LABOUR PRODUCTIVITY, ENVIRONMENTAL QUALITY AND INFRASTRUCTURE IN BANGLADESHI READYMADE GARMENTS INDUSTRY

By

MAHMUDA AKTER KHUKY

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Doctor of Philosophy

October 2021

SPE 2022 2

DEDICATION

This work is dedicated to my wonderful mother Shanaz Parven, for her love and measureless support.

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

LABOUR PRODUCTIVITY, ENVIRONMENTAL QUALITY AND INFRASTRUCTURE IN BANGLADESHI READYMADE GARMENTS INDUSTRY

By

MAHMUDA AKTER KHUKY

October 2021

Chairperson : Professor Law Siong Hook, PhD
Faculty : School of Business and Economics

Bangladesh is the second top readymade garments (RMG) exporting country, and the RMG industry plays a vital role in the remarkable economic growth of the country. Despite the stupendous growth of the RMG industry and its bright prospects, challenges are still there. This study, therefore, examines the relationship between RMG export, labour productivity, and economic growth in Bangladesh. The first objective used Autoregressive Distributed Lag (ARDL) method for analysis with a time-series data from 1983 to 2019. The result of the first objective found that a long run positive relationship between RMG export, labour productivity, and economic growth is observed. The policy implications suggest improving the labour skills, providing training, and the use of information technology to the RMG sector will promote economic growth. Secondly, this study investigated the impact RMG industry on environmental quality under a dynamic Environmental Kuznets Curve (EKC) context. The second objective also utilised Autoregressive Distributed Lag (ARDL) method is used to analyse time-series data from 1983 to 2019. The findings of the study have demonstrated a positive significant determinant of RMG export on CO_2 emission in Bangladesh. The study recommended the regulators should introduce more environmentally friendly ways of production. By initiating a cleaner production and considering the energy consumption and economic growth should be considered to reduce CO2 dioxide emissions. This finding suggests policy action should prioritize and make more investment to markedly address the CO2 emission issue. Thirdly, this study investigates the roles of transport and Information communication technology (ICT) in RMG exports. For third objective gravity model analysis has been used with pooled OLS and the Poisson-Pseudo Maximum Likelihood (PPML) estimators. Transport infrastructure is captured by four indicators. The results of this objective indicate that rail, air, and port-related infrastructure have positive and significant relationship with RMG exports. Thus, the results support the significance of transport infrastructure quality to boost RMG exports performance. The empirical findings suggest more investment in transportation facilities is vital. To measure ICT infrastructure, the current study used proxies such as fixed lines, mobile phone

subscriptions, and internet users. The results provide empirical evidence of the positive effects of telecommunications on RMG exports. Therefore, ICT infrastructure found significant in boosting RMG exports in Bangladesh. In practice, the findings of this research reduce the scarcity of literature focusing on the components of labour productivity, environment and infrastructure that are crucial for RMG sector development. The findings of this study may serve as policy guidance to facilitate different crucial factors for achieving and maintaining the competitiveness of the RMG industry of Bangladesh.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

PRODUKTIVITI BURUH, KUALITI ALAM SEKITAR DAN INFRASTRUKTUR DALAM INDUSTRI PAKAIAN SEDIA BUATAN BANGLADESH

Oleh

MAHMUDA AKTER KHUKY

Oktober 2021

Pengerusi : Profesor Law Siong Hook, PhD
Fakulti : Sekolah Perniagaan dan Ekonomi

Bangladesh ialah negara pengeksport pakaian siap sedia pakai kedua terbesar (RMG), di dunia dan industri pakaian siap sedia pakai (RMG) memainkan peranan penting dalam pertumbuhan ekonomi negara. Walaupun pertumbuhan industri RMG yang luar biasa dan prospeknya yang cerah, industri ini tetap berhadapan dengan cabaran. Oleh itu, kajian ini mengkaji hubungan antara eksport RMG, produktiviti pekerja, dan pertumbuhan ekonomi di Bangladesh. Kaedah Autoregresif Taburan Lat (ARDL) digunakan untuk menganalisis data siri masa dari tahun 1983 hingga 2019. Hubungan positif jangka panjang antara eksport RMG, produktiviti buruh, dan pertumbuhan ekonomi telah diperolehi. Implikasi dasar menunjukkan bahawa peningkatan kemahiran pekerja, memberi latihan, dan penggunaan teknologi maklumat dalam sektor RMG akan mendorong pertumbuhan ekonomi. Kedua, kajian ini menganalisis kesan industri RMG terhadap kualiti alam sekitar dalam konteks EKC yang dinamik. Hasil kajian telah mengenal pasti hubungan positif eksport RMG terhadap pelepasan CO2 di Bangladesh. Kajian ini mengesyorkan ager pembual dasar untuk memperkenalkan cara pengeluaran yang mesra alam. Dengan memulakan pengeluaran yang lebih bersih dan mempertimbangkan penggunaan tenaga dalam pertumbuhan ekonomi maka pelepasan karbon dioksida dapat dikurangkan. Penemuan ini menunjukkan bahawa tindakan dasar harus diutamakan dan lebih banyak pelaburan perlu dijalankan untuk mengatasi masalah pelepasan karbon dengan lebih berkesan. Ketiga, kajian ini juga menguji peranan pengangkutan dan, teknologi komunikasi maklumat (ICT) terhadap eksport pakaian siap sedia pakai. Bagi mencapai objektif ini, analisis data panel dari negara rakan berdasarkan model graviti, menggunakan anggaran OLS terkumpul dan Poisson-Pseudo Maximum Likelihood (PPML). Hasil kajian menunjukkan bahawa infrastruktur kereta api, udara, dan pelabuhan mempengaruhi kesan positif eksport RMG. Oleh itu, dapatan kajian ini menyokong pentingnya kualiti infrastruktur pengangkutan untuk meningkatkan kesan telekomunikasi kepada RMG eksport. Justeru, infrastruktur ICT adalah penting dalam meningkatkan nilai eksport RMG di Bangladesh. Secara praktiknya, penemuan penyelidikan ini dapat mengurangkan kekurangan literatur yang memfokuskan kepada komponen infrastruktur yang sangat

penting untuk pembangunan sektor pakaian siap pakai. Penemuan kajian ini juga berfungsi sebagai panduan dasar untuk memfasilitasikan faktor penting yang berbeza bagi mencapai dan mengekalkan daya saing industri RMG di Bangladesh.

ACKNOWLEDGEMENTS

All praises are due to Allah the most Beneficial the Most Merciful. May His eternal Blessings. I thank Allah first and foremost for allowing me to reach this stage. My heartfelt gratitude goes to my main supervisor Prof. Dr. Law Siong Hook for his continuous support to my PhD study, for his kind patience, inspirations, and wisdom. His guidance helped me to keep going doing this thesis. I could not have imagined having a better supervisor for my study. I also would like to thank the rest of my thesis committee: Associate Professor Dr. Lee Chin and Associate Professor Mohd. Yusof Bin Saari for their support and encouragement.

This PhD journey has highlighted a wide range of significant and permanent challenges that have made me the person that I am today. This process has been accompanied by extreme changes in my personal life in a very short time: From living in a new country, with a different language and cultural environment, to becoming a PhD candidate. I believe that I have never learned more than what I have learned in the last four years, and for that I am thankful.

I am indebted to my loving family my parents, brother, sister for their patience and support during the completion of this dissertation. It would not be possible without them. In particular, my mother always kept believing in me throughout this journey. Her continuous support, love, and encouragement gave me the strength to accomplish my Ph.D. That confidence that my mother put in me was one of the things that kept me alive in this. Many times, I felt frustrated because I could not reach my own goals, but she was always there, reminding me that everything is possible. I could not, therefore, let this opportunity pass without expressing my gratitude to all my friends and colleagues who supported my research. Life is beautiful, and one of the main features of this beauty is that we can share it and enjoy it with our dear ones. For this reason, many thanks to all of those who were part of this process; without you, it would not have been possible.

This thesis was submitted to the Senate of the Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Doctor of Philosophy. The members of the Supervisory Committee were as follows:

Law Siong Hook, PhD
Professor
School of Business and Economics
Universiti Putra Malaysia
(Chairman)

Lee Chin, PhD
Associate Professor
School of Business and Economics
Universiti Putra Malaysia
(Member)

Mohd. Yusof bin Saari, PhD
Associate Professor
School of Business and Economics
Universiti Putra Malaysia
(Member)

ZALILAH MOHD SHARIFF, PhD
Professor and Dean
School of Graduate Studies
Universiti Putra Malaysia

Date: 8 September 2022

Declaration by graduate student

I hereby confirm that:

- this thesis is my original work;
- quotations, illustrations and citations have been duly referenced;
- this thesis has not been submitted previously or concurrently for any other degree at any institutions;
- intellectual property from the thesis and copyright of thesis are fully-owned by Universiti Putra Malaysia, as according to the Universiti Putra Malaysia (Research) Rules 2012;
- written permission must be obtained from supervisor and the office of Deputy Vice-Chancellor (Research and innovation) before thesis is published (in the form of written, printed or in electronic form) including books, journals, modules, proceedings, popular writings, seminar papers, manuscripts, posters, reports, lecture notes, learning modules or any other materials as stated in the Universiti Putra Malaysia (Research) Rules 2012;
- there is no plagiarism or data falsification/fabrication in the thesis, and scholarly integrity is upheld as according to the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) and the Universiti Putra Malaysia (Research) Rules 2012. The thesis has undergone plagiarism detection software

Signature: _____ Date: _____

Name and Matric No: Mahmuda Akter Khuky

Declaration by Members of Supervisory Committee

This is to confirm that:

- the research conducted and the writing of this thesis was under our supervision;
- supervision responsibilities as stated in the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) are adhered to.

Signature: _____
Name of Chairman of Supervisory Committee: Professor Dr. Law Siong Hook

Signature: _____
Name of Member of Supervisory Committee: Associate Professor Dr. Lee Chin

Signature: _____
Name of Member of Supervisory Committee: Associate Professor Dr. Mohd. Yusof bin Saari

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ASEAN	Association of Southeast Asian Nations
ADB	Asian Development Bank
ARDL	Autoregressive Distributed Lag
AIC	Akaike information criteria
BRI	Belt and Road initiative
BGMEA	Bangladesh Garment Manufacturers and Exporters Association
CIS	Commonwealth of Independent States
RMG	Ready-made garment
EPZ	Export processing zone
EU	European Union
GATT	General Agreement on Tariffs and Trade
PPML	Poisson Pseudu-Maximum-Likelihood
UNCTAD	United Nations Conference on Trade and Development
USEPA	United States Environmental Protection Agency
SDG	Sustainable Development Goals
ICT	Information Communication Technology
ITC	International Trade Centre
IPPC	Integrated and Pollution Prevention and Control
TRIPS	Trade-related aspects of intellectual property rights
GDP	Gross domestic product
GII	Global Innovation Index
OECD	Organisation for Economic Co-operation and Development
WTO	World Trade Organization
WJP	World Justice Project

CHAPTER 1

INTRODUCTION

1.1 Background of the study

Economic growth refers to an improvement in an economy's productive ability to produce additional amounts of products and services. It is desirable for a country to have economic growth. The earning from exports plays a very crucial role in the economic growth of a country (Helpman, 2011; Krugman and Obstfeld, 2002). Therefore, the relationship between export and economic growth has drawn considerable academic attention from the scholars over the years (Amiti & Freund, 2010; Awokuse, 2008; Chandra et al. 2007; Nguyen, 2017; Temiz et al. 2019; Abdullah et al 2017; Datta et al. 2018; Choi et al. 2018; Adebayo, 2020; Nguyen et al. 2021; Kalita & Sahariah, 2021; World Bank, 2019).

Comparably the export and economic growth strategy has more potential to lead developing countries to rapid growth. Additionally, this export and growth strategy is more important to developing countries which may help to earn from export and use to dynamic benefits of the nation. An abundant volume of literature has been carried out over a large period documenting both positive and negative effects of trade on economic growth. Numerous studies have found a positive impact of export expansion on economic growth. However, Singh (2010) claimed that the effects of international trade on economic growth still is ambiguous in terms of both theoretical models and empirical research. Unexpectedly, the average growth of world trade slowed down by 2.8% percent in 2018 and 2.9% in the year 2019 which is the lowest rate since the financial crisis. In addition, it is projected that the world Gross domestic product (GDP) per capita growth will remain stuck at 3% over the next two years (OECD, 2019). Global trade is deteriorating and slowing down economic activities in almost all economies (UNCTAD, 2019).

The garment industry is the backbone of the economy of Bangladesh. This sector contributes to the rapid growth of economy. Currently the RMG industry is responsible alone for 75% to 78% of country's total export earnings (Bala et al. 2019). In the fiscal year 2018-19, the total value of the garment export of Bangladesh to the world was approximately US$ 34 million out of its total export US$ 40 million of total export value (BGMEA, 2019). This industry has been contributing to the national economy from the last three decades. However, this sector is now in emerging risk concern which makes the sustainability of the development of this sector is crucial for growth of the country.

The aim of this study is to analyse the effect of labour productivity on relationship between the export of RMG on economic growth, the impact of RMG export on environmental degradation and the impact of infrastructure on RMG export. This study is aimed to discuss about different important components of RMG industry and draw possible suggestions for the policymakers.

1.1.1 Overview of Ready-made Garment Sector of Bangladesh

Bangladesh is a South Asian country with 161 million population with a land area of 147,570 kilometres (BBS, 2018; World Bank 2018). Bangladesh is an emerging economic power in Asia, and for the last few decades, the garment industry has started to emerge as the backbone of its economy, which would be the second-largest producer and exporter of RMG on the world market after China. Being a developing country, Bangladesh is heavily depending on export earnings. The RMG export earning has been increased dramatically over last two decades. The European Union, the United States, and China are Bangladesh's main export partners. The RMG sector is therefore not just the main source of revenue for a foreign currency, it also plays an important part in the overall economic development and improving jobs, and reducing poverty (Khan and Rodrigues, 2015; Manni and Afzal, 2012). Woven and knitwear are the major products of Bangladesh's RMG business, which is heavily concentrated with only five low-cost items: trousers, T-shirts, Jackets, Sweaters, and shirts. Since the beginning of the RMG sector in Bangladesh, these five kinds of items have dominated.

In the early 1980s, Bangladesh commenced investment in the RMG sector (Hasan et al, 2013). There were only 50 factories at a certain time and only a few thousand people were employed, but now there are 4483 manufacturing companies in Bangladesh (BGMEA, 2017). Bangladesh exports 60% of its RMG to EU nations and 24% to the US advertise alongside other world nations (Berg et al. 2011). Bangladesh's RMG industry now accounts for more than 82 percent of the country's total export earnings, covering 16 percent of the total GDP. Recently, the Bangladesh Garment Manufacturer and Exporter Association (BGMEA) set a target of exporting $50 billion by 2021 and eventually becoming the world's largest producer and exporter of RMG shortly world market (BGMEA, 2017).

When comparing Bangladesh's RMG industry to that of other key competitors, it becomes clear that Bangladesh is far behind the pack. Furthermore, a comparison across different indicators reveals Bangladesh's dismal performance (Mian, 2020; Kabir et al., 2019). Figure 1.1 demonstrates that Bangladesh's RMG exports have increased steadily since joining the World Trade Organization (WTO) in 1990. In the fiscal year 2018-19, the total value of the garment export of Bangladesh to the world was approximately US$ 34133.27 million out of its total export US$ around 40 million which is almost 84% of the total export value (BGMEA, 2018).

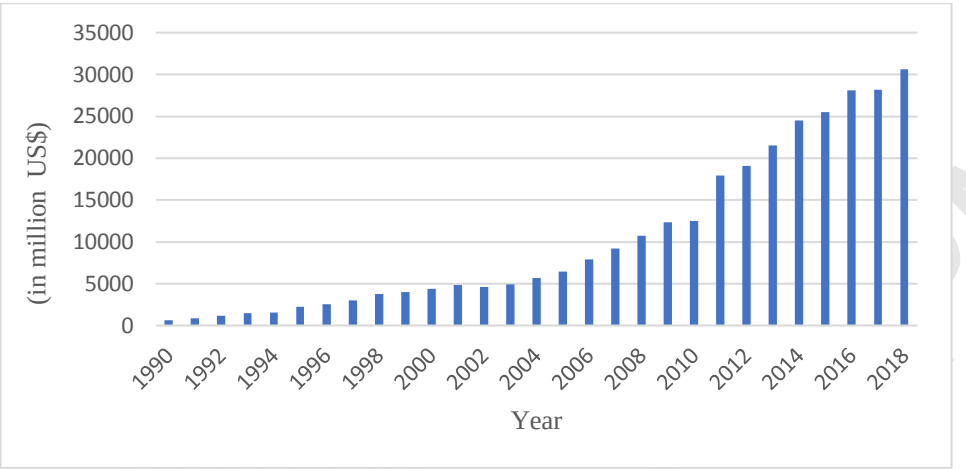

Figure 1.1 : Bangladesh Ready-made garment Export (US$)
(Source: BGMEA, 2019)

However, the composition of the exports has changed drastically since then, which has affected stability; the principal export item was the RMG. While this country distributes its product lines to many nations worldwide, its main markets represent only two more exports: European markets and US markets. The commodities of Bangladesh are among the most consumed in the USA (Dechezleprêtre & Sato, 2017). The United Kingdom was taken second when Germany took the third position. The potential markets in Bangladesh are Japan, Australia, India, South Korea, China, and Brazil.

Therefore, the growth of RMG 's exports depends on the growth of its market demand worldwide. Its growth is also anticipated to have a positive effect on Bangladesh's economy. In the last six years, the country's real annual GDP has risen, growing to over 6 percent. This is seen because of constructive macroeconomic policies, favourable weather conditions, exports, and strong development. In addition, there was a greater balance in the overall remuneration balance compared to the previous years during the time of analysis. As one of Asia's fastest-growing economies, since 2018, Bangladesh has been due to the expansion of its export sector (Dogan and Turkekul, 2016).

