerable mutual influence.

The relationship seen between the Nigerian manufacturing sector and external debt was demonstrated by Afolabi et al. in 2019. In this study, the estimated model and co-integration approach were utilized to analyze time series data collected over a 36-year period. As can be seen, the explanatory variables capital investment, inflation rate, transfer payments, and currency value are the controlled variables R^2 for 97% of construction sector fluctuations. The national government might actively raise the amount of FDI accessible to this crucial industrial sector to enhance its productivity, particularly with respect to its percent influence on employment and GDP, according to one of the study's suggestions.

Tsen (2005) examined the long-term relationships between FDI and its destination variables in Malaysia's industrial sector from 1980 to 2002. The Johansen co-integration test's findings demonstrate that each of the model results has a single co-integrating variable. The Philips and Hansen completely modified regression estimator's study reveals that although a rise in prices or the rate of exchange causes a fall in FDI, an increase in infrastructure, market size, or current account balance causes an increase.

According to Djulius et al. (2019) and Afolabi et al. (2019), one of the benchmarks for Indonesia's progress as a developing nation is the growth of the manufacturing sector. Both domestic and foreign direct investment (FDI) can fill the investment gap in this sector. This paper examines how the two types of investments interact to meet investment demands in the manufacturing sector, as well as how those investments affect both relatively capital- and labor-intensive industrial groups. The objective is to assess the contribution of both kinds of investment and the economic advantages they provide, including the transfer of technology and expertise from FDI to DI as well as the value generated for the economy. The panel data regression was the first to be used to examine differences between groups of industrial samples with a relatively high capital intensity and those with a relatively high labor intensity. In addition to the regression of the entire sample, the comparison findings demonstrate that there are substantial variations between the two industrial groups, which may be regressed on. The entire sample discovered that FDI and DI both affect the manufacturing industries value-added.

Alfaro et al. (2003) analytically inspected the association linking FDI and economic growth using cross-country data for the years 1981–1999 and proposed that overall FDI influenced significant cause on GDP. FDI in the industrial sector has a beneficial impact on growth compared to the primary sector.

Samal and Raju (2016) aim to demonstrate the impact of FDI on the Indian manufacturing sector: a new potential for GDP development and its difficulties. The analysis displays the contribution of FDI to several economic development drivers between 1954 and 2014. The primary factors of FDI inflows to the country are shown to be trade, GDP, reserves GDP, and exchange rate.

According to Danmola et al. (2017), FDI in the automotive industry has a highly relevant and favorable effect on industrial output. Time series investigations were carried out. Through the implementation of permissive industrial and trade regulations, the outcome supports the efficacy of the national government of Nigeria's economic strategy. According to the concept, boosting the flow of FDI into the industrial sector requires favorable domestic economic conditions in order to preserve economic growth and development.

Dhanani and Hasnain (2016) looked into how FDI affected the industrial sector in Indonesia. They stated that FDI contributed to the ongoing shortfall in goods production as well as a severe consequence on the balance of payments.

Chen et al. (2022) examines the link between FDI and industry and the service sector's industrial progress from 1980 to 2005. The empirical evidence points to an independent connection between FDI and company growth. Given that FDI can only result in expansion if the host nation has a well-established and adequately skilled labor force, the government must pay close attention to the specific ways in which FDI can engage with human capital in order to significantly affect the ongoing expansion of Malaysia's industrial sector.

Fonseca and Rosas (2018) analyze the key factors that contribute to understanding the regional distribution of production FDI in Mexico, utilizing speed databases, which boost the recognition of investment from abroad by many Mexican states, as well as spatial panel multiple linear regression designs, which evaluate the dynamic connection and economic consequences. Their key conclusions suggested that there was a favorable geographical association between the FDI of the regions.

Azeroual (2016) examines the various effects of investment from abroad, from both France and Spain, on Morocco's production industry's total economic growth. They applied the expanded technique of moments in responsive and flexible on a sample of 22 sections in this region with 616 observations over 1985 and 2012. In medium and higher-level manufacturing fields, French funding has a quantitatively major negative impact on TFP. Development in Spain is positive and favorable.

