GREEN INDUSTRIALIZATION OF READYMADE GARMENTS SECTOR IN BANGLADESH

MD. TAIBUR RAHMAN

A DISSERTATION FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

IN AGRICULTURAL EXTENSION AND INFORMATION SYSTEM

DEPARTMENT OF AGRICULTURAL EXTENSION AND INFORMATION SYSTEM

SHER-E- BANGLA AGRICULTURAL UNIVERSITY, DHAKA

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GREEN INDUSTRIALIZATION OF READYMADE GARMENTS SECTOR IN BANGLADESH

By

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Reg. No. 15-06894

A Dissertation

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SEMESTER: JULY- DECEMBER, 2018

Certificate of Approval

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CERTIFICATE

This is to certify that the dissertation entitled **"GREEN INDUSTRIALIZATION OF READYMADE GARMENTS IN BANGLADESH"** submitted to the department of Agricultural Extension and Information System, Sher-e-Bangla Agricultural University, Dhaka in partial fulfilment of the requirements for the degree of DOCTOR OF PHILOSOPHY in Agricultural Extension and Information System, embodies the result of a piece of bona fide research work carried out by **Md. Taibur Rahman, Registration No.15-06894** under my supervision and guidance. No part of the dissertation has been submitted for any other degree or diploma.

I further certify that any help or source of information, as has been availed of during the course of this investigation has been duly acknowledged by the Author.

Dated:
Dhaka, Bangladesh

.....
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DEDICATED

TO

MY BELOVED DAUGHTER

TOWFIQUA BINTEE TAIB

DECLARATION

It is hereby declared that except otherwise stated, this Dissertation is entirely the own work of the present researcher under the guidance and supervision of the Advisory Committee and has not been submitted in any form to any other University for any degree.

The Researcher

December, 2018

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The Researcher

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ACRONYMS

ADB	Asian Development Bank
ASA	Association for Social Advancement
BBS	Bangladesh Bureau of Statistics
BGMEA	Bangladesh Garment Manufacturers and Exporters Association
BKMEA	Bangladesh Knitwear Manufacturers & Exporters Association
BRAC	Bangladesh Rural Advancement Committee
BRDB	Bangladesh Rural Development Board
BRIF	Bangladesh Rural Improvement Foundation
ECNCE	Executive Committee of National Economic Council
EDF	Export Development Fund
ESCAP	Economic and Social Commission for Asia and the Pacific
et. al	All Others
ETP	Effluent Treatment Plant
GB	Grameen Bank
GDP	Gross Domestic Product
GO	Government Organization
GOB	Government of Bangladesh
IEA	International Energy Agency
IFAD	International Fund for Agricultural Development
IMF	International Monetory Fund
K.cal	Kilo Caloric
LCA	Life Cycle Assessment
LEED	Leadership Energy Environmental Design
LIBOR	London Inter Bank Offered Rate
MCE	Environmentally weighted
MDG	Millennium Development Goal
MFE	Material Flow Analysis
NGO	Non Government Organization
NPFP	National Poverty Focal Point
NSC	National Steering Committee
OECD	Organization for Economic Co-operation and Development
PDBF	Palli Daridro Bimochon Foundation
PKSF	Palli Karma Sahayak Foundation
PRSP	Poverty Reduction Strategy Paper
RDRS	Rangpur Dinajpur Rural Service
SCB	State Cooperative Bank
SERI	Sustainability Education Research Institute
TMSS	Thengamara Mohila Sabuj Sangha
UNEP	United Nations Environment Program
UNIDO	United Nations Industrial Development Organization
UNO	United Nations Organization
VO	Village Organization
WB	World Bank
WFP	World Food Programme
WWF	World Wildlife Fund