According to the World Trade Organization (WTO), Bangladesh remains the second-largest garment exporter in the world immediately after China. Bangladesh has accounted for a 6.5% share of the world market in year 2018 (Table 1.1). China, Bangladesh, and Vietnam remained the world's biggest exporters in 2017. However, China remained the largest exporter of garments and suppliers globally, with an export value of $158 billion in year 2018, where Bangladesh exported garment items worth $29 billion (Table 1.1). These three countries accounted for US$344.2 billion, which was 75.8 percent of the world's garment exports in 2018. Vietnam exported $27 billion worth of garment products which is 5.9% of the world market share. Next, India exported $18 billion with its 5.9% market share and ranked fourth. Turkey came next with around a 3.3 percent market share.

Together these top 10 exporting nations share almost 87.8 percent market share, which had a total value of $457 billion.

Table 1.1 : Global Market share of RMG exporters in year 2018

Country	Global market share in %
China	34.4
Bangladesh	6.5
Vietnam	5.9
India	4.1
Turkey	3.3
Indonesia	1.8
Cambodia	1.6

(Source: World Trade Organization, 2019)

In 2016, the growth rate in the gross domestic product (GDP) of Bangladesh was 7.11% which is much higher than the world average (3.1%) (Bangladesh Bank, 2017). It is worth mentioning that, since 2004, Bangladesh had experienced consistent growth in the gross domestic product (GDP), as well as real trade, which has also improved. In real trade, the RMG sector has a remarkable contribution. Based on the data from World Bank (2018) the exports and GDP of Bangladesh had continuous growth from 1986 to 2018 (Figure 1.2).

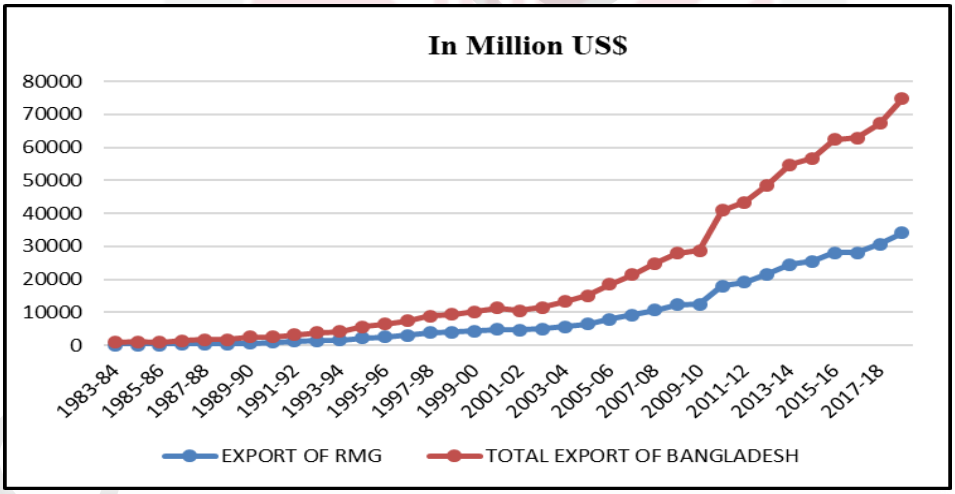

Figure 1.2 : Comparison of total export vs. export of RMG of Bangladesh
(Source**:** BGMEA, 2019)

The RMG sector's two main categories are tissue and knitting. This industry has increased since the 1990s (Shimu and Islam, 2016). Moreover, because of its international standing in product performance and value, the RMG sector is one of Bangladesh's leading export earning sectors. This sector is developed in Bangladesh because of its cheap workforce as a labour-intensive sector.

The export of RMG products from Bangladesh plays an important role in the global supply chain for retail customers. Figure 1.3 also shows the country-specific export of Bangladesh's garment products in 2018. It shows that Bangladesh's top 10 trading partners are Germany, the USA, Spain, France, Italy, the Netherlands, Japan, and Poland. These countries are the major importers of the RMG products from Bangladesh. More than 80% of total RMG exports are done by these countries (World trade organization, 2019).

In addition, figure 1.3 demonstrates the comparison of total RMG export in the year 2018 and the year 2019 between traditional markets (USA, Canada, and EU) and the non-traditional market (rest of the world). The ready-made garment product export mostly to major non-traditional markets grew for a couple of years. Among the non-traditional market Australia, Brazil, Chile, India, China, Japan, Mexico, Turkey, South Africa, and Russia are the markets where Bangladeshi apparel exports are significantly growing. An incentive package and access to duty-free markets are the main reasons behind this growth. Figure 1.3 shows that the export to the European Union (EU) remains the biggest market for Bangladesh for a few years. The red line and blue line show the total export amount in year 2016 and 2017. The green line shows the total export of year 2019 amount in million USD. The last bar is for all European union (EU) countries together and the total RMG export amount. After EU United State (US) is the biggest importer of the RMG products. From the bar chart (figure 1.3) in 2018-2019 the total export amount has been increased.

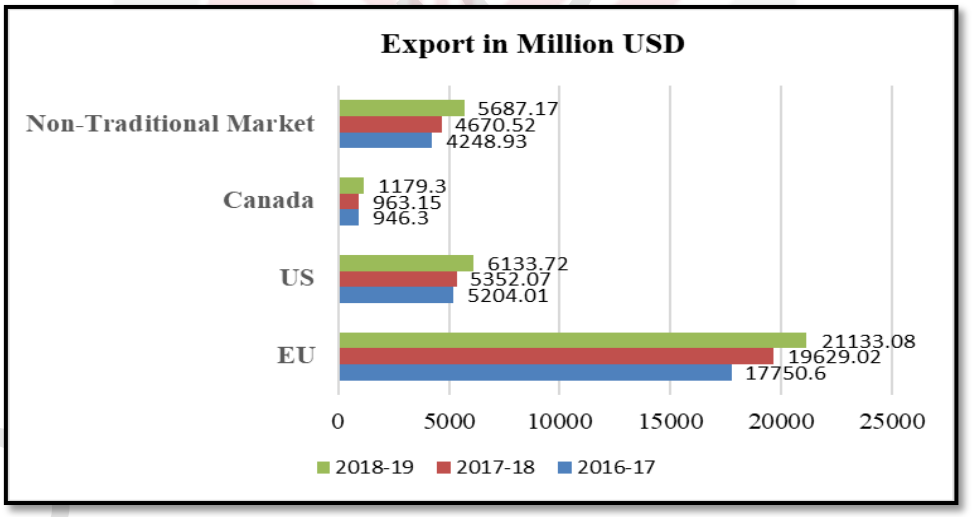

Figure 1.3 : Buyers of Bangladeshi RMG export
(Source: BGMEA, 2019)

1.1.2 Export and economic growth

There is a strong link between international and sustainable development as per the World Trade Organization (WTO) and the World Bank. These international organizations have

underlined many trades and sustainable development initiatives that will lead a country to stimulate economic growth and preserve the environment (Weiss, 1992; Chandia et al., 2018).

The primary focus in the developing countries is economic growth and the export-led growth hypothesis is one of the most highlighted strategies of the policymakers. Exports are equally significant for earning the foreign exchange as well as for advancing economic growth. Therefore, the connection between export and economic growth is recognized as a significant topic of discussion. The impact of export on Bangladesh's economic growth is studied by several researchers (Mamun and Nath, 2005; Begum et al. 1998; Ahmed et al. 2009). Export earnings play an important role in a nation's economic development. Thus, numerous academic research has taken the export-led growth hypothesis into consideration (Choi, 2010; Eaton, Kortum, and Hramarz, 2011; Herrerias and Orts, 2010; Singh, 2010).

The GDP per capita growth in Bangladesh in the 1990s, which was 3.3%, was several times faster than the normal rate of developing low-wage nations in the 1990s But the World Bank report (2018) additionally, that further advancements are required for improvement in administration, what's more, the defilement circumstance. However, Bangladesh developed at a considerably quicker rate in the accompanying a long time. Although there are a few worries over the unwavering quality of legitimate information on GDP development, a later evaluation predicts that Bangladesh's development strength is probably going to proceed.

Considering the importance of export to ensure Bangladesh's growth, export-oriented growth should be Bangladesh's goal of achieving the status of middle-income by 2021. From 1980-1989 the average economic growth was below 4%. Since the early 1990, the economy of Bangladesh has been experiencing extreme economic growth over the years (World Bank, 2018). The GDP growth raised from 3 % to 7.05 % from 1970–2017. An abundant volume of literature has been carried out over a large period documenting both positive and negative effects of trade on economic growth. However, Singh (2010) claimed that the effects of international trade on economic growth still is ambiguous in terms of both theoretical models and empirical research. Unexpectedly, the average growth of world trade slowed down by 2.8% percent in 2018 and 2.9% in the year 2019 which is the lowest rate since the financial crisis. In addition, it is projected that the world Gross domestic product (GDP) growth will remain stuck at 3% over the next two years (OECD, 2019). Furthermore, the world trade trend is now in slight deceleration mode due to several reasons such as political uncertainty, including an escalation of trade conflicts and geopolitical tensions.

Figure 1.4 plots data on GDP growth rates of the South Asian countries over 1990–2017. Bangladesh has been developing around the South Asian economies regarding the GDP development rate. Notwithstanding a couple of years, it has gained above other provincial contenders such as Pakistan. Bangladesh's average GDP growth rate was 5.49, 4.7, and 6.16% while Pakistan's figures within the particular time frames were 4.14, 3.86, and 4.45%, and the South Asian average growth rate were 6.27, 5.28, and 7.27%.

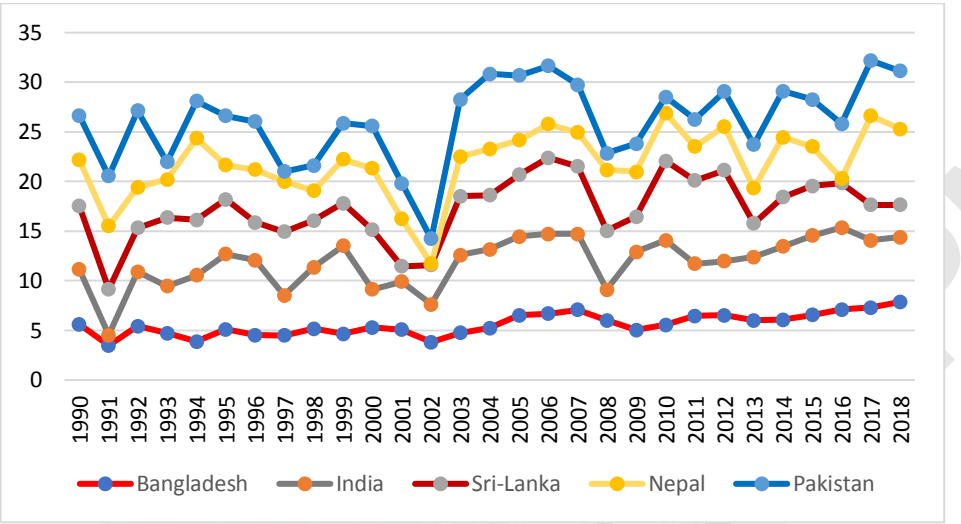

Figure 1.4 : GDP growth (annual %) of South Asian countries
(Source: World Development Indicators Database, 2019)

In response to external market forces, the RMG industry in Bangladesh has grown. Bangladesh's RMG sector has been consistently brilliant, making it the world's number two supplier of RMG's products, amid many macroeconomic and socio-political barriers. The Bangladesh RMG sector's competitiveness is vulnerable, however as international business and world market forces have a limited competitive background, weak infrastructure, unstable institutions, limited raw-material, disruptive technological advances, factory non-compliance, and failure to create labour standards. As a result, RMG producers in Bangladesh have limited influence on the international market, which is continually changing in terms of market structure, supply patterns, and buyer motivation.

Bangladesh's RMG export market has relied heavily on two market regions from the beginning, that is EU and the United States both regions have approximately 85 percent of Bangladesh's total RMG exports (BGMEA, 2019). Bangladeshi RMG industry's high concentration of export destinations limits its growth opportunities. It also puts the sector in a vulnerable position because exports rely on and differ from country to country in their social, economic, and political contexts. Bangladesh is scheduled in 2021, when it becomes the middle-income region, to lose its duties-free status in the EU markets.

Bangladesh RMG faces heavy competition between the South Asian and the Southeast sectors in recent years Asian neighbour countries such as Vietnam, India is trying to become the biggest RMGs countries that export. According to Asian Productivity Organization (2018) has measured the productivity among 20 member economies of the Asian Productivity Organization such as Bangladesh, Cambodia, China, Fiji, Hong Kong, India, Indonesia, Iran, Japan, South Korea, Lao PDR, Malaysia, Mongolia, Nepal, Pakistan, Philippines, Singapore, Sri-Lanka, Thailand, and Vietnam. Therefore, it is

important for Bangladesh must looking for all possible ways to improve the productivity of its labour force to compete with other exporters.

According to Asian Productivity Organization (2018), per hour workers' productivity of Bangladesh and its' competing countries in ready-made garment manufacturing and exporting are shown in Table 1.2. From the table, it is observed that Bangladesh's per hour labour productivity of each worker is US$ 5, whereas the close competitors of Bangladesh, such as India, Vietnam, Pakistan have per hour labour productivity per worker of US$ 8, US$ 6, US$ 8 respectively. As a result, the lower labour productivity of Bangladesh hinders the optimal growth in industrial manufacturing thus there are scopes to work with the skills set of workers employed in the RMG sector to improve labour productivity.

Table 1.2 : Per Hour Labour Productivity in Bangladesh

	Country	Per hour Labour Productivity (US$ as of 2019)
1.	Bangladesh	**5**
2.	China	12
3.	India	8
4.	Vietnam	6
5.	Pakistan	8

(Source: The Conference Board Total Economy Database 2019)

Bangladesh, one of the world's most populous countries, has the benefit of a massive labour force at an incredibly competitive rate. In generating jobs and in providing income for the vulnerable, the RMG industry plays a key role. There are almost four million employees directly and over twelve million people indirectly connected to the sector. The number of manufacturing units has risen in the past twenty-five years from 180 to over 4000 (Hasan et al. 2016). A significant explanation for the growth of Bangladesh's RMG industry is the presence of a large number of low-cost labour.

Besdies having large supply of labour in Bangladesh, the contribution rate of labour is not significant toward achieving higher productivity. The RMG industry is a labour intensive industry which means the best utilization of labours of the industry will assure the high level of profit. Compare to other RMG exporters, Bangladesh has the low labour productivity. Therefore, labour productivity need to be increased to sustain the RMG industry in future. The RMG industry requires sufficient skills and expertise. Despite the industry's growth, its progress is hampered by a scarcity of skilled workers. 90 percent of the country's current 4 million workers are women, the majority of them are uneducated, unskilled, and hail from rural areas. When compared to competitors such as India (92 percent), Vietnam (90 percent), and Pakistan (77 percent), this results in a lower productivity score of 77 percent (88 percent) (Islam, 2015). Most RMG factories lack in-house training facilities, and those that do have poor training quality due to a lack of professional qualified trainers, a weak training program (irregular courses and covered only workers), a lack of training aids, a lack of a systematic training needs assessment or

evaluation program, no follow-up and feedback intervention, and a lack of a corollary relationship between training and monetary or in-kind benefits, among other factors (Khan and Rodrigues, 2015).

Bangladesh was placed to satisfy demand and continue to supply its RMG sector with its large labour force. Bangladesh's total workforce in 2017 amounted to 67,14 million, far more than Vietnam, Cambodia, or Sri Lanka (World Development Indicator, 2020). The productivity of Bangladesh's labour is considered to be lower than China, India, Vietnam (Figure 1.5). It is observed that over the past 20 years productivity has stagnated and that the infrastructure and productivity of the other inputs have not improved. Although the other exporting economies are on the rise, efforts are essential to increase stagnant labour productivity in order to ensure that Bangladesh is competitive with other exporters and remains the second-largest exporter of ready-made garments. A truly sustainable garment industry demands increased efficiency and productivity in its production lines.

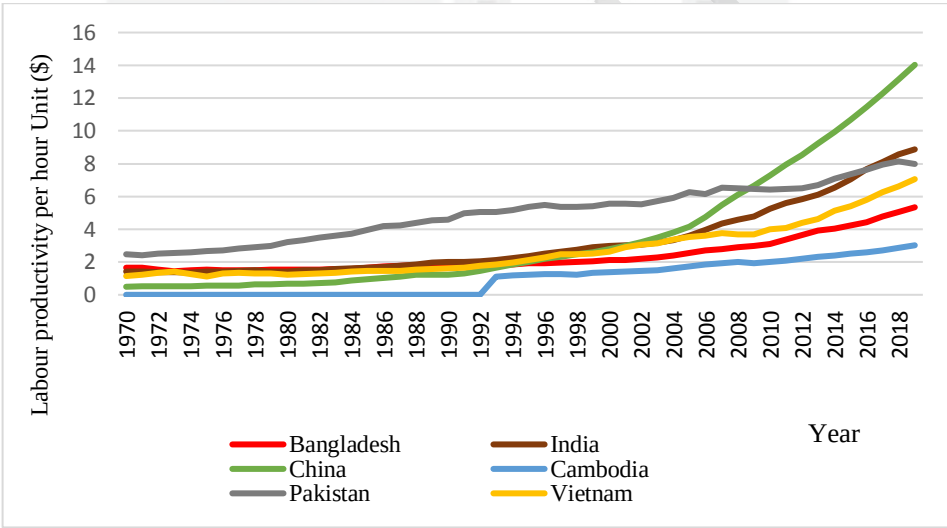

Figure 1.5 : The labour productivity per hour by RMG exporters
(Source: The Conference Board Total Economy Database, 2019)

The labour productivity variable is included as an interaction variable in the relationship between RMG export and economic growth relationship. RMG export is widely responsible for the economic growth of Bangladesh. On the other hand, the higher the labour productivity the higher the growth. Labour productivity is very crucial part of the RMG industry. More than 4 million workers are employing in the RMG industry. Thus, RMG industry is playing a significant role of the economy though creating direct employment for millions of workforce. Moreover, about 90% of the employees in the RMG industry are women and come from rural areas, therefore, mostly they are unskilled or semi-skilled (Islam et al., 2016). Therefore, this study focuses on how the labour productivity influence the RMG export performance and economic growth of Bangladesh. Considering the importance of labour productivity relevant to RMG industry, this study

will explore how much the RMG export will contribute to the economic growth of Bangladesh in long run.