In his 2009 article, Kinuthia explores Malaysia's structural transformation with an emphasis on the state's and financial firms' fluctuating roles. In Malaysia, multinational firms have a strong tradition. The Malaysian government has been successful in fostering their expansion while also bringing about improvements for the nation, including the development of jobs and the transfer of technology. It is improbable that Malaysia could have benefited much from government involvement. Institutions may play a significant role in serving as platforms for the administration to engage with international companies. With varying degrees of success, Malaysia has pursued both export and import modernization techniques. Authorities should enact laws that can aid progress, such as economic policies that may be favored as a growth strategy.



Applying least square method and Granger causality tests, Eze et al. (2019) examines the effect of funding from foreign countries (FDI) on the progression of economic expansion production in Nigeria from 1970 to 2016. The business sector's valuable contribution hasn't been all that inspiring because of issues including a lack of cash. Thus, the research presents a nonlinear model of the influence of FDI influx on factory growth. Although quantitatively negligible, this reveals a long-term link between both FDI and industrial output. The Granger causality finding reveals that FDI and MSOG are both causal. According to the study, in order to modify the economy by means of the industrial region, government policymakers should pay attention to the following factors: energy generation, currency fare, private sector lending, and civil security, all of that have strong correlations with MSOG.

Applying autoregressive Distributed Lag (ARDL) model presented by Pesaran et al. (2001) to examine the effects of foreign investment of economies in the European Union, ASEAN, Japan, China, and the United States on the expansion of Malaysia's industrial sector from 1991 to 2006. The findings indicate that FDI inflows from the United States, ASEAN-4 nations, and the European Union are associated with the expansion of Malaysia's industrial sector in both the short-and long-term. The long-run elasticity indicates that FDI inflows from the United States, China, and the European Union have a favorable effect on industrial expansion. However, the expansion of the industrial firm's employment is negatively associated with FDI from Japan and the ASEAN-4 nations.

Rahman and Bakar (2018) review and summarize the amount of conceptual and empirical research on the topic. It begins by outlining Pakistan's industrial industry and capital flows. On the basis of the findings both theoretically and empirically as from existing literature, it then analyzes the publications. This paper also sheds light on methodological concepts which explain how and why certain approach's function. Third, this essay suggests three useful themes for more study. This paper makes a contribution to the domain of FDI and industrial sector growth by assessing and summarizing current theory and research on FDI and production expansion.

According to Joshua (2021), this survey aims to investigate the effects of labor (household workforce) and finance (foreign direct entry) on construction sector production in Nigeria. The uneven method of integration as a result of the test of unit root served as the basis for the ARDL technique. The results show that finance considerably and favorably effects the production firm's productivity in Nigeria, but manpower has a little and favorable impact on that economy's productivity. Another finding demonstrates the flexible nature of the influence of labor, showing that even a little shift in labor may have a significant impact on the amount of production in the industrial sector. The manufacturing industry often has more equity than workers.

By utilizing the Ordinary Least Square (OLS) approach, Bardesi (2016) seeks to assess the effects of attracting FDI on the Saudi Arabian general economy and the industry sector, particularly over the past three decades, more especially over the era from 1968 to 2014. The

study revealed that FDI had favorable, considerable, yet modest impacts on Saudi Arabia's construction sector throughout this time. The findings also indicated that the most recent Foreign Investment Act (FIA), passed in 2000, and private capital formation unrelated to the oil industry had beneficial effects. Finally, a summary and suggestions for promoting the contribution of FDI to Saudi Arabia's industrial sector reforms are provided.

Blomstrom and Kokko (1998) identified FDI inflows as channels for the conversion and dissemination of innovation globally. They indicated that while internalized channels within the networks of MNCs even now account for the majority of processing and marketing, internalizing and externalizing streams as profitability grow in significance. Additionally, through backward linkages in particular, multinational firms can transfer knowledge and skills to local businesses.

According to research by Agosin and Machado (2005) of 12 countries between 1971 and 2000, FDI had no effect on local projects in Africa, Asia, or Latin America; in fact, it had the opposite effect in Latin America. Due to the tenuous connections between factors and outcomes in growing economies, this analysis found few indications of short-term industrialization in these areas. The research also discovered little proof that FDI guides or, on a more concrete level, strengthens efficiency.