GREEN INDUSTRIALIZATION OF READYMADE GARMENTS SECTOR IN BANGLADESH

MD. TAIBUR RAHMAN

ABSTRACT

The main purpose of this study was to determine the extent of green industrialization of Ready Made Garment (RMG) in Bangladesh. Two green industries namely, Rami Holdings Limited and Plummy Fashion Limited of Narayanganj District were considered for the study. Data were collected from a sample of randomly selected 263 RMG Workers and Supervisors out of 840 from these two (2) RMGs. Simple and direct questions with different scales were used to obtained information. The study was conducted during the time from 02 June 2019 to 30 August 2019. Eleven (11) selected characteristics of the RMG Workers and Supervisors were considered as the independent variables. Out of 11 top Leadership in Energy and Environmental Design (LEED) certified factories of the world, eight (8) factories are situated in Bangladesh. Findings revealed that overwhelming majority (84.41%) of the RMG Workers and Supervisors perceived low to medium green industrialization of RMGs in Bangladesh. The mean of green industrialization of green and non-green RMGs were 33.22 and 14.89 respectively as perceived by the workers and supervisors. The calculated value of 't' (193.788) was significant at .001 levels which was clearly indicated that green industrialization of green RMGs was higher than non-green RMGs. The items wise green industrialization index revealed that "ensure enough sunlight and solar power utilization to reduce the cost of electricity" ranked first followed by "keeping about 50% free space of total factory premises to ensure enough trees for enough ventilation facilities", "assure factory workers housing facilities". The next twelve important green industrialization items in descending order were "use of high solar reflecting paints in rooftop areas", "use of eco-friendly light in factory", "use of re-cycling bricks", "assure nearby market for shopping", "use of sprinkler for fire incident", "assure schools for workers children", "use of hand gloves during working", "collection of rainwater for factory", "access waste water treatment plant (ETP)", "use of fire alarm for factory", "use of eye guard during sewing" and "use of musk during working". The correlation coefficient was initially computed to determine the relationships among all the variables. Due to misleading results from multi-collinearity, Step-wise multiple regression and path analyses were used to explore the contribution and effect of the selected characteristics of the RMG Workers and Supervisors to/on the green industrialization of RMGs as perceived by them. The analyses indicated that out of 11 variables only 4 variables namely decision making ability, knowledge, cosmopolitness and education had significant contribution and effect to/on the green industrialization of RMGs as perceived by the Workers and Supervisors. The result indicated that the whole model of 11 independent variables explained 63.5 per cent of the total variation in green industrialization of RMG. But since the standardized regression coefficient of 4 variables formed the equation therefore, it might be assumed that whatever contribution was there, it was due to these 4 variables.

CHAPTER I
INTRODUCTION

1.1 General Background

The Green Industry promotes sustainable patterns of production and consumption i.e. patterns that are resource and energy efficient, low-carbon and low waste, non-polluting and safe, and which produce products that are responsibly managed throughout their lifecycle. It covers the greening of industries, under which all industries continuously improve their resource productivity and environmental performance. It also aims to create green industries, that deliver environmental goods and services in an industrial manner, including, for example, waste management and recycling services, renewable energy technologies, and environmental analytical and advisory services.

The greening of industries has become a core determinant of economic competitiveness and sustainable growth of the Sustainable Development Goals (SDGs) oriented activities. Since resource inputs represent an important production cost for industries, improving efficiency gives industries a competitive advantage. The greening of industries also plays vital role in poverty alleviation of the country as well as eco-friendly environment through promoting energy security, occupational health and safety, jobs creation, and reducing costs through increased productivity of the (Ready Made Garment (RMG) sectors of Bangladesh.

Bangladeshi RMG manufacturers have improved the safety standard, which enhanced the buyer's confidence and they are now placing more orders. Another thing is, buyers are concerned about the new minimum wage for the garments workers which will be applicable from December 2018, so they did more order throughout the year. Bangladeshi RMG manufacturers have improved the safety standard, which enhanced the buyer's confidence and they are now placing more orders.

The industry plays a key role in employment generation and reduction of poverty in remote areas. Nearly 4.5 million workers are directly and more than 15 million inhabitants are indirectly associated with the RMG industry. Bangladesh is not only producing lower segment RMG product but also quality product across the world.

According to this need the sector need to think to reorganize the production technique and production process with the line of international standard. Most important the sector is the main source of foreign currencies, so the modernization and up-gradation of the production process needed more attention. Therefore, reduce the energy and water consumption and introducing rain water harvesting system, the costs and risk for environmental hazard surely minimized. The improved working environment would enhance the norms and ethics of the workers leads to productivity improvement. The garments sectors initiate the Cleaner Production Mechanism (CPM) along with the Green Production Mechanism (GPM) with a higher level of productivity will balance the cost of compliance.

The green industry has positive effects on establishing environmental management system, occupational health, workplace safety, efficient use of chemicals, and results in increased productivity and cost savings.