1.1.3 Exports and Environmental impact

With the help of rapid globalization, international trade increased significantly which is associated with the concern of the impact on carbon emissions (CO2). For the last few years, the global merchandise trade has gained tremendous growth. Against this backdrop, it is evident that there is an unavoidable role of exports on emissions of greenhouse gas (GHG), especially CO2 dioxide (CO2) (Fang et al. 2012). Subsequently, reducing greenhouse emissions has become an international key agenda among policymakers worldwide. In this regard, mostly the environmental policies are conceptualized in a manner to facilitate economic growth at the same time ensuring environmental welfare as well. However, many developing countries are not able to reach up to that point where the income can increase and start reducing CO2 emissions. In the garment industry, the principal environmental effect is the release into the receiving environment of high quantities of chemical loads. High chemical and water consumption, energy consumption, air pollution, and solid waste constitute other important aspects.

The garment industry relies heavily on fossil-based energy for energy, which results in CO2 dioxide emissions, which are a major component of greenhouse gases and are thus regarded as the primary cause of global warming. According to the Natural Resource Defense Council (NRDC, 2016), RMG industry is extremely wasteful and polluting, and this industry is established as one of the most polluting industries. This pressing issue is putting further pressure on the RMG industry to improve its environmental management and become more environmentally friendly. Fabrics themselves are thought to be unlikely to pollute the environment; nonetheless, the manufacturing and finishing processes resulted in increased greenhouse gas emissions. In this regard, the RMG sector alone contributes 1 tonne of CO2 to the environment, out of a total of 19.8 tonnes. The major environmental effects of the textile industry are the discharge of high amounts of chemical loads resulting from high consumption of water and harmful chemicals used in this sector and the associated water pollution, high energy consumption in production processes, and related CO2 emissions. It is reported that by 2030, clothing production is expected to increase by 63% and the production process is always connected with environmental problems (WGSN, 2018a).

Export of RMG in Bangladesh has increased over the years and an increasing trend line noticed during the study period. The clean water, energy consumption, and wastewater sectors are at the front lines of industry (Saxena et al. 2017). Processes like adjusting recovery to reduce environmental damage and eco-protection resource consumption, the use of eco-friendly fibres or other materials, reduce pollution, and develop pollution prevention methods have become increasingly important in the future.

The RMG industry has been condemned as being one of the world's worst offenders in terms of pollution. The garment industry, being one of the most energy and CO2-intensive industry, uses a lot of chemicals, water, and fossil fuels in its production process, resulting in pollution of the soil, water, and air (Challa, 2014). To solve these energy and environmental pollution problems, various effective rules should be implemented by the government and garment factories owners (Huisingh et al., 2015). The garment industry has been the subject of numerous environmental regulations (exemplified by the directive for the Integrated and Pollution Prevention and Control, IPPC) and voluntary and administrative instruments relating to various environmental problems (Kant, 2012; Butnariu & Avasilcăi, 2014).

In developing countries, the RMG sectors play an important active role in the economy. This industry is among the leading industries of Bangladesh's economy, accounting for 80% of export revenues and is the main sector throughout the process of industrialization. High quantities of chemical loads arising from the high-water consumption, hazardous chemicals and the related water contamination, the increased electricity generation in production processes, and the related problem of air emissions with packaging and solid waste production are the main environmental consequences of this industry. It also estimated that by 2030, under a business-as-usual scenario, these numbers would increase by at least 50%. According to the latest Sustainable Development Goals (SDG) progress report (UNESCAP, 2019), Asian nations are showing inefficiency in handling the issues of rising CO2 emissions.

However, developed countries are making significant progress in terms of achieving a betterment of environmental quality, while Asian countries are experiencing the issues of rising emission levels. So far these countries could not be made any significant progress in this major issue (IEA, 2019). Sadorsky (2012) argued that export and import affect local energy use. Moreover, excessive fuel consumption in the trading process is responsible for the larger share of global greenhouse gas emissions. Figure 1.6 shows an increasing time series trend in CO2 emission across South Asian countries over the period. Most of the South Asian countries heavily depend on a high degree of exports. In all the export-oriented countries like India, Pakistan, Sri Lanka including Bangladesh the yearly CO2 emission rate is alarmingly increasing. These trends that the level of CO2 emission across the selected South Asian economies are persistently growing which is a matter of concern keeping the issues of environmental wellbeing and climate changes into cognizance. The increasing trends in CO2 emission across this region can be explained by the predominant reliance of most of these nations on the consumption of non-renewable energy.

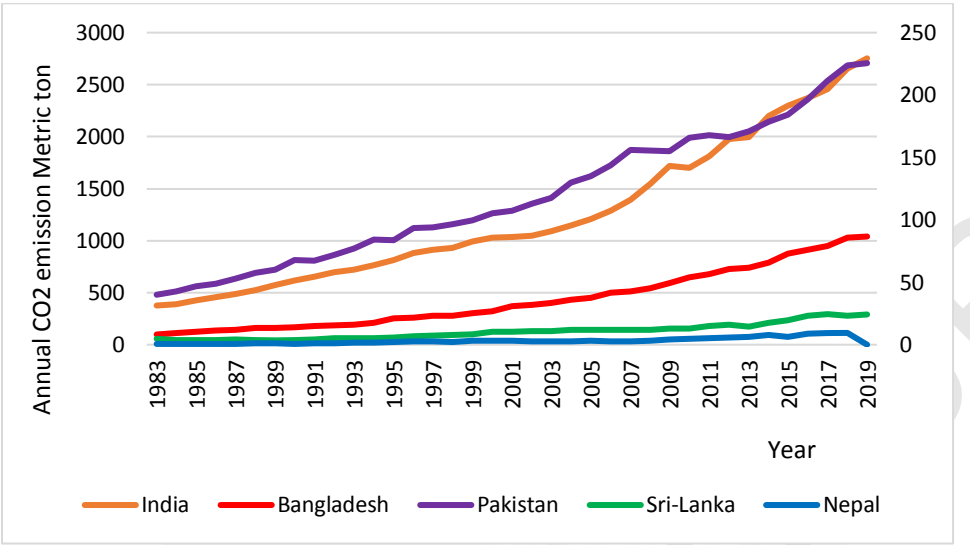

Figure 1.6 : Annual CO2 emission across selected South Asian economies
(Source: World Development Indicator Database, 2019)

To measure the environmental performance ecological footprint gives a comprehensive measure of natural ecosystems on which demand is depended. The ecological footprint is a method promoted by the Global Footprint Network to measure human demand on natural capital, i.e. the quantity of nature it takes to support people or an economy. It tracks this demand through an ecological accounting system. In most of the environmental studies are limited to test one indicator to examine the quality of environmental quality. Ascertaining of climate change is not just one triggered by only one part of the geographical agents but by different other sources are related such as gas flaring, exploration, use of natural resources (Ulucak and Lin, 2017).

According to Global Footprint Network (2018), ecological footprints is about total activities those are responsible for the grouped index of form that have combination of all the possible elements of pollution. Hence, RMG industry not only polluting air but also responsible for other source of environmental pollution. Ecological footprint gives the idea of all possible elements of pollution. Therefore, this study also uses the ecological footprint as a measure in accounting for environmental quality of Bangladesh. As shown in Figure 1.7, the picture that emerges when the environmental impacts and RMG export is very remarkable. Figure 1.7 clearly shows an upward increase in RMG export as well as the CO2 emission at the same time. However, there are ups and downs in certain years that can be noticed before 2008-2009, financial crises period after that it was a sharp increasing trend. It is evident from Figure 1.8 that the RMG export and the ecological footprint are increasing simultaneously after the year 2007 and onward. The increase in garment export is good for the country and having a big role in economic development but the sharp increase in CO2 emissions is also very noticeable. The CO2 emissions of Bangladesh have increased more than ten times in 2019 compared to 1983. While CO2 emission was 8236 metric tons in 1983, it has increased to 93761 metric tons in 2019.

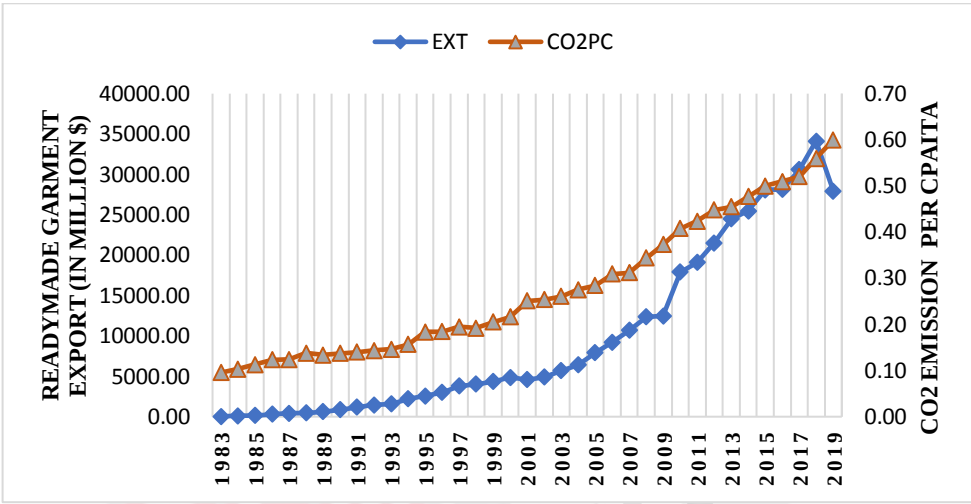

Figure 1.7 : Bangladesh's annual CO2 emission and RMG export
(Source: World Bank and BGMEA, 2019)

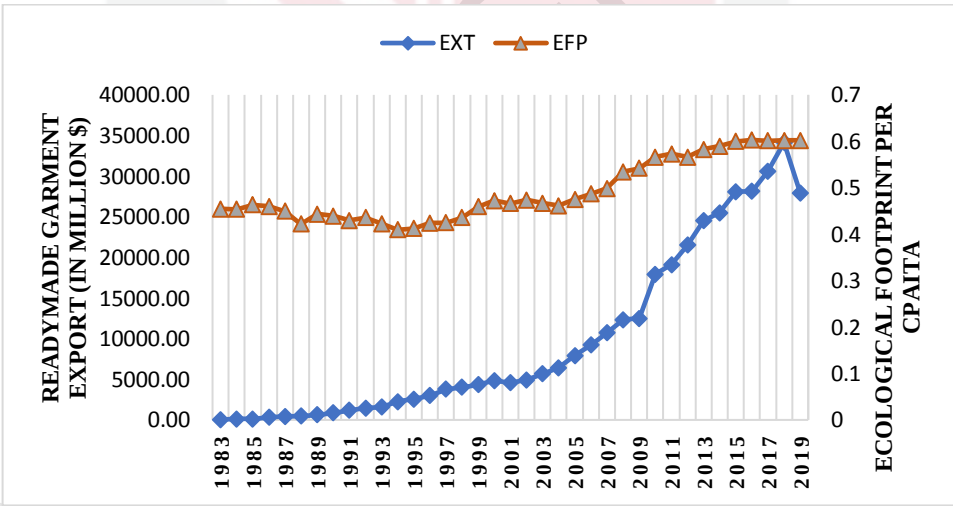

Figure 1.8 : Bangladesh's annual ecological footprint and RMG export
(Source: Global Footprint Network and BGMEA, 2019)

The operation of RMG industry requires a lot of energy consumption which is a great cause of air pollution. De Abreu (2015) highlights that all the key operational practices implemented in the production of RMG industry are wastewater treatment, electricity conservation, solid waste management, and air pollution control. The large number of exports requires a many manufacturing of products. The processes of producing the final products require series of processes with thousands of different chemicals, tons of water and considerable amount of energy are used to treat the fibres to reach the final RMG

products. Therefore, in this study the environmental problems that RMG industry cause has been examined. The possible suggestions from this study will help with sustainability of this industry.

1.1.4 Infrastructure and Exports

Infrastructure plays an important part in trade and cures trade deficiencies. Transport infrastructure can help a country to connect its remote area domestically and globally at a low cost (Donaubauer et al., 2018). There is a large body of evidence that shows that better infrastructure leads to more exports (Celbis, Nijkamp, & Poot, 2013; Normaz Wana & Jamilah Mohd, 2015; Nordas & Piermartini, 2004; Francois & Manchin, 2013). There is a consensus in the economics literature that improved infrastructure changes the comparative advantages of production, as it reduces production costs and increases the competitive prices of the product to be exported.

According to the Global Infrastructure Hub (2017), in the next decades, over half of global infrastructure investment needs will come from Asia and this amount is almost $21 trillion. There is an investment gap of $3.3 trillion up to 2030 is noticed after a comparison between current investment trends and future need outlook. Along with, in Asia, there is an annual infrastructure investment gap of $275 billion (World Bank, 2018; Baltensperger & Dadush, 2019). The transportation costs related to separation, data, and correspondence costs and, by and large, passage expenses to new markets are considered as exchange obstructions that may influence open doors for exchange (Melitz 2003; Fink, Mattoo, and Neagu 2005).

Infrastructure development is recognized as an essential element in terms of economic growth (Roller and Waverman 2001; Calderón and Servén 2003; Canning and Pedroni 2004). Further, transport and logistics services facilitate international trade and play a vital role in the growth of the economy. It enables countries to reduce transportation costs as well as trade costs to improve international trade activities and gain competitiveness. However, weak infrastructure is a major obstacle to global trade integration (Devlin and Yee, 2005; Gani, 2017). The infrastructure development contributes positively to economic growth and per capita income in South Asian countries. Nonetheless, South Asian countries should place a greater emphasis on infrastructure development (Sahoo & Dash, 2012). According to Global Infrastructure Hub (2017) report, the overall global infrastructure needs to invest further $3.5 trillion by 2030 which is equivalent to an additional 0.3 percent of world GDP. Also, the Asian Development Bank (ADB) estimates that from 2016 to 2030, ASEAN countries need the total infrastructure investment of USD 3.1 trillion (Asian Development Bank, 2017). The overall merchandise trade is expected to increase in ASEAN countries, therefore, the infrastructure needs are very important to support the increasing amount of trade.

Hence, both developed and developing countries from all over the world need to make heavy investments in infrastructure to meet the needs of their citizens and shore up productivity throughout their economies. Comparatively, the high-income countries are

getting more benefits from high-quality infrastructure that low-income countries. Thus, there is a very small gap between the current trends and investment need forecasts for developed economies, whereas this gap is greater amongst low and middle-income countries. The road and rail infrastructure are particularly low in Latin America and the Caribbean, and in South Asia (Global Infrastructure Hub, 2017). Moreover, three Asian economies namely Bangladesh, Cambodia, and Myanmar have the largest gap between their current trends and infrastructure investment requirements (Global Infrastructure Hub, 2017; Muhammad et al., 2013). Figure 1.10 illustrates that in Bangladesh almost every infrastructure sector requires further investments. The road sector needs the highest investment 1.1% of the country's GDP. After that, the telecommunication sector needs around 0.8% of the total GDP investment in the future (figure 1.9).

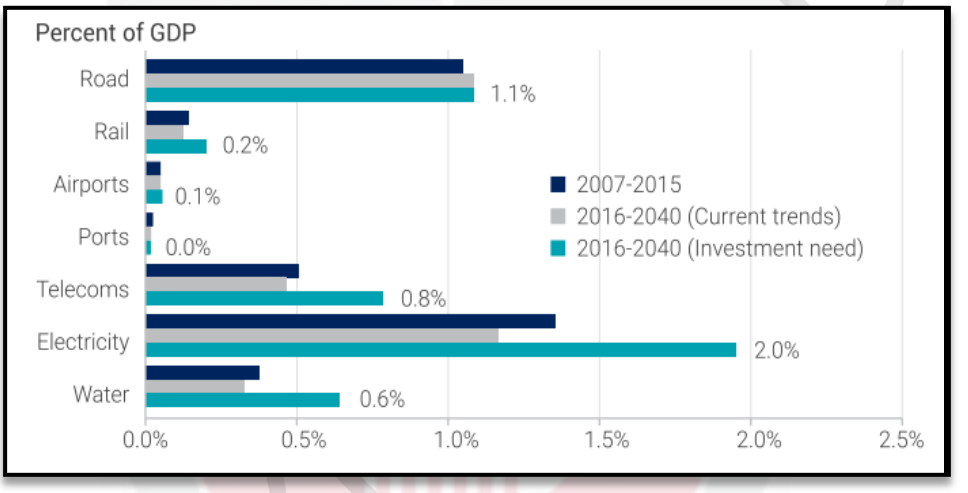

Figure 1.9 : Overall infrastructure investment need in Bangladesh
(Source: Global Infrastructure Hub, 2017)

Infrastructure improvements, both physical and nonphysical, could promote trade by reducing the costs of doing business and thereby promote trade. Transport and logistics services facilitate international trade and play a vital role in the growth of the economy. It enables countries to reduce transportation as well as trade costs, improve international trade activities, and gain competitiveness. However, weak infrastructure is a major obstacle to global trade integration (Devlin and Yee, 2005; Gani, 2017).

Various forms of infrastructure are required in trading, including transportation networks, cars, ports and warehouses, and storage (UNESCAP, 2019). The competitive nature of developing nations can seriously impede an inefficient logistics sector and insufficient transportation infrastructure (Asian development bank, 2019). The competitiveness of developing countries can be severely hampered by an inefficient logistics sector and inadequate transportation infrastructure. The most significant challenge to accessing international markets in developing countries is a lack of domestic transportation infrastructure (Cosar and Demir, 2016). A good investment environment is therefore

important for sustainable growth and is largely dependent on cost-effective infrastructure. Transport infrastructure should be facilitated in developing countries to increase competitiveness and reduce costs, because of increased costs for trade.

Infrastructure development contributes positively to export and per capita income in South Asian countries. Nonetheless, South Asian countries should place a greater emphasis on infrastructure development (Sahoo & Dash, 2012). According to Also, the Asian Development Bank (ADB) estimates that from 2016 to 2030, ASEAN countries need the total infrastructure investment of USD 3.1 trillion (Asian Development Bank, 2018). The overall merchandise trade is expected to increase in ASEAN countries therefore, the infrastructure needs are very important to support the increasing volume of trade.