In their investigation of the connection involving macroeconomic factors in China, Graham and Wada (2001) discovered that FDI only enhances the efficiency of work tools when initiatives are efficient. According to Bende-Nabende (2002). study of five Asian collective members between 1970 and 1996, FDI enhanced productivity expansion via variables such as productive capacity and technique learning.

Human capital is crucial, according to Nelson and Phelps (1996), as it boosts enterprises' capacity to absorb new technology and expertise and enables nations to eventually profit from financial markets. Additionally, Borensztein et al. (1998) demonstrated the detrimental consequences of a lack of capital structure on profitability and reaffirmed the effectiveness of human capital. They analyzed 69 emerging economies' FDI well throughout the past 20 years and concluded that FDI is an important mechanism for knowledge transfer and boosts economic development further than economic growth.

According to Hansen and Rand (2006), economic development in 31 developing nations was positively correlated with FDI between 1970 and 2000. Tiwari and Mutascu (2011) discovered that FDI and economic development were positively correlated in 23 Asian nations between 1986 and 2008 using cross-sectional data analysis. Additionally, Tast (2014) reported a favorable correlation between FDI inflows and the pace of economic development in the CIS and SEE nations from 2004 to 2011 during the transitional era. The study by Caves (1996) demonstrated that FDI has a favorable influence on the economy through knowledge transfer and the improvement of managerial and marketing abilities.

Description of Variables and Econometric Methodology

Description of Data and variables

The sort of data, data sources, and models used to determine the impact of FDI on the manufacturing sector are described in this section. The model uses five variables in total. Foreign Direct Investment, Manufacturing Value Added, Service Value Added, Inflation, Exchange Rate are the independent variables, while Manufacturing Value Added is the dependent variable. This is time series data, not static data. Data is gathered from secondary sources with the years 1996 to 2020 taken into account.

Table 1 Data Sources

Variable name	Abbreviation	Source
MVA	Manufactured Value Added (% of GDP)	World Bank (2022)
SVA	Service, Value Added (Annual% Growth)	World Bank (2022)
INF	Inflation, GDP deflator (Annual%)	World Bank (2022)
FDI	Foreign Direct Investment, net inflows (%GDP)	World Bank (2022)
ER	Official Exchange Rate (LCU per US\$, period average)	World Bank (2022)

Manufacturing Value Added:

Manufacturing pertains to the ISIC sectors 15–37 of enterprises. After summing up all production and eliminating any intermediary resources, value added is an economy's final profit. The calculation is performed without accounting for the deterioration of environmental assets.

Inflation:

A good number of previous literatures studied the importance of inflation on macro-economic performance (Alam et al. 2020; Saha et al. 2022). A wide increase in the cost of commodities as well as business throughout an economy is indicated as an inflation. As a result, inflation is associated with a decrease in the acquiring capacity of money.

Service Value Added:

Enhanced quality service is a type of service that an organization offers at minimal or no cost in order to promote its main line of enterprise. This is called value-added service or service value-added.



Foreign Direct Investment, net inflows:

The term "capital inflows" (FDI) refers to net funds invested to purchase a lifelong possession stake (10 percent or further deciding shares) in a organization which employs in a territory other than the lender's own. According to the public finances, it is the total of financial assets, retention of income, various long-term capital, and short-term assets.

Exchange Rate:

The rate at which one currency will be exchanged for another determines trade and the transfer of funds between nations.

Econometric methodology

We use the Ordinary Least Square (OLS) method to investigate how foreign direct investment affects manufactured value-added or manufactured output in Bangladesh. The OLS approach is preferred not only for its ease of calculation but also for the favorable statistical characteristics it possesses, for example; diameter, impartiality, lowest fluctuation, zero arithmetic mean of the incidental component, and many more.

Bardesi (2016) tries to assess the effects of attracting FDI on the Saudi Arabian general economy and the industrial sector, notably during the previous three decades, more precisely throughout the term from 1968 to 2014. He does this by using the Ordinary Least Square (OLS) technique. According to the report, FDI positively and modestly affected Saudi Arabia's building industry. Additionally, it was found that private capital formation unconnected to the oil industry and the most current Foreign Investment Act (FIA), passed in 2000, had positive benefits.