As sustainable practices and eco-friendly operations are emerging as a global aspect in the developed countries, compelled to set up the green factories to cope up with the world standards, ushering in a new era. According to United States Green Building Council (USGBC) certified as “green” a factory must be purely compliant, and all the elements used in the factory have to be tested by the US-based Green Building Concept (GBC). In Bangladesh 67 garment factories have received green certificate award from United States Green Building Council (USGBC). The USGBC is a standard authority to provide green certificate in three categories: Leed Platinum, Leed Gold and Leed Silver. However the sector

expressed satisfaction over export performance and expected that this trend will help RMG to reach USD 50 billion within 2021. The satisfaction over export performance and expected that this trend will help RMG to reach USD 50 billion within 2021**.**

The increment in the emission of greenhouse gasses through industrial processes and the destruction of natural resources has created a major problem in the environment. In the modern era of globalization and with aspirations of achieving a middle-income status, Bangladesh has been striving towards industrial reform. The rapid growth of these industries have provided benefits to the socioeconomic development in the country, have created many employment opportunities, reduced poverty and increased the quality of life (Zohir, 2001).

The scarcity of natural resources and environmental pollution in regards to air and water are one of the major constraints towards sustainable future growth. In Bangladesh, some major concerns are ground water depletion, production processes that use finite resources inefficiently, unavailability of natural gas, lack of waste management and occupational health and safety measures (Ahmed and Islam, 2014). The environmental degradation is allowed to be aggregated, cleaning up or controlling any negative ramifications might end up being unfeasible. Indubitably, for the Bangladesh economic growth, this has become one of the major concerns of the government, policy makers, and environmentalists (BELA, 2017).

Consequently, the competitiveness requires special attention for the long-term sustainability because the competition is increasing remarkably within the industry to industry, sector to sector both at national and international levels.

A growing demand for products that are environmentally friendly and have eco-friendly manufacturing processes has been observed. This reduces cost, improves resource efficiency, reduces any risk and causes greenhouse gas

emissions to be lowered. The stakeholders of different industries are now inclined towards conducting business with the vision of an environmentally friendly industry. For example, foreign buyers of the Ready Made Garments (RMG) industry are not only concerned about the product quality but also about the social, ethical and environmental standards (BKMEA, 2016).

Sustainability and environmental consciousness are a buzzword in today's world where business is no longer confined to the traditional concept of business, for example, the garments sector already consists of a number of factories that are concerned about the environment and are striving towards an industry that is environmentally inclusive. Namely, these factories have been actively participating in the betterment of the environment such as running effluent treatment plants (ETPs), using energy efficient technologies and installing renewable energy technologies and creating the business eco-friendly in general.

1.2 Green Industry

The term of green industry comes from a concept green economy, a pathway towards sustainability that is followed by organizations such as the World Bank and United Nations Environment Programme (UNEP, Barbier, 2012). Strategies, policies, and programs give the rise of a green industry that focuses on the development of production. Green industry has been defined by United Nations Industrial Development Organization (UNIDO) as a pathway of sustainable growth by undertaking green public investments and implementing public policy initiatives that encourage environmentally responsible private investments (UNIDO, 2011). A green industry does not put industrial production above and all at the expense of the natural environment and human health (Hall and Dickson, 2011). A green industry aims to build an industry that intertwines environmental and social consideration with economic considerations of the environmental manners. In a broader sense, a green industry is one that sustainably uses any inputs, where production process requires less use of water, energy, and materials, where solid waste is reused and recycled, any emission of

harmful gases are reduced, and production process is free from harmful human toxins. A green industry takes an approach towards any form of growth by reducing its impact on the environment while taking into account of environmental criteria that may or may not directly relate to the development at hand, but to the ecosystem of the world at large. A green industry can help them to reduce costs, fight climate change, and re-think long-held business practices and open doors to a myriad of opportunities (Fineman and Clarke, 1996).

The Green factory helps at different green factories said a green factory uses 40% less energy, 41% less water and emits 35% less carbon compared to a regular RMG factory.

Green factories provide better working environment and ensures workers' safety, which boosts productivity of the RMG sectors in Bangladesh. Green building construction has been on a rising trajectory for the past decade, ushering in an era of environmental sustainability that is showing a positive indicator of sustainable development in Bangladesh. There are a number of green building rating systems around the world, but the most popular certification system in Bangladesh is granted by the US Green Building Council (USGBC) under the umbrella of Leadership in Energy and Environmental Design (LEED). According to USGBC Bangladesh has 551 registered buildings, of which a total of 64 buildings are LEED certified, as of February 2018. This includes different kinds of buildings and contains a mix of commercial and industrial buildings.