Bangladesh is 111th out of 137 countries in the field of infrastructure. In line with technological innovation, not just in the world standard but in the South Asian region, infrastructure is also well behind it. There is therefore enormous scope to develop Bangladesh's infrastructure. While Bangladesh is carrying out three major projects on infrastructure, it should continue and take the policies and steps required to improve the sector further. Countries such as China and India, by planned infrastructure developments, are shown to have achieved tremendous success in overall economic growth, Bangladesh also Infrastructure. Infrastructure remained a major obstacle to the development and rapid development of South Asia. For example, 40% of From India, 45% of Pakistan, 60% of Bangladesh, and 75% of Nepal report that inadequate infrastructure is a major impediment to their rapid growth (Global Infrastructure Hub, 2017). In particular, the inefficient transport system, which is routinely blocked to port by the road system, and the process of handling freight for shipments abroad, are linked to an adequate and reliable power supply (to ensure uninterrupted operation by factories).

According to the Global Infrastructure Hub (2017), in the next decades, over half of global infrastructure investment needs will come from Asia and this amount is almost $21 trillion. There is an investment gap of $3.3 trillion up to 2030 noticed after a comparison between current investment trends and future need outlook. Along with Asia, there is an annual infrastructure investment gap of $275 billion (World Bank, 2018). Road density varies significantly in South Asia. Bangladesh's road density is highest Although only 30% of the roads are paved and over 60% of its rural population lacks access to roads throughout the season (Asian Development Bank, 2018). The availability in Bangladesh is currently 1.9 per capita. In the developed region, broadband availability is 25, in China 22.90 in 2016. The telecom sector needs $2.3 trillion in investment between 2016 and 2030 in response to the need assessment (Asian Development Bank, 2017).

The road and rail infrastructure are particularly low in Latin America and the Caribbean, and South Asia (Global Infrastructure Hub, 2017). Moreover, three Asian economies namely Bangladesh, Cambodia, and Myanmar have the largest gap between their current trends and infrastructure investment requirements (Global Infrastructure Hub, 2017; Muhammad et al., 2011).

The cost related to exporting is a key concern to many developing countries. World Trade Organization (2018), trade costs were 227 percent (of their ad-valorem tax equivalent) in less developed countries (LDCs) for the manufacturing sector, compared with 125 percent, 98 percent, and 82 percent in lower middle income, upper middle income, and high-income countries respectively. A comparison of connectivity shows that Bangladesh significantly lagging behind China. The "Transport Infrastructure" sub-indicator of the Global Competitiveness Index (Table 1.3) ranks Bangladesh lower than China in each sub-indicator – roads, ports, railways, and air connectivity infrastructure. The widely held view is that infrastructure development in China has benefitted from massive public investment and successful implementation (Qin et al. 2016).

Table 1.3 : Ranking in infrastructure parameters of Global Competitiveness Index

Infrastructure Indicators	China	Bangladesh
Road connectivity index 0-100 best)	17	121
Quality of roads 1-7 (best)	42	111
Railroad density km of roads/square km	58	40
The efficiency of air transport services 1-7 (best)	63	109
Airport connectivity (score)	2	63
Linear Shipping Connectivity Index 0-157.1 (best)	1	81
Efficiency of seaport services 1-7 (best)	48	93

(Source: World Bank, Global Competitiveness Report, 2018)

Access to supportive infrastructure is key for sustainability, with a significant gap faced by the RMG sector in Bangladesh. "Infrastructure is the single largest hampering issue in the RMG industry in Bangladesh," according to McKinsey and Company (2011). The container cost of 20-foot container in U.S. dollars. All the fees associated with completing the procedures to export or import the goods are included. These include costs for documents, administrative fees for customs clearance and technical control, customs broker fees, terminal handling charges, and inland transport. However, this container cost does not include tariffs or trade taxes, only official costs are recorded. Shipping logistics is the most used transportation mode in exporting garment products.

Additionally, it sometimes becomes a lengthy process to carry ready-made items to the destinations via the port. Weak congested roads add inefficiencies in the export time, with limited inland transport options. The RMG industry depends heavily on the Dhaka-Chittagong highway as the principal gateway to this country is the seaport of Chittagong. Dhaka and Chittagong are two cities where most of the garments factories are located. This makes it very important to use the Dhaka-Chittagong route to export garments products. At present, a two-lane road is under construction, with heavy traffic and a four-lane highway. An inefficient cargo is reached for 280 kilometres of the road from Dhaka to Chittagong Seaport for a day. The cargo cars must stay in traffic jams on their way from Dhaka to Chittagong and its surrounding regions for hours, due to poor road installations. The Chittagong port, which handles nearly 85% of the country's trade merchandise, suffers from labour problems, poor port management, and lack of equipment. The productivity and efficiency of Chittagong port are not competitive and it suffers from high

lead time as well. The alternative mode of transportation such as Bangladesh railways and Dhaka-Chittagong airports provides very few carting and handling facilities.

As Bangladesh is getting relief from both tariff and non-tariff barriers, they appear to be much less important than other policies, such as infrastructure. Poor physical infrastructure is reflected in high transportation costs, which will be an obstacle to trade and impede the realization of gains from trade liberalization. However, the transportation costs vary across countries and products group. The transportation infrastructure affects a country's comparative advantage, as the costs of different modes of transportation affect the volume and composition of trade. This enables the government to formulate a more comprehensive trade policy at both the aggregate and sectoral levels. This study is considering all the modes of transportation such as land, air, and sea infrastructure because transport and distribution are key factors when having international trade.

Figure 1.10 shows that the comparative cost per container among top garment exporters. Although China is in the first position of exporting garment products, the cost per container is lower than in Bangladesh. Another close competitor of Bangladesh is Vietnam which also has a lower cost than Bangladesh. Therefore, it is a disadvantage for Bangladesh to have a high cost than another exporter. According to the latest data, in 2014 the cost per container of China, Bangladesh, India, and Vietnam are $28805, $44835, $46620, and $21350 respectively.

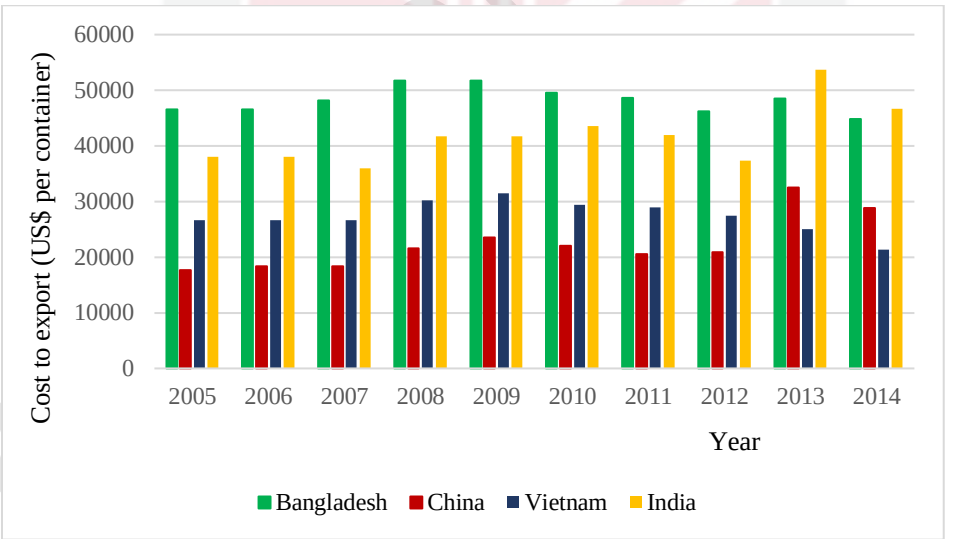

Figure 1.10 : Par container cost to export among top exporters of RMG
(Source: World Development Indicator Database, 2018)

The use of information and communication technology (ICT) is critical for RMG enterprises to compete on the global market. Indeed, the rapid advancement of information and communication technology (ICT) has catapulted the world into the digital economy,

bringing with it substantial digital benefits (World Bank, 2016). The nature of information and communication technology (ICT) is reliably appraised higher than the physical transportation framework. The distinction between the top and base is littlest in ICT, recommending that creating nations may have been putting vigorously in modern-day advancements. Though a limitation in developing nations, the foundation is by all accounts improving. The impression of progress is higher in the base quintile than in the best one. Generally, is said in done, the utilization of these advancements may help firms to diminish their pursuit, the executives and control, dispatching, and time costs (Venables 2001; Demirkan et al. 2009; Ahmad, Ismail, and Hook 2011). ICT adds to encouraging the entrance to and dispersion of data and information about business sectors, items, suppliers, and agents. ICT use may lessen the exchange costs related to worldwide exchange tasks (Venables 2001; Kauffman and Kumar 2008). Table 1.4 below shows the statistics of ICTs proxies of Bangladesh over the last eight years.

Table 1.4 : The ICT infrastructure of Bangladesh for last few years

Years	Mobile-cellular telephone subscriptions (per 100 inhabitants)	Fixed-telephone subscriptions (per 100 inhabitants)	Fixed broadband subscriptions (per 100 people)	Percentage of Individuals using the Internet
2010	46.03	0.87	0.28092007	3.70
2011	56.52	0.65	0.31385419	4.50
2012	64.36	0.64	0.39764118	5.00
2013	76.30	0.71	0.99850147	6.63
2014	82.10	0.63	2.00182721	13.90
2015	84.08	0.55	3.13135582	14.40
2016	86.08	0.48	4.17300595	18.02
2017	94.53	0.44	4.57180112	15.00
2018	100.24	0.90	6.34354432	-

(Source: World Bank Indicator 2019)

Additionally, ICT and RMG sectors are deeply involved in different foreign countries over the world. Bangladesh is not fully prepared to use modern ICT applications in the RMG sectors. It is now the initial phase of using ICT applications in this sector. From the procurement of raw materials and other resources, this sector must face several tasks like maintaining supply chain management, communicating with the partners and clients, attracting the native and foreign investors, performing the exporting functions, ensuring the safety and security issues, etc.

In fact, there are many channels by which ICT can induce countries to export internationally (Liu and Nath, 2013). First, ICT facilitates exports by significantly reducing the fixed costs of entering a market, such as the costs of looking for relevant information on potential customers as well as the costs of developing global distribution channels. Second, business transactions require proper planning to recognise uncertainty and risk linked to delays in the acquisition and transmission of relevant information. These delays can be minimised with the use of ICT applications, leading to faster and higher trade flows between countries. Third, ICT promotes trade by reducing the cost of information search and communication as well as by reducing the time of the transaction

process. The trade flow of a country can thus be increased by building a suitable ICT infrastructure which leads to lower transportation costs, increased sales, higher profits, and greater global market reach (Rahayu and Day, 2017). Therefore, the relationship between ICT and international trade has attracted extensive attention from academics, policymakers, and practitioners alike.

The Global Innovation Index (GII) rates world economies based on their innovation capabilities, considering a variety of factors such as human capital research and development, development finance, university performance, and patent application. The GII measures a country's innovation capacity, as well as how it performs locally and globally (WIPO, 2019). The score Bangladesh receives in GII 2019 is poor which places it at the lower end of the ranking. Bangladesh scores only 15.55 out of 100 and ranks 108 out of 129 countries. Almost all other RMG manufacturing countries are in a better position compared to Bangladesh. For example, in the year 2019 GII, China scores 52.75 and ranks 5, India scores 28.49 and ranks 51, Vietnam scores 33.93 and ranks 37, and Cambodia scores 19.68 and ranks 84 (WIPO 2019).

The close competitors namely, India, Vietnam, Cambodia are far ahead than (Muhammad et al., 2011). Due to the highly competitive market, Bangladesh must improve its RMG export performance to maintain the current position and gain sustainability in the future. However, the competitiveness is increasing among competitors and Bangladesh remains behind with other competitors (The Financial Express, 2017). However, Bangladesh's competitiveness in the RMG industry is threatened by a competitive international market, poor infrastructure, weak institutions, tiny goods and markets, disruptive technical advances, factory non-compliance, and failure to maintain standard working conditions.

The above discussion has drawn the attention of different sustainable concern of the RMG industry. The development of RMG industry requires sufficient skilled workforce. There are 4 million workers in this industry and 90% of them is women. Most of them coming from rural area, illiterate, unskilled (Islam 2018). This results in a lower productivity score compared to other RMG exporting countries. It is already proved that RMG industry is one of the most polluting industries in the world which consumes a huge amount of energy use, water, and chemicals. As the exporting amount is increasing the production also getting increased which ultimately responsible for more environmental degradation. In addition, the RMG industry is lack of implementing the sustainability mark without polluting environment. The chemicals in the materials release into the environment without treating them which results deteriorate the ecology and environment. Inadequate transport infrastructure is hampering Bangladesh' RMG industry. Obstacles like inefficient ports, facilities of transportation are responsible for delayed shipment which keep the industry out of getting full advantage in export earnings (Rahman, 2015). The infrastructure connectivity is providing less efficiency and facilities provides a great disadvantage to make smooth transportation of the exports. Bangladeshi RMG industry need to overcome labour productivity issue, environment pollution problem, as well as less infrastructure efficiency. Therefore, to sustain in the global market in future, RMG industry must address the aspects which will help to overcome the problems.

1.2 Problem Statements

The RMG industry is a major driver of economic growth of Bangladesh. Despite the importance of this sector, this industry faces several issues for long term sustainability. Labour productivity have strong influence on the RMG production process and production costs. The labour wage rate, unskilfulness makes labour productivity low in Bangladesh. The labour productivity in other RMG exporting country is higher than that of Bangladesh. This captures a lot of attention to understand the reason behind the low productivity rate in the RMG industry, which will eventually impact the economic growth of the country. Low literacy rate, low wage rate are the key reasons for low productivity. The unskilled labours with low productivity results high production costs and slow the growth of industry. Therefore, it is important to study the issues related to labour productivity and its impacts on RMG industry. This study attempts to fill the gap and incorporates the labour productivity to investigate the impact of RMG export and economic growth. In addition, lack of professional training system is unavailable in many RMG factories.

RMG sector is prominent to cause higher environmental degradation with increased adverse environmental impacts. Bangladesh's RMG sector mostly depends on fossil fuel energy which is responsible for CO2 dioxide emission. It can be mentioned here that Bangladesh's industrial and manufacturing sectors develop unforeseen in the areas around Dhaka and Chittagong cities. Unplanned installations are underway. Consequently, environmental degradation is taking place. The development process, therefore, takes place at the cost of the environmental problem and the major public health impact. A large part of the energy mix in the RMG sector is inefficient and mostly fossil-based which results in emitting CO2 dioxide emissions. Thus, burning fossil fuel involved in the manufacturing process of textiles generates direct CO2 in the atmosphere.

In addition, the entire supply chain of RMG products augments toxic emissions. In this sense, the concept of sustainability has become a matter of concern in the RMG sector. Therefore, Bangladesh's emissions are expected to grow further soon, which is raising serious concerns about its sustainable development. The lifelong ecological impacts of RMG products are affected by the raw materials, their origin, and the durability of the product, in addition to the production methods. The picture that emerges when the use of RMG products from raw materials and their subsequent environmental effects are very striking because of their chemical, energy, water usage, packaging and solid waste production, the formation of pollution.

Infrastructure like transport is the single-issue hampering Bangladesh's RMG industry. The transportation system in Bangladesh also not a good, narrow, and broken road that results in property damage. This has for long being a constraint against the RMG industry in Bangladesh. The highest cost per container export also a disadvantage for Bangladesh. The transportation system in Bangladesh also not the good, narrow and broken road is the cause of property damaged.

To gain sustainable growth of Bangladesh's RMG industry, it is crucial to investigate the possible issues and solve them. This study will examine the fundamental issues for sustainability in the RMG export and will enable the industry to rise. Currently, the influence of trade accelerating factors in literature is inconsistent. To mitigate the above-discussed issues under consideration, there is a need to investigates the relationship between RMG export, economic growth, environmental quality, and infrastructure.

1.3 Research Questions

This study attempts to address the following research questions based on problem statement:

i. What are the moderating effects of labour productivity on the relationship between ready-made garment export and economic growth?

ii. What is the impact of ready-made garment export on environmental quality?

iii. What is the impact of infrastructure on readymade garment export?

1.4 Objectives of the Study

The general objective of the study is to empirically analyse the impacts of RMG export in economic growth and the environment and impact of various types of infrastructure on the export in Bangladesh. The specific objectives of the study are:

1. To analyse the effects of ready-made garment exports on economic growth by incorporating labour productivity as moderating variables.
2. To investigate the impact of RMG exports on environmental quality.
3. To examine the impact of infrastructure on the RMG exports.

1.5 Significance and contribution of the Study

This study contributes to the existing literature by presenting specific policy recommendations on how better labour productivity, better infrastructure could improve the RMG exports performance. Previous works examines vastly the impact of RMG export on economic growth of the country. However, this study focuses on three relevant important aspects associated with RMG industry.

The present study contributes to the existing literature by presenting specific policy recommendations on how RMG export can increase the economic growth in Bangladesh. Previous work examines mostly the impact of merchandise export on economic growth. Many empirical studies have been done on the overall trade and economic growth; however, there is insufficient empirical work on the role of labour productivity in RMG

export and growth. In terms of trade facilitation, one of the biggest challenges for Bangladesh is the low labour productivity variable on the trade-growth hypothesis.

In contrast to previous studies, this study includes the labour productivity indicator to examine the export-growth relationship. Thus, this study revisited to contribute to the growth policymaking process in terms of understanding how to maintain growth and the benefits of readymade garment export, productivity. Furthermore, the findings are expected to raise awareness to international trade policymakers and encourage participation in promoting economic growth in Bangladesh. Through the result of this study, the various RMG factory owners will come to know that labour productivity is vital to achieve more exports. This study will encourage various RMG companies to ensure the labour reforms and motivate them to achieve higher level of productivity. Thus, the owners of the RMG companies will come up with different development programs and will design different training development for the improvement in the labour productivity.

The second objective is to investigate the impact of RMG export on the environmental pollution of Bangladesh. The role of the RMG industry in causing environmental degradation is prominent. The previous studies failed to identify the conclusive role of the RMG industry in causing environmental damage in the case of Bangladesh. Moreover, many studies elaborated those developing countries are more potential to cause environmental destruction (Masron and Subramaniam, 2019). This particular industry is considered as vulnerable to deteriorating climate change in the country in a big portion. Some studies examine the effect of overall export on the environment. Mostly the growth-environment relationship has been tested. This study contributes to the existing research by investigating the effect of the RMG industry on the CO2 emission of Bangladesh.