Due to the previous literature and objectives of the research, the regression model is established here:

$$MVA = F(FDI, SVA, INF, ER) \dots \dots \dots (1)$$

That is

$$LMVA = \beta_0 + \beta_1 LFDI + \beta_2 LSVA + \beta_3 LINF + \beta_4 LER + \beta_5 LER + \epsilon_t \dots \dots \dots (2)$$

Here,

lnMVA = Log of Manufacturing, Value Added

lnFDI = Log of Foreign Direct Investment, net inflows

lnSVA = Log of Service, Value Added

INF = Inflation Rate

lnER = Log of Exchange Rate

B₀ = Intercept Term

β₁, β₂, β₃, β₄, β₅ = Partial regression coefficient

C = Error Term

t = Time Period (1996-2020)

Discussion of Result

Estimation of Least Square Method

The least square method is a type of mathematical regression analysis to find the line of best fit for the data set. This is a visual representation of the relationship between data points. The correlation between independent and dependent variable is represented by each data point.

Table 4.1: Regression Analysis (OLS)

Dependent Variable: lnMVA				
Variable	Coefficient	Std.Error	t-Statistic	Prob.
lnMVA _{t-1}	0.032479***	0.004785	6.787917	0.0000
lnFDI	0.026775***	0.008926	2.999627	0.0071
lnSVA	-1.949170***	0.328227	-5.938489	0.0000
INF	0.004125***	0.001034	3.990603	0.0007
lnER	0.327820***	0.063375	5.172723	0.0000
C	8.573749***	1.224567	7.001455	0.0000
R-squared: 0.968360		F-statistic: 122.4239		
Adjusted R-squared : 0.960451		Prob(F-statistic): 0.000000		
Durbin-Watson stat: 1.639265		Number of obs.: 25		

***p<0.01, **p<0.05, *p<0.1

Table 4.1 displays the estimates of the time series regression between lnMVA_t and the other independent variables. According to the goodness of fit, with an R² value of 96.83%, the independent variables can explain nearly 96% of the variation in the dependent variable, Manufacturing Value Added. Here is the estimated equation:

$$\ln MVA_t = 8.573749 + 0.032479 \ln MVA_{t-1} + 0.026775 \ln FDI - 1.949170 \ln SVA + 0.004125 \text{INF} + 0.327820 \ln ER$$

The findings suggest that Foreign Direct Investments have a positive and significant impact on Manufacturing output of Bangladesh. The result indicates that, irrespective changes to other independent variables, a 1% increase in FDI inflows will result in an increase of 0.03% in Manufactured Value Added. On the other hand, there is a statistically significant but negative correlation between Service Value Added and Manufactured Value Added. According to the coefficient for the service value added, manufactured value-added decreases by 1.95%, on average for every 1% increase in service. The impact of Inflation on Manufactured Value Added is positive and the result is significant. The outcome indicates that for every 1% increase in inflation, the manufactured value added also increases by on average of 0.004%. The Exchange Rate has a significant and positive impact on Manufactured Value Added. Here the manufactured value-added increases by 0.33% for every 1% increase in exchange rates.

Diagnostic Checking

Different diagnostic tests are run to verify the accuracy of the model. Here are a few tests given below for the study.

Normality Test

Through Jarque Bera test, normality of data can be checked. Jarque Bera statistics follow chi-square distribution. Hypothesis for this test is stated below:

H₀: The data is normally distributed

H₁: The data is not normally distributed

The result of prob chi = 0.266160 or 26.61% which is greater than 5%. So, the null hypothesis is accepted and the data are normally distributed.

Heteroskedasticity Test: Breusch Pagan Godfrey

By this, heteroskedasticity in a linear regression model can be checked. Hypothesis for this test is stated below;

H₀: Constant Variance or Homoscedasticity

H₁: Heteroskedasticity

The result here, probability of Chi-Square is 84.66% that is greater than 5%. So, the null hypothesis cannot be rejected. The model is free from heteroskedasticity.