Building a structured green industry will allow us to achieve the global SDGs in 2030 and allow our society to strive to live in harmony with the environment.

1.2.1 Structure of the Green Industry:

The environmental horticulture industry, also known as the Green Industry, is comprised of wholesale nursery, greenhouse, and turf grass sod growers; landscape service firms such as architects, designers/builders, contractors, and maintenance firms, retail firms such as garden centers, home centers and mass merchandisers with lawn and garden departments, and marketing intermediaries such as brokers and horticultural distribution centers. There is also a substantial allied trade industry that supplies various production inputs to the industry. The structure of the Green industry is illustrated in Figure 1.1.

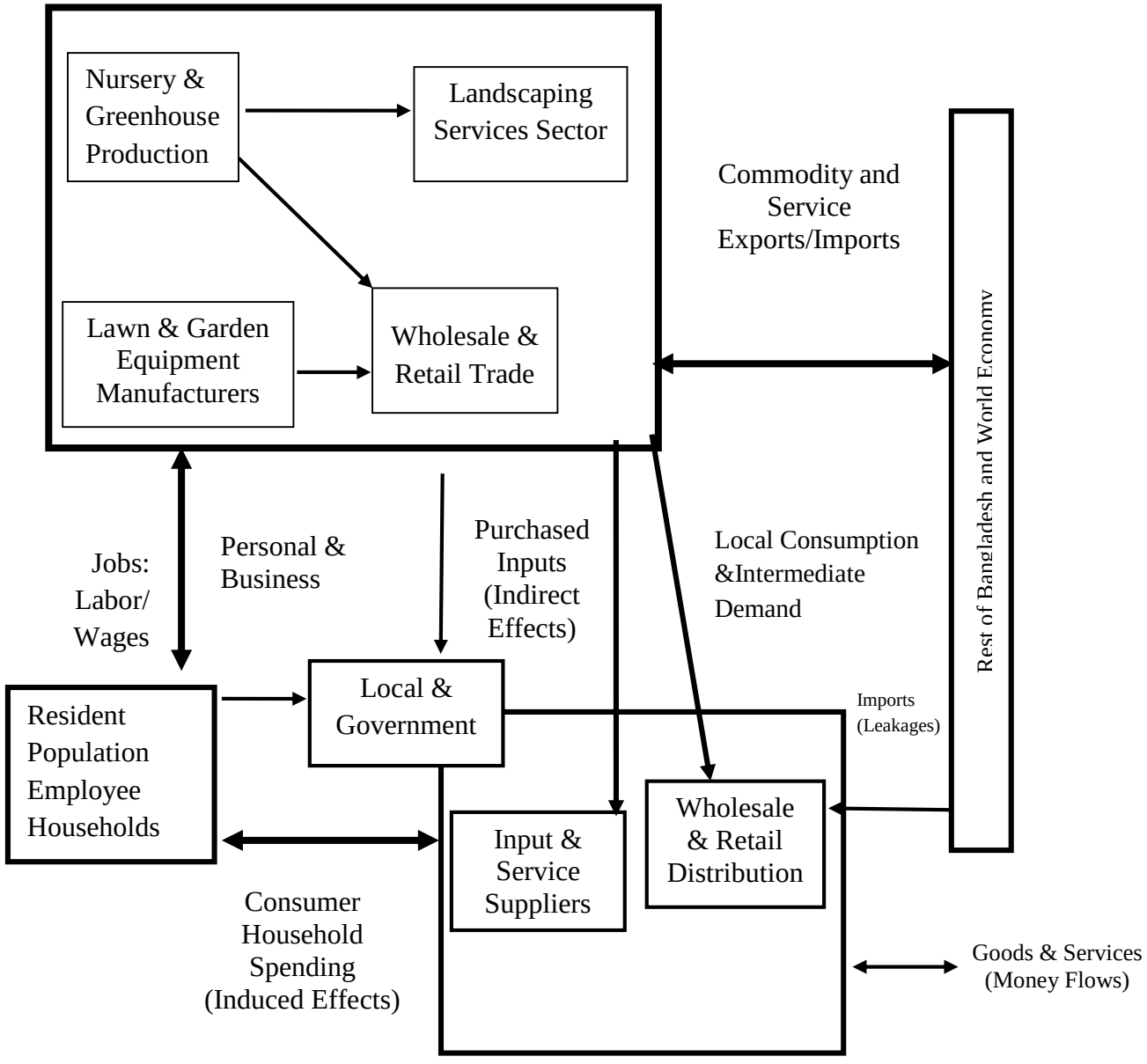


Figure 1.1 Market structure and economic linkages of the Green industry

1.2.2 Why the Greening of Industries

While developing countries need to expand their industries, unsustainable economic growth is resulting in resource depletion and severe environmental degradation. In many countries, production and consumption patterns are outpacing the renewal capacity of natural resources and the capacity of local governments to manage waste products. The greening of industries by governments is a proactive way to decouple environmental pressures from economic growth.

1.2.3 Economic Benefits

The limited supply of energy and other natural resources, there is a sound economic argument that resource productivity and eco efficiency should be at the fore of this new green wave. The reductions in production costs can result in lower prices for consumers. Some of the economic arguments behind resource efficiency as a means of transforming and stimulating the economy are highlighted by the Natural Edge Project (Weizacker et al., 2009). First, investments in resource productivity, such as building energy efficiency have a higher economic multiplier than general expenditure. This is because in addition to improving productivity, resource efficiency investments provide a tangible financial return on investment. Second, investments in improving resource efficiency and recycling reduce the demand for energy, water and virgin resources, thus reducing the need to invest billions on new energy and water supply infrastructure and new extractive industries. The lower investment requirements since it has been estimated that every US$ 1 invested on the demand-side management of electricity can save more than US$ 2 of investment in the power sector – or almost US$ 3 in developing countries (ESCAP, 2008).

1.2.4 Alleviating poverty through green industrialization of RMG

The greening of industry has an important role to play in poverty alleviation. First, greater efficiency in resource use over the life cycle of goods and services results in improved productivity and consequently, reduced costs. Growth in