Hence, the current study is also novel for evaluation of the garment-environment link in Bangladesh's economy that is more garment dependent. This study also included ecological footprint (EFP) as the dependent variable for the robustness check of the second objective which is the more comprehensive measure for environmental degradation. Likewise, it is found that energy use, trade, economic growth is not environmentally friendly in developing countries (Nathaniel, 2020b). There is lack of study available that has investigated the effects of RMG export, energy use, economic growth on the CO_2, and ecological footprint in Bangladesh. This study is important because it can assist to capture the market conditions where the RMG sector can boost or weaken environmental degradation. The findings can offer several policy implications to the government in detecting the true potentials of the RMG sector in Bangladesh's growth process and beneficial for environmental concerns. This study will help relevant regulatory bodies to come up with some environmentally friendly policies to encourage greening RMG industry. Also, this study will help the policy makers to make environmentally friendly policies.

Finally, this study investigates into the impact of physical infrastructure and information and communication technology on Bangladesh's readymade garment exports. Some studies examine the competitiveness of readymade exports or the impact of physical infrastructure and information technology on overall exports. This study adds to existing

research by examining the impact of transportation infrastructure and (ICT) on total readymade exports from Bangladesh using a gravity model, which has been lacking in earlier studies.

Using an extension of the gravity model where home infrastructure is used intensively in the export of a good, it is easy to show that countries with poorer infrastructure quality will face higher exporting trade costs, with an attending effect on bilateral trade balances. In the trade literature, many studies have examined the role of infrastructure in affecting trade performance. From the background discussion, it seems the garment product export in Bangladesh is higher than other major exporter namely China, India, Vietnam which is a disadvantage for Bangladesh. Therefore, it is important to know which transportation mode can help to reduce the trade cost of this garment manufacturing industry.

In addition, this study also offers policymakers information to define the type of transport infrastructure that is essential to the RMG sector to minimize trade costs and increase the amount of trade. Evaluating the function and impact of the transportation infrastructure using disaggregated sectors helps us to recognize the influence of these factors, and therefore, increase the comparative advantage among other garment exporters. With the analysis findings at the sectoral level, it can help policymakers to formulate strategies for infrastructure investment according to the need of this industry. In addition, by examining the impact of infrastructure, policymakers can evaluate the transmission mechanism from the infrastructure investment to more exports. Also, taking the data from export products will help to identify the factors that are important to gain sustainable trade. By examining, the impacts of transport infrastructure can give information for policymakers to compare the benefits and costs of infrastructure investment or policy reform. Better transportation, ICT facilitates would increase the volume of RMG exports and provide other numerous economic benefits due to improvements in efficiency.

The Bangladeshi government could effectively undertake deliberate policies to tackle T&C moral and regulatory issues. Thus, this study will be able to contribute in several ways in which academicians dramatically improve the empirical analysis on the study of infrastructure covering bilateral trade flow of garment and industry as well as policymaker can take necessary initiatives to improve the trade potential.

1.6 Scope of the study

The scope of study focuses on RMG exports of Bangladesh. Bangladesh is a South Asian country, and its economy is rapidly growing. The RMG industry is one of the most significant strengths of Bangladeshi economy. This study is focusing on three major aspects related to the readymade industry. The RMG exports is definitely have influence on increasing the economic growth of the country. However, there are several factors those have significant influence on the performance of RMG industry. The current study has been broadly looked into the factors. Firstly, the study has considered the impact of labour productivity on the relationship between RMG export and economic growth of the country. Secondly, this study investigated into the impact of RMG exports on the

environment quality of the country. Finally, the study investigated the impact of infrastructure on RMG export performance.

1.7 The organization of the Thesis

The study is organized into five chapters. Chapter one discusses the research background, problem statements, research objective, and significance of the study. Chapter 2 reviews the literature related to the export of the ready-made garment industry and its impact on the economic growth and the environment in Bangladesh. Further, this chapter reviews the literature related to the contribution of infrastructure to reducing manufacturing trade costs. Chapter 3 elaborates the research methodology used to achieve the research objectives. Chapter 4 focuses on results and provides the related explanations related to the objectives. Finally, chapter 5 presents the summary of the findings, relevant policy implications as well as the limitations of the study. This chapter provides the recommendations accrued from the study in line with literature and data from both countries. with an emphasis on the development and promotion of RMG export through Bangladeshi productivity and competitiveness.

REFERENCES

Abdullah, D. N. C., Shaari, M. S., & Hussain, N. E. (2017). Investigating the Causal Relationship between Export and Economic Growth: A Malaysian Perspective. *International Journal of Academic Research in Business and Social Sciences*, *7*(7), 2222-6990.

Abeliansky, A. L., & Hilbert, M. (2017). Digital technology and international trade: Is it the quantity of subscriptions or the quality of data speed that matters?. *Telecommunications Policy*, *41*(1), 35-48.

Abou-Stait, F. (2005). Working Paper 76-Are Exports the Engine of Economic Growth? An Application of Cointegration and Causality Analysis for Egypt, 1977-2003 (No. 211).

Adebayo, T. S. (2020). New insights into export-growth nexus: wavelet and causality approaches. *Asian Journal of Economics, Business and Accounting*, 32-44.

Adewole, A. O. (2012). Effect of population on economic development in Nigeria: A quantitative assessment. *International Journal of Physical and Social Sciences*, *2*(5), 1-14.

Aghion, P., Ljungqvist, L., Howitt, P., Howitt, P. W., Brant-Collett, M., & García-Peñalosa, C. (1998). *Endogenous growth theory*. MIT press.

Ahmad, B. A., Jaini, A. N., & Zamzamir, B. Z. (2015). The impact of infrastructure on trade in Malaysia. *Journal of Entrepreneurship and Business*, *3*(2), 42-49.

Ahmad, N. A., Ismail, N. W., & Hook, L. S. (2011). The Impact of ICT Infrastructure on Malaysian Trade. *Prosiding Persidangan Kebangsaan Ekonomi Malaysia Ke VI*, 293.

Ahmed, E. M. (2011). Measuring the effects of labour productivity on ASEAN5 plus 3 economic growth. *Journal of Business Management and Economics*, *2*(2), 069-074.

Ahmed, N. (2009). Sustaining ready-made garment exports from Bangladesh. *Journal of Contemporary Asia*, *39*(4), 597-618.

Ahmed, S., Appendino, M., & Ruta, M. (2015). *Depreciations without exports? Global value chains and the exchange rate elasticity of exports*. The World Bank.

Ahmed, V., Abbas, A., & Ahmed, S. (2013). Public Infrastructure and Economic Growth in Pakistan: A Dynamic CGE-Micro Simulation Analysis. *Infrastructure and economic growth in Asia*, *117*.

Ahmed, Z., Asghar, M. M., Malik, M. N., & Nawaz, K. (2020). Moving towards a sustainable environment: the dynamic linkage between natural resources, human capital, urbanization, economic growth, and ecological footprint in China. *Resources Policy*, *67*, 101677.

Ahmed, Z., Wang, Z., Mahmood, F., Hafeez, M., & Ali, N. (2019). Does globalization increase the ecological footprint? Empirical evidence from Malaysia. *Environmental Science and Pollution Research*, *26*(18), 18565-18582.

Akhtar, S., Baig, S. F., Saif, S., Mahmood, A., & Ahmad, S. R. (2017). Five year carbon footprint of a textile industry: A podium to incorporate sustainability. *Nature Environment and Pollution Technology*, *16*(1), 125.

Al Mamun, K. A., & Nath, H. K. (2005). Export-led growth in Bangladesh: a time series analysis. *Applied Economics Letters*, *12*(6), 361-364.

Ali, H. S., Law, S. H., Lin, W. L., Yusop, Z., Chin, L., & Bare, U. A. A. (2019). Financial development and CO2 dioxide emissions in Nigeria: evidence from the ARDL bounds approach. *GeoJournal*, *84*(3), 641-655.

Ali, M., Egbetokun, A., & Memon, M. H. (2018). Human capital, social capabilities and economic growth. *Economies*, *6*(1), 2.

Allen, T., Arkolakis, C., & Takahashi, Y. (2020). Universal gravity. *Journal of Political Economy*, *128*(2), 000-000.

Al-Maamari, A. (2017). Potential impacts of hard infrastructure development on agricultural trade (*Doctoral dissertation, Colorado State University*).

Altıntaş, H., & Kassouri, Y. (2020). Is the environmental Kuznets Curve in Europe related to the per-capita ecological footprint or CO2 emissions?. *Ecological Indicators*, *113*, 106187.

Álvarez, I. C., Barbero, J., Rodríguez-Pose, A., & Zofío, J. L. (2018). Does institutional quality matter for trade? Institutional conditions in a sectoral trade framework. *World Development*, *103*, 72-87.

Amiti, M., & Freund, C. (2010). The anatomy of china's export growth, in 'China's Growing Role in World Trade'.

Anderson, J. E. (1979). A theoretical foundation for the gravity equation. *The American economic review*, *69*(1), 106-116.

Anderson, J. E., & Van Wincoop, E. (2003). Gravity with gravitas: A solution to the border puzzle. *American economic review*, *93*(1), 170-192.

Anderson, J. E., & Van Wincoop, E. (2003). Gravity with gravitas: A solution to the border puzzle. *American economic review*, *93*(1), 170-192

Andrews, M., Schank, T., & Upward, R. (2006). Practical fixed-effects estimation methods for the three-way error-components model. *The Stata Journal*, *6*(4), 461-481.

Antoci, A. (2009). Environmental degradation as engine of undesirable economic growth via self-protection consumption choices. *Ecological Economics*, *68*(5), 1385-1397.

Apergis, N. (2016). Environmental Kuznets curves: New evidence on both panel and country-level CO2 emissions. *Energy Economics*, *54*, 263-271.

Ara, L. A., & Rahman, M. M. (2009). The competitiveness and future challenges of Bangladesh in international trade. *WTO Research Centre, Aoyama Gakuin University, Tokyo, Japan*.

Arvis, J. F., & Shepherd, B. (2011). *The air connectivity index: measuring integration in the global air transport network*. The World Bank.

Ashraf, H., & Prentice, R. (2019). Beyond factory safety: Labour unions, militant protest, and the accelerated ambitions of Bangladesh's export garment industry. *Dialectical Anthropology*, *43*(1), 93-107.

Asian Development Bank (ADB), 2019. Achieving Energy Security in Asia: Diversification, Integration and Policy Implications. Available at: https://www.adb.org/publications/achieving-energy-security-asia.

Asian Productivity Organization (2018) APO Productivity Databook 2018. Retrieved 2018. 24 November from, http://www.apo-tokyo.org/publications/wp-content/uploads/sites/5/APO-Productivity-Databook_2018.pdf.

Asteriou, D., & Hall, S. G. (2007). Applied Econometrics: a modern approach, revised edition. *Hampshire: Palgrave Macmillan*, *46*(2), 117-155.

Awokuse, T. O. (2008). Trade openness and economic growth: is growth export-led or import-led?. *Applied economics*, *40*(2), 161-173.

Azam, M., & Ahmed, A. M. (2015). Role of human capital and foreign direct investment in promoting economic growth. *International Journal of Social Economics*.

Bacchetta, M., Beverly, C., Cadot, O., Fugazza, M., Grether, J. M., Helble, M., & Piermartini, R. (2012). A practical guide to trade policy analysis. Geneva, CH: *World Trade Organization*.

Bala, B. K., Islam, M. M., Ghosh, S., Hossain, M. S., Hoque, A. S. M. M., & Saha, S. (2019). Modelling of the supply chain of ready-made garments in Bangladesh. *Systems Research and Behavioral Science*.

Balassa, B. (1978). Exports and economic growth: further evidence. *Journal of development Economics*, *5*(2), 181-189.

Baldwin, R. E., & Okubo, T. (2006). Heterogeneous firms, agglomeration and economic geography: spatial selection and sorting. *Journal of economic geography*, *6*(3), 323-346.

Baldwin, R., & Harrigan, J. (2011). Zeros, quality, and space: Trade theory and trade evidence. *American Economic Journal: Microeconomics*, *3*(2), 60-88.

Balli, H. O., & Sørensen, B. E. (2013). Interaction effects in econometrics. *Empirical Economics*, *45*(1), 583-603.

Baltagi, B. (2008). *Econometric analysis of panel data*. John Wiley & Sons.

Banerjee, A., Dolado, J., & Mestre, R. (1998). Error-correction mechanism tests for cointegration in a single-equation framework. *Journal of time series analysis*, *19*(3), 267-283.

Banerjee, P. K., & Rahman, M. (2012). Some determinants of CO2 dioxide emissions in Bangladesh. *International Journal of Green Economics*, *6*(2), 205-215.

Bangladesh Bank. (2017). Annual Report, July 2016-June 2017. Department of Communications and Publications, Bangladesh Bank.

Barro, R. J., & Lee, J. W. (2013). A new data set of educational attainment in the world, 1950–2010. *Journal of development economics*, *104*, 184-198.

BBS (2018). Statistical Yearbook of Bangladesh, Bangladesh Bureau of Statistics, Statistics Division, Ministry of Planning, Government of the People's Republic of Bangladesh, Dhaka.

Beckers, I., Pauwels, P. F., de Ruyter, K., Wetzels, M. G., & Lages, L. F. (2007). Internet capabilities in a knowledge-based perspective of export marketing performance. In *EMAC Conference Proceedings* (pp. 1-7).

Begum, S., & Shamsuddin, A. F. (1998). Exports and economic growth in Bangladesh. *The Journal of Development Studies*, *35*(1), 89-114.

Ben Jebli, M., Ben Youssef, S., & Ozturk, I. (2015). The role of renewable energy consumption and trade: Environmental kuznets curve analysis for sub-Saharan Africa countries. *African Development Review*, *27*(3), 288-300.

Berg, A., Hedrick, S., Kempf, S. & Tochtermann, T. (2011). Bangladesh Readymade garments landscape: The challenge of growth. *McKinsey & Company, Inc.*

Bergstrand, J. H. (1985). The gravity equation in international trade: some microeconomic foundations and empirical evidence. *The review of economics and statistics*, 474-81.

Bergstrand, J. H. (1989). The generalized gravity equation, monopolistic competition, and the factor-proportions theory in international trade. *The review of economics and statistics*, 143-153.

BGMEA (2019). About garment industry of Bangladesh. [online]. Retrieved from: https://www.bgmea.com.bd/home/about/aboutgarmentindustry.

BGMEA, (2017) RMG Industry. [ONLINE]. Available at: www.bgmea.com.bd/home/newslist. [Accessed 1 August 2017].

BGMEA. (2018). Trade information. Retrieved August from http://www.bgmea.com.bd/home/pages/TradeInformation.

Bicknell, K. B., Ball, R. J., Cullen, R., & Bigsby, H. R. (1998). New methodology for the ecological footprint with an application to the New Zealand economy. *Ecological economics*, *27*(2), 149-160.

Bilgin, M. H., Gozgor, G., & Lau, C. K. M. (2017). Institutions and gravity model: the role of political economy and corporate governance. *Eurasian Business Review*, *7*(3), 421-436.

Bosupeng, M. (2016). The effect of exports on CO2 dioxide emissions: policy implications. *International Journal of Management and Economics*, *51*(1), 20-32.

Bougheas, S., Demetriades, P. O., & Morgenroth, E. L. (1999). Infrastructure, transport costs and trade. *Journal of international Economics*, *47*(1), 169-189.

Brakman, S., Garretsen, H., & Van Marrewijk, C. (2009). The new introduction to geographical economics. *Cambridge University Press.*

Brambor, T., Clark, W. R., & Golder, M. (2006). Understanding interaction models: Improving empirical analyses. *Political analysis*, 63-82.

Breusch, T. S. (1978). Testing for autocorrelation in dynamic linear models. *Australian Economic Papers*, *17*(31), 334-355.

Brooks, C. (2014). Introductory econometrics for finance (3rd ed.) Cambridge: *Cambridge University Press.*

Brooks, D. H., & Hummels, D. (2009). Infrastructure? s Role in Lowering Asia? s Trade Costs: Building for Trade. *Edward Elgar Publishing.*

Brown, J. C., Pusey, P. N., Goodwin, J. W., & Ottewill, R. H. (1975). Light scattering study of dynamic and time-averaged correlations in dispersions of charged particles. *Journal of physics A: Mathematical and General*, *8*(5), 664.

Brugnoli, A., Dal Bianco, A., Martini, G., & Scotti, D. (2018). The impact of air transportation on trade flows: A natural experiment on causality applied to Italy. *Transportation Research Part A: Policy and Practice*, *112*, 95-107.

Burger, M., Van Oort, F., & Linders, G. J. (2009). On the specification of the gravity model of trade: zeros, excess zeros and zero-inflated estimation. *Spatial Economic Analysis*, *4*(2), 167-190.

Butnariu, A., & Avasilcăi, S. (2014). Initiatives of textile industry organizations towards environmental issues. In *Advanced Materials Research* (Vol. 837, pp. 612-617). Trans Tech Publications Ltd.

Buys, P., Deichmann, U., & Wheeler, D. (2010). Road network upgrading and overland trade expansion in Sub-Saharan Africa. *Journal of African Economies*, *19*(3), 399-432.

Celbis, M. G., Nijkamp, P., & Poot, J. (2013). How big is the impact of infrastructure on trade? Evidence from meta-analysis. Technical report, United Nations University, Maastricht Economic and social Research and Training Centre on Innovation and Technology, Working paper 2013-032.

Cetin, M., Ecevit, E., & Yucel, A. G. (2018). The impact of economic growth, energy consumption, trade openness, and financial development on CO2 emissions: empirical evidence from Turkey. *Environmental Science and Pollution Research*, *25*(36), 36589-36603.

Challa, L. (2014). Impact of textiles and clothing industry on environment: approach towards eco-friendly textiles. *Retrieved from fibre2fashion. com*.

Chan, E. M., & Au, K. F. (2007). Determinants of China's textile exports: An analysis by gravity model. *Journal of the Textile Institute*, *98*(5), 463-469.

Chandia, K. E., Gul, I., Aziz, S., Sarwar, B., & Zulfiqar, S. (2018). An analysis of the association among CO2 dioxide emissions, energy consumption and economic performance: an econometric model. *CO2 Management*, *9*(3), 227-241.