Ramsey RESET Test

The probability of F-Statistic is 26.01% which is higher than 5%. Here the null hypothesis cannot be rejected rather it is accepted. So, the model is free from misspecification.

Multicollinearity Test

With this test we can identify multicollinearity among explanatory variables. The result is given below

Table 2 Variance Inflation Factor

Variables	VIF	1/VIF
lnMVA _{t-1}	3.710508	0.269504
lnFDI	4.757560	0.210191
lnSVA	5.186285	0.192816
INF	1.030392	0.970504
lnER	7.493065	0.133456

Source: compiled by the author

Summary of Results

The above results of the various testes proved that there is a statistically significant relationship between Foreign Direct Investment inflows and Manufactured Value Added in Bangladesh. Which means that foreign direct investment will increase the manufactured output. This result is patronized by Eze et al. (2019) and Bardesi (2016). The literatures show positive relationship between foreign direct investment and manufactured output.

From the result we can conclude that there is a positive and significant relationship between Foreign Direct Investment and Manufactured Value Added or Manufactured output. When net FDI inflow increases the manufactured output also increases.

It also concludes that inflation and exchange rate increase it brings a rise in manufactured value added also. But rise of service and trade makes a decline in the manufactured output.

Conclusion and Policy Recommendations

The industry has several dynamic advantages that are beneficial for the industry and play a catalytic role in a contemporary economy. The manufacturing sector is a dominant industry in several ways in any established market, or even in a developing economy such as Bangladesh. It is a means to increase export earnings in connection to importing substitution and product growth, create the ability to earn foreign currency, boost productivity, and increase the economic status of each country, which results in distinctive consumer preferences. It is found that an increase in economic growth expansion will have a beneficial effect on FDI inflows.

The government must make an effort to boost economic production through monetary and fiscal policy. Additionally, it is necessary to work to enhance the rules of the currency market because the allocation of foreign exchange plays a major role in the expansion of manufacturing output. Efforts to deregulate the distribution of financial markets to the industrial sector created

an industry extra productive in the acquisition of primary products, which had a bad effect on the production output. Moreover, initiatives must be made to improve the industrial environment so that manufacturing operations can flourish. One of these is the supply of fundamental technical features, which might improve the full exploitation of industrial capacity. Foreign direct investment will flood into the industry as a result of this favorable environment.

Foreign direct investment positively influences the manufactured output or value added that is proved through the research using the OLS method. It is estimated that increase in foreign fundings also brings a rise in the manufactured value added and it is statistically significant. The study concludes that FDI is positively correlated with Manufacturing Value Added or output of Manufacturing sector and the result is significant statistically. To attract more FDI following steps are needed to be followed:

1. To encourage mass production, foreign direct investment inflows have to be purposefully targeted towards the manufacturing industry.
2. To help the manufacturing sector boost output and hence employ more people, the federal government should endeavor to remove barriers to financial markets at a reduced rate.
3. The stability of foreign investors should be guaranteed by resolving the armed opposition concerns in the nation, as disturbance everywhere will turn off foreign investment.
4. To stimulate and boost the level of productivity and innovation, the government needs to issue strong strategic guidance, in particular on tax breaks and vacations, to help firms with the acquisition of modern innovation and foreign allocation capabilities into Manufacturing Sector the followings are recommended:
5. Expanding the availability of water, gas, as well as other resources towards the manufacturing line.
6. Project completion portfolio (PP) development and contacting appropriate global organizations (MNCs).
7. Developing a body different from the Board of Investment to advertise wealth management.
8. FDI is drawn towards sectors with reverse and forward links, such as evaluation labs, shared resource areas, the creation of business estates, and sectors having connections with global value chains.
9. Establishing a focus on profit, trade, and employment enterprises.

Foreign direct investment (FDI) comes into the nation because it acts as a conduit for the exchange of information, equipment, know-how, and skills uplifted for poor countries' manufacturing sector. That will boost the economy.



Declarations

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Ethics approval and consent to participate

Not applicable.

Consent for publication

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Competing interests

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Availability of data and materials

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Author contributions

The only author collects and analyzes data, choose methodology, interpret the result and approved the final manuscript.



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