consumer demand for sustainable products can provide sustainable producers in developing countries with access to new markets (e.g. environmental goods and services), job opportunities, and price premiums for their products – all of which can facilitate the transition towards a green economy. Moreover, the greening of industry can provide development opportunities in instances where labour intensity (and associated employment) replaces a high dependency on inputs or energy-intensive mechanized processes. Environmental sustainability initiatives can also be part of a wider shift towards socially and economically responsible production and consumption, which can further strengthen poverty alleviation benefits (UNEP, 2009).The greening of industries is a means of promoting energy security in developing countries without access to ample, reliable and affordable energy, economies cannot develop. The IEA's outlook to 2030 of global energy supply and demand trends estimates that 1.6 billion people (one quarter of the world population) have no access to electricity and that in the absence of vigorous new policies, 1 billion people will continue to lack electricity in 2030. Currently, four out of five of these people live in rural areas of the developing world, mainly in south Asia and sub-saharan Africa (Mandil, 2003).The greening industries can improve health conditions in developing countries through access to clean water (resulting from water supply infrastructures and protection programmes), clean energy (from decentralized renewable energy programmes), and improved nutrition from sustainable agricultural practices.

1.3 Rationale of the study

This proposed study will focus on the Green Industrialization RMG sector of Bangladesh. The proposed study will explain three pillars for the sustainable development industries such as 1.Environmental aspect, 2. Social aspect and 3. Economic aspect. Its increase the productivity improvement, worker health, environment and quality of life and touch upon efforts towards green industry development. Bangladesh is considered as a one of the poor work place environment providing countries across the world which has a negative impact

on the health and productivity of the worker. So improvement of workplace environment through green industry development is the major priorities of this study. Along with that, the initiative for the green industry development will reduce the use of natural resources, also ensure the recycle and reuse policy which will have a positive impact on the environmental sustainability.

1.4 Statement of the Problems

Bangladesh is a poverty stricken country with a big population whiles the limited resources. Bangladesh has been suffering from slow pace of development. In this situation, to accelerate the pace of development comprehensive participation of entrepreneur of green industry development is required in every sphere of development process. The government of Bangladesh is trying to make efforts towards green industry of RMG sectors of Bangladesh formation of policies aimed at bringing about significant socio-economic improvements and eco-friendly environment to the people and ultimately self-reliance for the nation by incorporating the women participation in the main stream of development process. But only government efforts are not adequate for achieving the goal.