Chandra Parida, P., & Sahoo, P. (2007). Export-led growth in South Asia: a panel cointegration analysis. *International Economic Journal*, *21*(2), 155-175.

Charfeddine, L., & Mrabet, Z. (2017). The impact of economic development and social-political factors on ecological footprint: A panel data analysis for 15 MENA countries. *Renewable and Sustainable Energy Reviews*, *76*, 138-154.

Chen, T. H., Chang, H. C., & Lue, K. Y. (2009). Unregulated trade in turtle shells for Chinese traditional medicine in East and Southeast Asia: the case of Taiwan. *Chelonian Conservation and Biology*, *8*(1), 11-18.

Chen, Y., Zang, L., Liu, M., Zhang, C., Shen, G., Du, W., & Zhao, M. (2019). Ecological risk assessment of the increasing use of the neonicotinoid insecticides along the east coast of China. *Environment international*, *127*, 550-557.

Cheng, I.-Hui, Wall, Howard J., (2005). Controlling for heterogeneity in gravity models of trade. *Federal Reserve Bank of St. Louis Working Paper*, vol. 1999-010C.

Chi, T., & Kilduff, P. P. (2010). An empirical investigation of the determinants and shifting patterns of US apparel imports using a gravity model framework. *Journal of Fashion Marketing and Management: An International Journal*.

Choi, C. (2010). The effect of the Internet on service trade. *Economics Letters*, *109*(2), 102-104.

Choi, C., & Yi, M. H. (2018). The Internet, R&D expenditure and economic growth. *Applied Economics Letters*, *25*(4), 264-267.

Chu, W. C. A., Chan, M. H. E., & Cheung, J. (2018). A Review of the Determinants of Textile and Clothing Bilateral Trade Flow.

Clark, X., Dollar, D., & Micco, A. (2004). Port efficiency, maritime transport costs, and bilateral trade. *Journal of development economics*, *75*(2), 417-450.

Clarke, G. R., & Wallsten, S. J. (2006). Has the internet increased trade? Developed and developing country evidence. *Economic Inquiry*, *44*(3), 465-484.

Cole, M. A. (2004). Trade, the pollution haven hypothesis and the environmental Kuznets curve: examining the linkages. *Ecological economics*, *48*(1), 71-81.

Conference Board. (2020). The Conference Board total economy database. The Conference Board.

Chowdhury, T. T., & Ahmed, M. (2017). Total Factor Productivity in Bangladesh: An Analysis Using Data from 1981-2014.

Coşar, A. K., & Demir, B. (2016). Domestic road infrastructure and international trade: Evidence from Turkey. *Journal of Development Economics*, *118*, 232-244.

Cullinane, K., Wang, T. F., Song, D. W., & Ji, P. (2006). The technical efficiency of container ports: Comparing data envelopment analysis and stochastic frontier analysis. *Transportation Research Part A: Policy and Practice*, *40*(4), 354-374.

Damania, R., Russ, J., Wheeler, D., & Barra, A. F. (2018). The road to growth: Measuring the tradeoffs between economic growth and ecological destruction. *World Development*, *101*, 351-376.

Dasgupta, S., Laplante, B., Wang, H., & Wheeler, D. (2002). Confronting the environmental Kuznets curve. *Journal of economic perspectives*, *16*(1), 147-168.

Datta, K., & Lahiri, A. (2018). FDI Inflow, export and economic growth relationship in India: An ARDL-Bound cointegration approach. *Economic Affairs*, *63*(2), 533-545.

Davidson, R., & MacKinnon, J. G. (2004). *Econometric theory and methods* (Vol. 5). New York: Oxford University Press.

De Abreu, M. C. S. (2015). Perspectives, drivers, and a roadmap for corporate social responsibility in the textile and clothing industry. In *Roadmap to sustainable textiles and clothing* (pp. 1-21). Springer, Singapore.

De Sousa, J., Mayer, T., & Zignago, S. (2012). Market access in global and regional trade. *Regional Science and Urban Economics*, *42*(6), 1037-1052.

Dean, J. M., & Lovely, M. E. (2010). Trade growth, production fragmentation, and China's environment. In China's growing role in world trade (pp. 429-469). *University of Chicago Press.*

Deardoff, A. (1998). Determinants of Bilateral Trade: Does Gravity Model Work in a Classical World.

Dechezleprêtre, A., & Sato, M. (2017). The impacts of environmental regulations on competitiveness. *Review of Environmental Economics and Policy*, *11*(2), 183-206.

Dennis, A., & Shepherd, B. (2011). Trade facilitation and export diversification. *The World Economy*, *34*(1), 101-122.

Destek, M. A., & Sarkodie, S. A. (2019). Investigation of environmental Kuznets curve for ecological footprint: the role of energy and financial development. *Science of the Total Environment*, *650*, 2483-2489.

Devlin, J., & Yee, P. (2005). Trade logistics in developing countries: The case of the Middle East and North Africa. *World Economy*, *28*(3), 435-456.

Dey, S. (2018). Relationship between Export Revenue and Gross Domestic Product in Bangladesh: An Econometric Analysis. *Asian Business Review*, *8*(1), 1-12.

Dhiman, R., & Sharma, M. (2019). Relation between labour productivity and export competitiveness of Indian textile industry: Co-integration and causality approach. *Vision*, *23*(1), 22-30.

Dickey, D. A., & Fuller, W. A. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica: journal of the Econometric Society*, 1057-1072.

Dinda, S. (2004). Environmental Kuznets curve hypothesis: a survey. *Ecological economics*, *49*(4), 431-455.

Dixit, A. K., & Stiglitz, J. E. (1977). Monopolistic competition and optimum product diversity. *The American economic review*, *67*(3), 297-308.

Djankov, S., Freund, C., & Pham, C. S. (2010). Trading on time. *The Review of Economics and Statistics*, *92*(1), 166-173.

Djankov, S., Freund, C., & Pham, C. S. (2010). Trading on time. *The Review of Economics and Statistics*, *92*(1), 166-173.

Dogan, E., & Seker, F. (2016). The influence of real output, renewable and non-renewable energy, trade and financial development on CO2 emissions in the top renewable energy countries. *Renewable and Sustainable Energy Reviews*, *60*, 1074-1085.

Donaldson, D. (2018). Railroads of the Raj: Estimating the impact of transportation infrastructure. *American Economic Review*, *108*(4-5), 899-934.

Donaldson, D., & Hornbeck, R. (2016). Railroads and American economic growth: A "market access" approach. *The Quarterly Journal of Economics*, *131*(2), 799-858.

Donaubauer, J., Glas, A., Meyer, B., & Nunnenkamp, P. (2018). Disentangling the impact of infrastructure on trade using a new index of infrastructure. *Review of World Economics*, *154*(4), 745-784.

Druckman, A., & Jackson, T. (2008). Household energy consumption in the UK: A highly geographically and socio-economically disaggregated model. *Energy Policy*, *36*(8), 3177-3192.

Duval, Y., & Utoktham, C. (2009). Behind the border trade facilitation in Asia-Pacific: cost of trade, credit information, contract enforcement and regulatory coherence (No. 67). *ARTNeT Working Paper Series*.

Eaton, J., Kortum, S., & Kramarz, F. (2011). An anatomy of international trade: Evidence from French firms. *Econometrica*, *79*(5), 1453-1498.

Ee, C. Y. (2016). Export-led growth hypothesis: empirical evidence from selected Sub-Saharan African countries. *Procedia Economics and Finance*, *35*(2), 232-240.

Egger, P. H., & Staub, K. E. (2016). GLM estimation of trade gravity models with fixed effects. *Empirical Economics*, *50*(1), 137-175.

Egger, P. H., & Tarlea, F. (2015). Multi-way clustering estimation of standard errors in gravity models. *Economics Letters*, *134*, 144-147.

Egger, P., & Pfaffermayr, M. (2003). The proper panel econometric specification of the gravity equation: A three-way model with bilateral interaction effects. *Empirical Economics*, *28*(3), 571-580.

Eicker, F. (1963). Asymptotic normality and consistency of the least squares estimators for families of linear regressions. *The Annals of Mathematical Statistics*, 447-456.

Emeka, E. J., Frederick, I., & Peter, A. (2012). Macroeconomic impact of trade on Nigerian growth: An empirical evaluation. *Research Journal of Business Management and Accounting*, *1*(4), 079-083.

Enders, C. K. (2010). *Applied missing data analysis*. Guilford press.

Eravwoke, K. E., & Oyovwi, D. O. (2012). Growth Perspective via Trade in Nigeria: A Co-integration Approach. *African Research Review*, *6*(1), 18-26.

Evans, G., & Newnham, J. (1998). The Penguin dictionary of international relations. *London Penguin Group USA*, 623 p.

Fagerberg, J., Verspagen, B., & Caniels, M. (1997). Technology, growth, and unemployment across European regions. *Regional Studies*, *31*(5), 457-466.

Fally, T. (2012). Production staging: measurement and facts. *Boulder, Colorado, University of Colorado Boulder, May*, 155-168.

Fally, T. (2015). Structural gravity and fixed effects. *Journal of International Economics*, *97*(1), 76-85.

Fang, W., Si, Y., Douglass, S., Casero, D., Merchant, S. S., Pellegrini, M., & Spalding, M. H. (2012). Transcriptome-wide changes in Chlamy domonas reinhardtii gene expression regulated by CO2 dioxide and the CO2-concentrating mechanism regulator CIA5/CCM1. *The Plant Cell*, *24*(5), 1876-1893.

Feenstra, R. C. (2002). Border effects and the gravity equation: Consistent methods for estimation. *Scottish Journal of Political Economy*, *49*(5), 491-506.

Fernández-Amador, O., Francois, J. F., Oberdabernig, D. A., & Tomberger, P. (2017). CO2 dioxide emissions and economic growth: An assessment based on production and consumption emission inventories. *Ecological economics*, *135*, 269-279.

Fernández-Val, I., & Weidner, M. (2016). Individual and time effects in nonlinear panel models with large N, T. *Journal of Econometrics*, *192*(1), 291-312.

Ferng, J. J. (2003). Allocating the responsibility of CO2 over-emissions from the perspectives of benefit principle and ecological deficit. *Ecological economics*, *46*(1), 121-141.

Fink, C., A. Mattoo, and I. C. Neagu. 2005. "Assessing the Impact of Communication Costs on International Trade." *Journal of International Economics* 67 (2): 428–445.

Francois, J., Manchin, M., & Martin, W. (2013). Market structure in multisector general equilibrium models of open economies. In *Handbook of computable general equilibrium modeling* (Vol. 1, pp. 1571-1600). Elsevier.

Frankel, J. A., & Rose, A. K. (2005). Is trade good or bad for the environment? Sorting out the causality. *Review of economics and statistics*, *87*(1), 85-91.

Frankel, J. A., & Wei, S. J. (1998). Regionalization of world trade and currencies: Economics and politics. In *The regionalization of the world economy* (pp. 189-226). University of Chicago Press.

Fredriksson, P. G. (1999). The political economy of trade liberalization and environmental policy. *Southern Economic Journal*, 513-525.

Freund, C. L., & Weinhold, D. (2004). The effect of the Internet on international trade. *Journal of international economics*, *62*(1), 171-189.

Fuinhas, J. A., & Marques, A. C. (2012). Energy consumption and economic growth nexus in Portugal, Italy, Greece, Spain and Turkey: an ARDL bounds test approach (1965–2009). *Energy economics*, *34*(2), 511-517.

Furman, J. L., Porter, M. E., & Stern, S. (2002). The determinants of national innovative capacity. *Research policy*, *31*(6), 899-933.

Ganesan, P., Thirugnanasambandam, M., Rajakarunakaran, S., & Devaraj, D. (2015). Specific energy consumption and CO2 emission reduction analysis in a textile industry. *International Journal of Green Energy*, *12*(7), 685-693.

Gani, A. (2017). The logistics performance effect in international trade. *The Asian Journal of Shipping and Logistics*, *33*(4), 279-288.

Ghalandari, K. (2013). The role of customers' individual and firms' business level factors in the influence of e-retailing attribute on e-satisfaction and e-loyalty of iranian customers in purchase online. *Life Science Journal*, *10*(3s), 926-936.

Ghazali, A., & Ali, G. (2019). Investigation of key contributors of CO2 emissions in extended STIRPAT model for newly industrialized countries: a dynamic common correlated estimator (DCCE) approach. *Energy Reports*, *5*, 242-252.

Gibbs, A., Jewkes, R., Willan, S., Al Mamun, M., Parvin, K., Yu, M., & Naved, R. (2019). Workplace violence in Bangladesh's garment industry. *Social Science & Medicine*, *235*, 112383.

Gillen, D. W., & Waters II, W. G. (1996). Introduction: Transport infrastructure investment and economic development. *Logistics and Transportation Review*, *32*(1), 1.

Global Infrastructure Hub (2017). Global Infrastructure Outlook—Infrastructure Investment Needs: 50 Countries, 7 Sectors to 2040. *Sydney, Australia*.

Godfrey, L. G. (1978). Testing against general autoregressive and moving average error models when the regressors include lagged dependent variables. *Econometrica: Journal of the Econometric Society*, 1293-1301.

Gómez, E., & Baleix, J. M. (2012). EMU impact of on third countries' exports. A gravity approach (No. 10/26). Department of Economic Theory and Economic History of the University of Granada.

Gómez-Herrera, Estrella. (2013) "Comparing alternative methods to estimate gravity models of bilateral trade." *Empirical economics* 44, no. 3: 1087-1111.

Gordon, N. H. (1990). Maximum likelihood estimation for mixtures of two Gompertz distributions when censoring occurs. *Communications in Statistics-Simulation and Computation*, *19*(2), 733-747.

Grossman, G. (1991). E., Helpman (1991),"Innovation and Growth in the Global Economy". *Cambridge, MIT Press*, *1*, 991.

Grossman, G. M., & Helpman, E. (1990). Trade, innovation, and growth. *The American economic review*, *80*(2), 86-91.

Grossman, G. M., & Krueger, A. B. (1991). *Environmental impacts of a North American free trade agreement* (No. w3914). National Bureau of economic research.

Grossman, G. M., & Krueger, A. B. (1995). Economic growth and the environment. *The quarterly journal of economics*, *110*(2), 353-377.

Gujarati, D. N., & Porter, D. (2009). Basic Econometrics Mc Graw-Hill International Edition.

Hanushek, E. A., & Kimko, D. D. (2000). Schooling, labour-force quality, and the growth of nations. *American economic review*, *90*(5), 1184-1208.

Hasan, I., & Tucci, C. L. (2010). The innovation–economic growth nexus: Global evidence. *Research policy*, *39*(10), 1264-1276.

Hasan, J. (2013). The Competitiveness of Ready Made Garments Industry of Bangladesh in Post MFA Era: How Does the Industry Behave to Face the Competitive Challenge?. *Journal of Economics, Management and Trade*, 296-306.

Hasan, J. (2013). The competitiveness of readymade garments industry of Bangladesh in post MFA era: How does the industry behave to face the competitive challenge?. *Journal of Economics, Management and Trade*, 296-306.

Hasan, K. F., Mia, M. S., Rahman, M. M., Ullah, A. A., & Ullah, M. S. (2016). Role of textile and clothing industries in the growth and development of trade & business strategies of Bangladesh in the global economy. *International Journal of Textile Science*, *5*(3), 39-48.

Hasan, M. M., Parven, T., Khan, S., Mahmud, A., & Yajuan, L. (2018). Trends and impacts of different barriers on Bangladeshi RMG industry's sustainable development. *International Research Journal of Business Studies*, *11*(3), 245-260.

Hasanov, F. J., Liddle, B., & Mikayilov, J. I. (2018). The impact of international trade on CO2 emissions in oil exporting countries: Territory vs consumption emissions accounting. *Energy Economics*, *74*, 343-350.

Haseeb, M., Haouas, I., Nasih, M., Mihardjo, L. W., & Jermsittiparsert, K. (2020). Asymmetric impact of textile and clothing manufacturing on CO2-dioxide emissions: Evidence from top Asian economies. *Energy*, *196*, 117094.

Hassan, S. T., Xia, E., Khan, N. H., & Shah, S. M. A. (2019). Economic growth, natural resources, and ecological footprints: evidence from Pakistan. *Environmental Science and Pollution Research*, *26*(3), 2929-2938.

Haug, A. A., & Ucal, M. (2019). The role of trade and FDI for CO2 emissions in Turkey: Nonlinear relationships. *Energy Economics*, *81*, 297-307.

Head, K., & Mayer, T. (2004). The empirics of agglomeration and trade. In *Handbook of regional and urban economics* (Vol. 4, pp. 2609-2669). Elsevier.

Head, K., & Mayer, T. (2014). Gravity equations: Workhorse, toolkit, and cookbook. In *Handbook of international economics* (Vol. 4, pp. 131-195). Elsevier.

Heckscher, E. F., & Ohlin, B. G. (1991). *Heckscher-Ohlin trade theory*. The MIT Press.

Helble, M., & Ngiang, B. L. (2014). From global factory to global mall: East Asia's changing trade composition.

Helpman, E. (2011). *Understanding global trade*. Harvard University Press.

Helpman, E., & Krugman, P. R. (1985). *Market structure and foreign trade: Increasing returns, imperfect competition, and the international economy*. MIT press.

Helpman, E., & Krugman, P. R. (1985). *Market structure and foreign trade: Increasing returns, imperfect competition, and the international economy*. MIT press.

Hernandez, J., & Taningco, A. B. (2010). *Behind-the-border determinants of bilateral trade flows in East Asia* (No. 80). ARTNeT Working Paper Series.

Herrerias, M. J., & Orts, V. (2010). is the export-led growth hypothesis enough to account for China's growth?. *China & World Economy*, *18*(4), 34-51.

Hitam, M. B., & Borhan, H. B. (2012). FDI, growth and the environment: impact on quality of life in Malaysia. *Procedia-Social and Behavioral Sciences*, *50*, 333-342.

Hoekman, B. and A. Nicita (2008). "Trade Policy, Trade Costs and Developing Country Trade," World Bank Policy Research Paper 4797.

Hoffmann, K., Ipeirotis, P., & Sundararajan, A. (2016). Ridesharing and the use of public transportation. Paper presented at the International Conference on Information Systems (ICIS).