The purpose of the present study was to evaluate the Impact of green industrialization of RMG in Bangladesh as perceived by the workers. The study aims to find out the answer to the following questions

i) What was the status of green industrialization of RMGs in Bangladesh according to the international standard for green industrial development?
ii) What were the extents of impact of green industrialization of RMG in Bangladesh?
iii) What was the difference of green industrialization between green and non-green garments?
iv) What were the items wise comparative statuses on green industrialization of RMG?
v) What was the characteristic of the workers and supervisors of RMG?

vi) What were the contributions and effect of the selected characteristics of the RMG workers and supervisors to/ on the green industrialization of RMG as perceived by them?

In order to satisfy the above queries, a research study entitled "green industrialization on RMG sector in Bangladesh as perceived by the workers and supervisors" was undertaken.

1.5. Objectives of the Study

The overall objective of study was to find out the green industrialization of Ready Made Garment in Bangladesh.

However, the specific objectives were as follows;

1. To assess the status of green industrialization of Ready Made Garments (RMGs) in Bangladesh according to the international standard for green industry development;

2. To determine the extent of green industrialization of the RMG in Bangladesh as perceived by the workers and supervisors;

3. To compare the green industrialization between green and non-green garments;

4. To compare the items wise green industrialization of the readymade garments in Bangladesh;

5. To determine and describe the following selected characteristics of the RMG workers and supervisors:
   i. Age
   ii. Education
   iii. Family size

iv. Yearly salary
v. Yearly savings
vi. Training exposure
vii. Cosmopoliteness
viii. Decision making ability
ix. Service length
x. Knowledge on green industrialization
xi. Problem faced in garments

6. To explore the contribution and effect of the selected characteristics of the workers and supervisors of the RMG of Bangladesh to/on the green industrialization of RMGs as perceived by them.

1.6 Justification of the Study

Increased productivity, income, food consumption and participation of the beneficiaries in socio-economic development activities are some of the major prerequisites for the overall economic development of Bangladesh. Most of the RMG entrepreneurs are believed to working to meet-up the above pre-requirements as the prerequisite for socio-economic development since the independence of Bangladesh. The RMG entrepreneurs were welcomed in Bangladesh to improve the socio-economic conditions of the poorest section of the population. The workers of RMG are expected to uplift their personal, social and economic dimensions by increasing their access and control over resources. In order to improve this position, a large number of i.e. more than 5400 Ready Made Garments factories of Bangladesh which are green and non-green complaints and non-complaints are now operating in the country. The green industry has extended activities where people especially improving working conditions, occupational health and safety use solar energy water and re use of water as well as transport facilitation of RMG employee. For undertaking any meaningful socio-economic development programme, if targeted to involve poor section of rural people in development related activities, it needs to know the

specific problems issues. The issues on socio-economic development and eco-friendly environment need more attention and thus it deserves a specific investigation. It is necessary to conduct study regarding to the performance of different factories on green industry development of Bangladesh. Considering the time and resource constraints among the green industrialization of Bangladesh. The green industry was selected for this piece of research. The findings of the study are expected to be of great value to the researchers, extension service providers, students and particularly planners in formulating and designing extension strategies for involvement of green industrialization activities.

The findings of the study will in particular be applicable to Narayanganj District of Bangladesh. However, the findings may also be applicable to other areas of Bangladesh where physical, socio-economic, cultural and geographical conditions do not differ much from those of the study area. Lastly, the researcher believes that the study will enhance the intellectual competence of the researcher and to contribute significantly to the development on green industrialization of RMG sector which improved Eco friendly environment at the national level.

1.7 Assumptions of the Study

An assumption is the supposition that an apparent fact or principle is true in the light of the available evidence (Carter, 1945). The researcher had the following assumptions in mind while undertaking this study:

1. The respondents of RMG workers and supervisors were capable of furnishing proper responses to the questions contained in the interview schedule.
2. The responses furnished by the respondents were valid and reliable.
3. Information furnished by the respondents included in the sample were the representative of the whole population of the study.

4. The researcher who personally collected data well-adjusted himself to the social environment of the study area. Hence the data collected from the respondents were free from interviewer bias.
5. The findings of the study are expected to be useful for planning and execution of various programmes in connection with the RMG factory activities of the country especially green industrialization on climate change programmes to be implemented by the factories owners.
6. The selected characteristics of the factories and green industrialization activities study were normally and independently distributed with their respective means and standard deviation.