Holtz-Eakin, D., & Selden, T. M. (1995). Stoking the fires? CO2 emissions and economic growth. *Journal of public economics*, *57*(1), 85-101.

Hossain, A. K., & Hasanuzzaman, S. (2012). The impact of energy consumption, urbanization, financial development, and trade openness on the environment in Bangladesh: An ARDL bound test approach. *Shahjalal University of Science & Technology*.

Hossain, J., Ahmed, M., & Akter, A. (2010). Bangladesh labour law: Reform directions. *People Tree Foundation*.

Hossain, M. A., & Chen, S. (2020). Decoupling of energy-related CO 2 emissions from economic growth: a case study of Bangladesh. *Environmental Science and Pollution Research*, *27*(17), 20844-20860.

Howitt, P. (2000). Endogenous growth and cross-country income differences. *American Economic Review*, *90*(4), 829-846.

Huang, B., Zhao, J., Geng, Y., Tian, Y., & Jiang, P. (2017). Energy-related GHG emissions of the textile industry in China. *Resources, Conservation and Recycling*, *119*, 69-77.

Huang, B., Zhao, J., Geng, Y., Tian, Y., & Jiang, P. (2017). Energy-related GHG emissions of the textile industry in China. *Resources, Conservation and Recycling*, *119*, 69-77.

Huimin, L., & Ye, Q. (2010). CO2 embodied in international trade of China and its emission responsibility. *Chinese Journal of Population Resources and Environment*, *8*(2), 24-31.

Huisingh, D., Zhang, Z., Moore, J. C., Qiao, Q., & Li, Q. (2015). Recent advances in CO2 emissions reduction: policies, technologies, monitoring, assessment and modeling. *Journal of Cleaner Production*, *103*, 1-12.

Hummels, D. (2007). Transportation costs and international trade in the second era of globalization. *Journal of Economic Perspectives*, *21*(3), 131-154.

Hussain, M. A., & Saaed, A. A. (2014). Relationship between exports, imports, and economic growth in Saudi Arabia: 1990-2011. Evidence from co-Integration and granger causality analysis. *Journal of Emerging Trends in Economics and Management Sciences*, *5*(3), 364.

Imamoglu, H. (2018). Is the informal economic activity a determinant of environmental quality?. *Environmental Science and Pollution Research*, *25*(29), 29078-29088.

International Energy Agency (IEA), 2019. SDG7: Data and Projections: Access to affordable, reliable, sustainable and modern energy for all. Available at: https://www.iea.org/reports/sdg7-data-and-projections.

International Monetary Fund. Asia and Pacific Dept., (2018). *Regional Economic Outlook, April 2018, Asia Pacific: Good Times, Uncertain Times: A Time to Prepare*. USA: International Monetary Fund. DOI: https://doi.org/10.5089/9781484339886.086.

Islam, F., & Shahbaz, M. (2012). *Is There an Environmental Kuznets Curve for Bangladesh?*. University Library of Munich, Germany.

Islam, M. S. (2020). Ready-made garments exports earning and its contribution to economic growth in Bangladesh. *GeoJournal*, 1-9.

Ismail, N. W., & Mahyideen, J. M. (2015). The Impact of Infrastructure on Trade and Economic Growth in Selected Economies in Asia, ADBI Working Paper 553 (pp. 3–28). Tokyo: Asian Development Bank Institute.

Jafari, Y., Othman, J., & Nor, A. H. S. M. (2012). Energy consumption, economic growth and environmental pollutants in Indonesia. *Journal of Policy Modeling*, *34*(6), 879-889.

Jahangir, A.M, Begum, I. A., Buysse, J., & Van Huylenbroeck, G. (2012). Energy consumption, CO2 emissions and economic growth nexus in Bangladesh: Cointegration and dynamic causality analysis. *Energy policy*, *45*, 217-225.

Jalil, A., & Feridun, M. (2011). The impact of growth, energy and financial development on the environment in China: a cointegration analysis. *Energy Economics*, *33*(2), 284-291.

Jaunky, V. C. (2011). The CO2 emissions-income nexus: evidence from rich countries. *Energy Policy*, *39*(3), 1228-1240.

Jones, C. I. (1995). Time series tests of endogenous growth models. *The Quarterly Journal of Economics*, *110*(2), 495-525.

Jorgenson, A., Schor, J., & Huang, X. (2017). Income inequality and CO2 emissions in the United States: a state-level analysis, 1997–2012. *Ecological Economics*, *134*, 40-48.

Juselius, K. (2006). The cointegrated VAR model: methodology and applications. *Oxford university press.*

Kalita, B., & Sahariah, B. (2021). Export and Economic Growth in India: An Empirical study. *Psychology and Education Journal*, *58*(2), 6788-6793.

Kander, A., Warde, P., Henriques, S. T., Nielsen, H., Kulionis, V., & Hagen, S. (2017). International trade and energy intensity during European industrialization, 1870–1935. *Ecological Economics*, *139*, 33-44.

Kant R. (2012) Textile dyeing industry an environmental hazard. *Natural Science*. 4(1):22–26.

Kara, S. (2019). Tainted garments: the exploitation of women and girls in India's home-based garment sector. *Berkeley, University of California*.

Kashem, M. A., & Rahman, M. M. (2019). CO 2 Emissions and Development Indicators: a Causality Analysis for Bangladesh. *Environmental Processes*, *6*(2), 433-455.

Katircioğlu, S. T., & Taşpinar, N. (2017). Testing the moderating role of financial development in an environmental Kuznets curve: empirical evidence from Turkey. *Renewable and Sustainable Energy Reviews*, *68*, 572-586.

Katrakilidis, C., & Trachanas, E. (2012). What drives housing price dynamics in Greece: New evidence from asymmetric ARDL cointegration. *Economic Modelling*, *29*(4), 1064-1069.

Kepaptsoglou, K., Karlaftis, M. G., & Tsamboulas, D. (2010). The gravity model specification for modeling international trade flows and free trade agreement effects: a 10-year review of empirical studies. *The open economics journal*, *3*(1).

Khan, M. A., & Milne, G. (2019). Global Governance, neoliberalism and national responses: The case of Bangladesh's ready-made garment (RMG) sector. *Development Policy Review*, *37*, O230-O247.

Khan, T. I., Akbar, M. I., & Sadique, M. Z. (2013). Impact of Trade Cost on Bangladesh's Trade A Gravity Model Approach'. In *Prepared for Conference on Empirical Investigations in Trade and Investment, Phuket, Thailand*.

Khan, Z. R., & Rodrigues, G. (2015). Human before the garment: Bangladesh tragedy revisited. Ethical manufacturing or lack thereof in the garment manufacturing industry. *World*, *5*(1), 22-35.

Khatun, T., & Afroze, S. (2016). Relationship between Real GDP and Labour & Capital by Applying the Cobb-Douglas Production Function: A Comparative Analysis among Selected Asian Countries. *Journal of Business*, *37*(1).

Knight, R. L., Knight, H. A., & Camp, R. J. (1993). Raven populations and land-use patterns in the Mojave Desert, California. *Wildlife Society Bulletin*, 469-471.

Koop, G., & Korobilis, D. (2013). Large time-varying parameter VAR. *Journal of Econometrics*, *177*(2), 185-198.

Korkmaz, S., & Korkmaz, O. (2017). The relationship between labour productivity and economic growth in OECD Countries. *International Journal of Economics and Finance*, *9*(5), 71.

Krugman, P. (1979). A model of balance-of-payments crises. *Journal of money, credit and banking*, *11*(3), 311-325.

Krugman, P. (1980). Scale economies, product differentiation, and the pattern of trade. *The American Economic Review*, *70*(5), 950-959.

Krugman, P. (1991). Increasing returns and economic geography. *Journal of political economy*, *99*(3), 483-499.

Krugman, P. R. (1985). Increasing returns and the theory of international trade.

Krugman, P., & Obstfeld, M. (2002). International economy. *Athens: Publications Kritiki*.

Krugman, P., & Venables, A. J. (1990). Integration and the competitiveness of peripheral industry. *Unity with diversity in the European Community*, 56-77.

Kundu, N. (2015). Bilateral trade balance of Bangladesh with BRICS countries: A static panel data analysis.

Kurniawan, R., & Managi, S. (2018). Economic growth and sustainable development in Indonesia: an assessment. *Bulletin of Indonesian Economic Studies*, *54*(3), 339-361.

Kuznets, S. (1955). Economic growth and income inequality. *The American economic review*, *45*(1), 1-28.

Kwiatkowski, D., Phillips, P. C., Schmidt, P., & Shin, Y. (1992). Testing the null hypothesis of stationarity against the alternative of a unit root: How sure are we that economic time series have a unit root?. *Journal of econometrics*, *54*(1-3), 159-178.

L. Edwards and M. Odendaal, "Infrastructure, transport costs and trade: a new approach," *Trade & Industrial Policy Strategies*, 2008.

Lakshmanan, T. R. (2011). The broader economic consequences of transport infrastructure investments. *Journal of transport geography*, *19*(1), 1-12.

Lau, C. K. M., & Bilgin, M. H. (2010). Export conditions of the Chinese textile industry: An analysis in comparison with selected ASEAN countries. *Textile Research Journal*, *80*(19), 2028-2045.

Lau, Y. Y., Chan, M. H., & Nguyen, H. O. (2017). Assessing the displacement effect of exports with gravity trade model: China's textile and clothing case and OBOR implications. *Journal of International Logistics and Trade*, *15*(1), 19.

Levchenko, A. A., & Zhang, J. (2014). Ricardian productivity differences and the gains from trade. *European Economic Review*, *65*, 45-65.

Li, M.; Xiao, H.; Zhao, S. (2015) Study on the Relationship among the Financial Development, Technological Innovation and Economic Growth: Based on China's Provincial Panel Data. *Journal of Chinese management Science*. 2,162–169.

Li, R., Wu, D. D., & Jiang, H. (2011). Carbon footprint and its measurement in dyeing and finishing. *Dyeing*, *37*(18), 40-43.

Lieberman, M. B., & Kang, J. (2008). How to measure company productivity using value-added: A focus on Pohang Steel (POSCO). *Asia Pacific Journal of Management*, *25*(2), 209-224.

Liu, C., & Xia, G. (2018). Research on the dynamic interrelationship among R&D investment, technological innovation, and economic growth in China. *Sustainability*, *10*(11), 4260.

Liyanage, C., Dias, N., Amaratunga, D., & Haigh, R. (2017). Current context of transport sector in South Asia: Recommendations towards a sustainable transportation system. *Built Environment Project and Asset Management*, *7*(5), 490-505.

Ma, Y. H., & Lu, A. (2015). Estimation and factors analysis of CO2 emission of textile and apparel industry. *Wool Text. J*, *43*(8), 62-65.

Magerman, G., Studnicka, Z., & Van Hove, J. (2016). Distance and border effects in international trade: A comparison of estimation methods. *Economics: The Open-Access, Open-Assessment E-Journal*, *10*(2016-18), 1-31.

Mahmud, W. (2008). Social development in Bangladesh: pathways, surprises and challenges. *Indian Journal of Human Development*, *2*(1), 79-92.

Maitra, B. (2018). Investment in physical, human capital, economic growth and life expectancy in Bangladesh: An empirical investigation. *South Asia Economic Journal*, *19*(2), 251-269.

Mandle, J. R. (2013). From growth to development in Bangladesh. *Economics Faculty Working Papers.* Paper 37. http:// commons.colgate.edu/econ_facschol/37.

Mankiw, N. G., Romer, D., & Weil, D. N. (1992). A contribution to the empirics of economic growth. *The quarterly journal of economics*, *107*(2), 407-437.

Manni, U. H., & Afzal, M. N. I. (2012). Effect of trade liberalization on economic growth of developing countries: A case of Bangladesh economy. *Journal of Business Economics and Finance*, *1*(2), 37-44.

Maradana, R. P., Pradhan, R. P., Dash, S., Gaurav, K., Jayakumar, M., & Chatterjee, D. (2017). Does innovation promote economic growth? Evidence from European countries. *Journal of Innovation and Entrepreneurship*, *6*(1), 1-23.

Márquez-Ramos, L., Martínez-Zarzoso, I., Pérez-García, E., & Wilmsmeier, G. (2011). "Special issue on Latin-American research" maritime networks, services structure and maritime trade. *Networks and Spatial Economics*, *11*(3), 555-576.

Marrero, G. A. (2010). Greenhouse gases emissions, growth and the energy mix in Europe. *Energy Economics*, *32*(6), 1356-1363.

Martin, W., & Pham, C. S. (2015). *Estimating the gravity model when zero trade flows are frequent and economically determined*. The World Bank.

Martínez-Zarzoso, I. (2011). The log of gravity revisited. *Applied Economics*, *45*(3), 311-327.

Martínez-Zarzoso, I., & Nowak-Lehmann, F. (2003). Augmented gravity model: An empirical application to Mercosur-European Union trade flows. *Journal of applied economics*, *6*(2), 291-316.

Martinez-Zarzoso, I., Perez-Garcia, E. M., & Suárez-Burguet, C. (2008). Do transport costs have a differential effect on trade at the sectoral level?. *Applied Economics*, *40*(24), 3145-3157.

Matyas, L. (1998). The gravity model: Some econometric considerations. *World Economy*, *21*(3), 397-401.

McKinsey & Company (2011), Bangladesh's Ready-Made Garments Landscape: The Challenge of Growth, available at: www.mckinsey.de/sites/mck_files/files/2011_McKinsey_ Bangladesh.pdf.

Mia, R., Selim, M., Shamim, A. M., Chowdhury, M., Sultana, S., Armin, M., ... & Naznin, H. (2019). Review on various types of pollution problem in textile dyeing & printing industries of Bangladesh and recommandation for mitigation. *Journal of Textile Engineering & Fashion Technology*, *5*(4), 220-226.

Mia, R., Selim, M., Shamim, A.M., Chowdhury, M., Sultana, S., Armin, M., Hossain, M., Akter, R., Dey, S. and Naznin, H., (2019). Review on various types of pollution problem in textile dyeing & printing industries of Bangladesh and recommandation for mitigation. *Journal of Textile Engineering & Fashion Technology*, *5*(4), pp.220-226.

Mia, S., & Akter, M. (2019). Ready-Made Garments Sector of Bangladesh: Its Growth, Contribution and Challenges. *Economics*, *7*(1), 17-26.

Mian, M.E.U., (2020). A Study on Competitiveness of Ready-Made Garments For Export-Led Economic Growth In Bangladesh: Issues And Challenges. Doctoral dissertation, University of Saskatchewan.

Mikayilov, J. I., Galeotti, M., & Hasanov, F. J. (2018). The impact of economic growth on CO2 emissions in Azerbaijan. *Journal of cleaner production*, *197*, 1558-1572.

Miyan, M. S., & Biplob, M. N. K. (2019). Revisiting Exports, Imports and Economic Growth Nexus: Empirical Evidence from Bangladesh (1981-2017). *Modern Economy*, *10*(2), 523-536.

Mondal, M., & Sanaul, H. (2019). The implications of population growth and climate change on sustainable development in Bangladesh. *Jàmbá: Journal of Disaster Risk Studies*, *11*(1), 1-10.

Mrabet, Z., & Alsamara, M. (2017). Testing the Kuznets Curve hypothesis for Qatar: A comparison between CO2 dioxide and ecological footprint. *Renewable and Sustainable Energy Reviews*, *70*, 1366-1375.

Muhammad, A. (2011). Wealth and deprivation: Ready-made garments industry in Bangladesh. *Economic and Political weekly*, 23-27.

Mukhtar, W. L. (2017). Cointegration and Causality between Exports and Economic Growth: Evidence from Nigeria. *Journal of Economics and Sustainable Development*, *8*, 91-99.

Murshed, M., & Dao, N. T. T. (2020). Revisiting the CO 2 emission-induced EKC hypothesis in South Asia: the role of Export Quality Improvement. *GeoJournal*, 1-29.

Naiya, I. I., & Manap, T. A. A. (2013). Structural transformation, poverty and inequality in Nigeria: An ARDL bound testing technique. *International Journal of Economics and Finance*, *5*(4), 141-152.

Narayan, P. K. (2005). The saving and investment nexus for China: evidence from cointegration tests. *Applied economics*, *37*(17), 1979-1990.

Nathaniel, S. P. (2020b). Ecological footprint, energy use, trade, and urbanization linkage in Indonesia. *GeoJournal*, 1-14.

Nathaniel, S. P., & Iheonu, C. O. (2019). CO2 dioxide abatement in Africa: the role of renewable and non-renewable energy consumption. *Science of the Total Environment*, *679*, 337-345.

Nathaniel, S., Anyanwu, O., & Shah, M. (2020a). Renewable energy, urbanization, and ecological footprint in the Middle East and North Africa region. *Environmental Science and Pollution Research*, 1-13.

Naved, R., Rahman, T., Willan, S., Jewkes, R., & Gibbs, A. (2018). Female garment workers' experiences of violence in their homes and workplaces in Bangladesh: a qualitative study. *Social Science & Medicine*, *196*, 150-157.

Nguyen, D., Tran, L., Bui, T., Ngo, T., & Nguyen, T. (2021). The relationships between foreign direct investment, export and economic growth. *Accounting*, *7*(6), 1371-1378.

Nguyen, N. T. K. (2017). The long run and short run impacts of foreign direct investment and export on economic growth of Vietnam. *Asian Economic and Financial Review*, *7*(5), 519.

Nijdam, D. S., Wilting, H. C., Goedkoop, M. J., & Madsen, J. (2005). Environmental load from Dutch private consumption: how much damage takes place abroad?. *Journal of Industrial Ecology*, *9*(1-2), 147-168.

Nordas, H. K., & Piermartini, R. (2004). Infrastructure and Trade. World Trade Organization. *Staff Working Paper ERSD-2004-04*.

NRDC, (2016). Fixing the Fashion Industry. [online]. Available at: https://www.nrdc.org/stories/fixing- fashion-industry (Accessed 12th April 2018).

OECD. (2019). *OECD economic outlook 2019: Volume 2019 Issue 1*. OECD, Paris, France.

Olper, A., & Raimondi, V. (2009). Patterns and determinants of international trade costs in the food industry. *Journal of Agricultural Economics*, *60*(2), 273-297.

Omoju, O., & Adesanya, O. (2012). Does trade promote growth in developing countries? Empirical evidence from Nigeria. *International Journal of Development and Sustainability*, *1*(3), 743-753.

Onyinye, N. G., Idenyi, O. S., & Ifeyinwa, A. C. (2017). Effect of capital formation on economic growth in Nigeria. *Asian Journal of Economics, Business and Accounting*, 1-16.

Ozturk, I., & Acaravci, A. (2013). The long-run and causal analysis of energy, growth, openness and financial development on CO2 emissions in Turkey. *Energy Economics*, *36*, 262-267.

Pascali, L. (2017). The wind of change: Maritime technology, trade, and economic development. *American Economic Review*, *107*(9), 2821-54.

Pedroni, P. (1999). Critical values for cointegration tests in heterogeneous panels with multiple regressors. *Oxford Bulletin of Economics and statistics*, *61*(S1), 653-670.

Pedroni, P. (2004). Panel cointegration: asymptotic and finite sample properties of pooled time series tests with an application to the PPP hypothesis. *Econometric theory*, 597-625.

Perman, R., & Stern, D. I. (2003). Evidence from panel unit root and cointegration tests that the environmental Kuznets curve does not exist. *Australian Journal of Agricultural and Resource Economics*, *47*(3), 325-347.

Perry, P., Kauric, A. G., & Novak, I. (2014). corporate social responsibility in fashion supply chains: people and knowledge in the creation footwear industry (case study). *Economic and Social Development: Book of Proceedings*, 275.

Pesaran, M. H., & Timmermann, A. (2000). A recursive modelling approach to predicting UK stock returns. *The Economic Journal*, *110*(460), 159-191.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics*, *16*(3), 289-326.

Phillips, P. C., & Hansen, B. E. (1990). Statistical inference in instrumental variables regression with I (1) processes. *The Review of Economic Studies*, *57*(1), 99-125.

Phillips, P. C., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika*, *75*(2), 335-346.

Portugal-Perez, A., & Wilson, J. S. (2012). Export performance and trade facilitation reform: Hard and soft infrastructure. *World development*, *40*(7), 1295-1307.

Portugal-Perez, A., Reyes, J. D., & Wilson, J. S. (2010). Beyond the information technology agreement: Harmonisation of standards and trade in electronics. *The World Economy*, *33*(12), 1870-1897.

Pöyhönen, P. (1963). A tentative model for the volume of trade between countries. *World Economic Archives* , 93-100.

Pradhan, R. P., Mallik, G., & Bagchi, T. P. (2018). Information communication technology (ICT) infrastructure and economic growth: A causality evinced by cross-country panel data. *IIMB Management Review*, *30*(1), 91-103.

Psacharopoulos, G. (1994). Returns to investment in education: A global update. *World development*, *22*(9), 1325-1343.

Qin, J., Liu, Y., & Grosvenor, R. (2016). A categorical framework of manufacturing for industry 4.0 and beyond. *Procedia cirp*, *52*, 173-178.

Rabbi, S. F., Wilson, B. R., Lockwood, P. V., Daniel, H., & Young, I. M. (2015). Aggregate hierarchy and CO2 mineralization in two Oxisols of New South Wales, Australia. *Soil and Tillage Research*, *146*, 193-203.

Rahman, M. M., & Ara, L. A. (2010). Bangladesh trade potential: a dynamic gravity approach. *Journal of International Trade Law and Policy*.

Rahman, M., Habibullah, M., & Masum, M. (2017). Readymade garment industry in Bangladesh: Growth, contribution and challenges. *IOSR Journal of Economics and Finance (IOSR-JEF)*.

Rahman, R., Shahriar, S., & Kea, S. (2019). Determinants of exports: A gravity model analysis of the Bangladeshi textile and clothing industries. *FIIB Business Review*, *8*(3), 229-244.

Rehman, O. U., Liu, X., Rauf, A., Slama, M. B., & Amin, W. (2020). Internet tradition and tourism development: A causality analysis on BRI listed economies. *Tourism Economics*, *26*(6), 926-957.

Rakib, M. A., & Adnan, A. (2015). Challenges of ready-made garments sector in Bangladesh: Ways to overcome. *BUFT Journal*, *3*(1), 84-85.

Ren, S., Yuan, B., Ma, X., & Chen, X. (2014). International trade, FDI (foreign direct investment) and embodied CO2 emissions: A case study of Chinas industrial sectors. *China Economic Review*, *28*, 123-134.

Reza, M., Suthiwartnarueput, K., & Wiseskul, P. P. (2015). Liner shipping connectivity and international trade in maritime Southeast Asian countries. Journal of International Logistics and Trade, 13(3), 43.

Ridzuan, A. R., Mohd Noor, A. H., & Ahmed, E. M. (2016). ASEAN4 prospective of export-led economic growth. *E3 Journal of Business Management and Economics*, *7*(1), 1-12.

Rivera-Batiz, L. A., & Romer, P. M. (1991). International trade with endogenous technological change. *European economic review*, *35*(4), 971-1001.

Riyath, M. I. M., & Jahfer, A. (2016). Exports, imports, and economic growth in Sri Lanka: evidence from causality and co-integration analysis.

Roller, L. H., & Waverman, L. (2001). Telecommunications infrastructure and economic development: A simultaneous approach. *American economic review*, *91*(4), 909-923.

Romer, P. M. (1986). Increasing returns and long-run growth. *Journal of political economy*, *94*(5), 1002-1037.

Sadorsky, P. (2012). Energy consumption, output and trade in South America. *Energy Economics*, *34*(2), 476-488.

Sahoo, P., & Dash, R. K. (2012). Economic growth in South Asia: Role of infrastructure. *The Journal of International Trade & Economic Development*, *21*(2), 217-252.

Salahuddin, M., Gow, J., & Ozturk, I. (2015). Is the long-run relationship between economic growth, electricity consumption, CO2 dioxide emissions and financial development in Gulf Cooperation Council Countries robust?. *Renewable and Sustainable Energy Reviews*, *51*, 317-326.

Sánchez-Chóliz, J., & Duarte, R. (2004). CO2 emissions embodied in international trade: evidence for Spain. *Energy policy*, *32*(18), 1999-2005.

Sarker, B., & Khan, F. (2020). Nexus between foreign direct investment and economic growth in Bangladesh: an augmented autoregressive distributed lag bounds testing approach. *Financial Innovation*, *6*(1), 10.

Saxena, S. B., & Salze-Lozac'h, V. (2010). Competitiveness in the Garment and Textiles Industry: Creating a supportive environment. *A Case Study of Bangladesh*.

Saxena, S., Raja, A. S. M., & Arputharaj, A. (2017). Challenges in sustainable wet processing of textiles. In *Textiles and clothing sustainability* (pp. 43-79). Springer, Singapore.

Schmalensee, R., Stoker, T. M., & Judson, R. A. (1998). World CO2 dioxide emissions: 1950–2050. *Review of Economics and Statistics*, *80*(1), 15-27.

Selden, T. M., & Song, D. (1994). Environmental quality and development: is there a Kuznets curve for air pollution emissions?. *Journal of Environmental Economics and management*, *27*(2), 147-162.

Serlenga, L., & Shin, Y. (2007). Gravity models of intra-EU trade: application of the CCEP-HT estimation in heterogeneous panels with unobserved common time-specific factors. *Journal of applied econometrics*, *22*(2), 361-381.

Shahbaz, M., Balsalobre-Lorente, D., & Sinha, A. (2019). Foreign direct Investment–CO2 emissions nexus in Middle East and North African countries: Importance of biomass energy consumption. *Journal of cleaner production*, *217*, 603-614.

Shahbaz, M., Loganathan, N., Zeshan, M., & Zaman, K. (2015). Does renewable energy consumption add in economic growth? An application of auto-regressive distributed lag model in Pakistan. *Renewable and Sustainable Energy Reviews*, *44*, 576-585.

Shahbaz, M., Shahzad, S. J. H., Ahmad, N., & Alam, S. (2016). Financial development and environmental quality: the way forward. *Energy Policy*, *98*, 353-364.

Shahiduzzaman. (2010). Repression against women on rise in Bangladesh, *New Age Newspaper*: 25 November (CISNET Bangladesh-CX254371).

Shahriar, S., Qian, L., & Kea, S. (2019). Determinants of exports in China's meat industry: A gravity model analysis. *Emerging Markets Finance and Trade*, *55*(11), 2544-2565.

Shepherd, B. (2011). *Logistics costs and competitiveness: Measurement and trade policy applications.* World Bank.

Shimu, A. A., & Islam, M. S. (2016). The Prospect of the Readymade Garments Sector in Bangladesh: Result from Trend Analysis. *American Journal of Trade and Policy*, *3*(2), 45-54.

Shimu, A. A., & Islam, M. S. (2018). Impacts of macro-economic variables on the RMG export growth of Bangladesh. *Economics and Business*, *32*(1), 112-125.

Siddiqui, A. A., & Vita, S. (2019). Impact of logistics performance on trade with specific reference to garment sector in Cambodia, Bangladesh and India. *Global Business Review*, 0972150918811700.

Silva, J. S., & Tenreyro, S. (2006). The log of gravity. *The Review of Economics and statistics*, *88*(4), 641-658.

Silva, J. S., & Tenreyro, S. (2011). Further simulation evidence on the performance of the Poisson pseudo-maximum likelihood estimator. *Economics Letters*, *112*(2), 220-222.

Singh, T. (2010). Does international trade cause economic growth? A survey. *The World Economy*, *33*(11), 1517-1564.

Sousa, R., Antunes, C., & Guilhermino, L. E. D. P. S. (2008). Ecology of the invasive Asian clam Corbicula fluminea (Müller, 1774) in aquatic ecosystems: an overview. In *Annales de Limnologie-International Journal of Limnology* (Vol. 44, No. 2, pp. 85-94). EDP Sciences.

Stiroh, K. J. (2002). Information technology and the US productivity revival: what do the industry data say?. *American Economic Review*, *92*(5), 1559-1576.

Suri, V., & Chapman, D. (1998). Economic growth, trade and energy: implications for the environmental Kuznets curve. *Ecological economics*, *25*(2), 195-208.

Sattar, Z. (2015). Strategy for Export Diversification 2015-2020: Breaking into new markets with new: Policy Research Institute of Bangladesh.

Tabari, N. A. Y., & Reza, M. (2012). Technology and education effects on labour productivity in the agricultural sector in Iran. *European Journal of Experimental Biology*, *2*(4), 1265-1272.

Tamazian, A., & Rao, B. B. (2010). Do economic, financial and institutional developments matter for environmental degradation? Evidence from transitional economies. *Energy economics*, *32*(1), 137-145.

Tang, V. (2006). *U.S. Patent Application No. 11/344,720*.

Tapia Granados, J. A., & Carpintero, Ó. (2013). Economic aspects of climate change. *Journal of Crop Improvement*, *27*(6), 693-734.

Temiz Dinç, D., & Gökmen, A. (2019). Export-led economic growth and the case of Brazil: An empirical research. *Journal of Transnational Management*, *24*(2), 122-141.

Terzia, N. (2011), "The impact of e-commerce on international trade and Employment", *Procedia Social and Behavioral Sciences*, 24 (7), 745–753.

The Financial express (2017), Global economic integration under threat: Bangladesh needs to be proactive Published in February 15, 2017 19:33:15. Available at https://thefinancialexpress.com.bd/views/global-economic-integration-under-threat-bangladesh-needs-to-be-proactive.

The World Bank. (2019). World Development Report. In *International Bank for Reconstruction and Development*.

Tinbergen, J. (1962). Shaping the world economy; suggestions for an international economic policy.

Tiwari, A. K., Shahbaz, M., & Hye, Q. M. A. (2013). The environmental Kuznets curve and the role of coal consumption in India: cointegration and causality analysis in an open economy. *Renewable and Sustainable Energy Reviews*, *18*, 519-527.

Tongzon, J. (2007). Determinants of competitiveness in logistics: implications for the ASEAN region. *Maritime Economics & Logistics*, *9*(1), 67-83.

Tsang, V. W. Y., & Au, K. F. (2008). Regionalization of Textile Trade: Evidence from the EU, NAFTA, AFTA, and SAPTA. *The International Trade Journal*, *22*(4), 457-483.

Turkson, F. E. (2011). *Logistics and bilateral exports in developing countries: A multiplicative form estimation of the logistics augmented gravity equation* (No. 11/06). CREDIT Research Paper.

Udemba, E. N., Güngör, H., & Bekun, F. V. (2019). Environmental implication of offshore economic activities in Indonesia: a dual analyses of cointegration and causality. *Environmental Science and Pollution Research*, *26*(31), 32460-32475.

UNCTAD. (2019). United Nations Conference on Trade and Development. Trade and Development Report 2019: Financing A Global Green New Deal. In New York (Issue September).

United Nations Economic and Social Commission for Asia and Pacific (UNESCAP), 2019.Asia and the Pacific SDG Progress Report 2019.

USEPA (2006) Decision Documents for Atrazine. U.S. Environmental Protection Agency.

Van Hoa, T., & Limskul, K. (2013). Economic impact of CO2 emissions on Thailand's growth and climate change mitigation policy: A modelling analysis. *Economic Modelling*, *33*, 651-658.

Vemuri, V. K., & Siddiqi, S. (2009). Impact of commercialization of the internet on international trade: A panel study using the extended gravity model. *The International Trade Journal*, *23*(4), 458-484.

Venables, A. J. (2001). Geography and international inequalities: the impact of new technologies. *Journal of Industry, Competition and Trade*, *1*(2), 135-159.

Venables, A. J., & Behar, A. (2010). *Transport Costs and International Trade* (No. 488).

Virginia diNino, R. E. B. (2006). Euros and Zeros: The Common Currency Effect on Trade in New Goods. *NBER Working Paper Series*, 12673.

Wackernagel, M., Lin, D., Evans, M., Hanscom, L., & Raven, P. (2019). Defying the footprint oracle: Implications of country resource trends. *Sustainability*, *11*(7), 2164.

Wang, H., & Xu, M. J. (2011). Review on theoretical model of carbon emissions in textile industry chain. *Shanghai Text. Sci. Technol*, *7*, 1-4.

Wang, S.; Wang, H.; Yin, J. (2015) Educational Investment and Technological Innovation and Economic Growth. *Educational Research M*. 5, 14–19.

Wang, Z. K., & Winters, L. A. (1992). The trading potential of Eastern Europe. *Journal of Economic Integration*, 113-136.

Wei, S. J. (1995). The open door policy and China's rapid growth: evidence from city-level data. In *Growth Theories in Light of the East Asian Experience, NBER-EASE Volume 4* (pp. 73-104). University of Chicago Press

Wei, Z., Hou-Tse, H., Min, Z., & Mei-Juan, Y. (2012). A contrastive study on the influences of radial and three-dimensional satellite gravity gradiometry on the accuracy of the Earth's gravitational field recovery. *Chinese Physics B*, *21*(10), 109101.

Weiss, E. B. (1992). Environment and trade as partners in sustainable development: A commentary. *The American Journal of International Law*, *86*(4), 728-735.

Westerlund, J., & Wilhelmsson, F. (2011). Estimating the gravity model without gravity using panel data. *Applied Economics*, *43*(6), 641-649.

WGSN, (2018a). Sustainable fashion: Asia in Focus. [online]. Retrived from: <https://www.wgsn.com/blogs/sustainable-fashion-asia-in-focus/?utm_source=ne wsletters&utm_medium=email&utm_campaign=global-weekly-insider&mkt_tok.

WGSN, (2018b). Recycled Fibres: Closing the Loop in Fashion. <https://www.wgsn.com/content/reports/#/Sustainability>.

White, H. (1980). A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica: journal of the Econometric Society*, 817-838.

Wilson, T. M., Stewart, C., Sword-Daniels, V., Leonard, G. S., Johnston, D. M., Cole, J. W. & Barnard, S. T. (2012). Volcanic ash impacts on critical infrastructure. *Physics and Chemistry of the Earth, Parts A/B/C*, *45*, 5-23.

WIPO (2019). Intellectual Property (TRIPS) – Technology Transfer, 2016, Wto.org. Abgerufen am 16. 08. 2016 von https://www.wto.org/english/tratop e/trips e/techtransfer e.htm.

Wooldridge, J. M. (2012). Introductory econometrics: A modern approach: Cengage Learning. *A Figures*, *18*.

World Bank, (2020). World development indicators. Accessed at: http://www.world bank.org/data/online databases.

World Bank, T. (2018). World Development Indicator. [online]. Available: http://databank.worldbank.org/data/reports.aspx?source=worlddevelopment-indicators.

World Bank. (2018). Global investment competitiveness report 2017/2018: Foreign investor perspectives and policy implications.

World Bank. (2019). World development indicators. Retrieved January 01, 2019, from https://databank.worldbank.org/ data/source/world-development-indicators#.

World Economic Situation and Prospects (2018). *New York: United Nations Department of Economic and Social Affairs*. https://doi.org/10.1007/BF02929547

World trade organization. (2019). International trade statistics. (Internet).

WTO. (1996). Trade and foreign direct investment. Geneva, Switzerland: *World Trade Organization*, Press Release.

Xing, Z. (2018). The impacts of Information and Communications Technology (ICT) and E-commerce on bilateral trade flows. *International Economics and Economic Policy*, *15*(3), 565-586.

Yan, W., & Yang, X. (2019). A New Motivation for Sustainable Trade Between Countries with Different Regulatory Qualities. *Sustainability*, *12*(1), 1-16.

Yunus, M., & Yamagata, T. (2012). The garment industry in Bangladesh. *Dynamics of the Garment Industry in Low-Income Countries: Experience of Asia and Africa (Interim Report). Chousakenkyu Houkokusho, IDE-JETRO*, *6*, 29.

Zhang, Y., Ma, S., Yang, H., Lv, J., & Liu, Y. (2018). A big data driven analytical framework for energy-intensive manufacturing industries. *Journal of Cleaner Production*, *197*, 57-72.

Zubair, M., Farid, M., Danish, M., & Zafar, M. N. (2017). evaluation of air pollution sources in selected zone of textile industries in pakistan. *Environmental Engineering & Management Journal (EEMJ)*, *16*(2).

Zulu, J. J., & Banda, B. M. (2015). The Impact of Labour Productivity on Economic Growth: The Case of Mauritius and South Africa. *Southern African Journal of Policy and Development*, *2*(1), 6.