1.8 Limitations of the Study

Considering time, money and other resources available to the researcher, the following limitations were taken into consideration:

1. The study was confined in Narayanganj district of Bangladesh.
2. There were many garments in the study area, but only two green readymade garments (Remi holdings ltd and Plummy Fashion ltd) were considered for this study one non green readymade garment was consider for the comparison.
3. Characteristics of the RMG workers and supervisors are many and varied. But only 11 (Eleven) characteristics were selected for this study.
4. For information about the study, the researcher had to depend on data as furnished by the selected RMG workers and supervisors during data collection.
5. Some initial difficulties were faced in interviewing with the RMG factory owner's supervisors due to confidential questions. However, this problem was subsequently overcome, by creating proper rapport by the researcher.
6. Data were collected from the RMG workers and supervisors, not from the top level managers and administrators.

1.9 Definition of Terms

Age: Age of a rural woman was defined as the period of time in years from her birth to the time of interview.

Education: Education is defined as the ability of an individual to read and write or formal education received upto a certain standard.

Family size: Family size is defined as the total number of members including husband, children and other dependent members in the family of a respondent.

Yearly salary: Yearly salary refers to the workers sum of monthly salary, overtime, part-time and other sources of income in an annum.

Yearly savings: Yearly savings refers to the workers sum saving in NGO, bank, cash in hand and other in the year round.

Training Exposure: The training experience refers to the workers attend the training activities in the year round.

Cosmopolitness: The Cosmopolitnes**s** refers to the workers place visit in the year round.

Decision Making Ability: The decision making ability refers to the workers how much contribution of intendant activities.

Service Length: The service length refers to the workers how many years he/ she worked.

Worker: worker refers to the man/ women who act in the RMG, aged between 18 to 60 years and engaged with the RMG activities.

Knowledge on green industrialization: Its refers the facts or ideas acquired by garments workers and supervisors through investigation, observations or experiences.

Problem faced in garments: It refers to the different problems faced by the RMG workers and supervisors at the time of operating different activities related in the garments.

Green Industry: Industry which commits to environmentally-friendly entrepreneurship by focusing on development and continuous improvement in production process and environmental management.

According to United Nations Industrial Development Organization (UNIDO), a green industry is defined as "a pathway of sustainable growth by undertaking green public investments and implementing public policy initiatives that encourage environmentally responsible private investments". This concept stems from the concept of a green economy, and is widely followed by organizations such as the World Bank and United Nations Environment Programme (UNEP).

Green Commitment: Commitment demonstrated by policy, goals and action plans to reduce environmental impacts, and assuring effective organizational internal communication.

Green Activity: Activities in compliance with policy, goals and plans which have been set to reduce concretely environmental impacts as commitment states.

Green System: Systematic environmental management including follow-up, assessment and revision aimed to continuous development as well as receiving a widely-recognized award on environment and accreditations of various types of environments.

Green Culture: Cooperation of employees in all level organization to implement friendly environment in all aspects of business operation until it becomes a part of organization culture.

Green Network: Demonstration of network extension throughout green demand chains by supporting business partners and allies entering into accredited green industry process.

Environmental Culture: Environmental awareness creation, attitude to people in the organization, collective behavior sharing, value building, environmental operations and promoting understanding to people inside the organization and concerned people. Practice guidelines setting to enhance awareness in order to sustain environment which will become an organization culture. Measurement setting for evaluating the organizational culture on environmental aspects which will be beneficial for continuous improvement.

Green Economy: Economy system which will improve quality of life and decrease inequality in a long term. The next generation of people will not face natural resource degradation and environmental problems

CHAPTER II
REVIEW OF LITERATURE

Review of literatures relevant with the objectives of this study is presented in this Chapter. Literatures and research works in line with the present study were searched from the relevant libraries, research institutes and websites (internet). But no study could be located to be specially undertaken in a systemic way in this direction. Therefore, an attempt has been made in the present chapter to review some interlinked literature in this aspect from home to abroad.

The literatures of available studies have been briefly discussed in this Chapter under four sections. The first section deals with the concept of green industrialization matters. The second section deals with research gap. The conceptual framework has been discussed in the third section.

2.1 Concept of Green Industrialization of RMG Sector and related matters

Chen et al. (2017) showed that a green industry can make big improvements in a country's socio-economic development and provides a favorable condition for a sustainable industrial development. This study assessed the current green industry conditions in China and the results show that about 8% contribution was done to the socio-economic conditions by a green industry. The number is quite small and even big though improvements are being done; there is a substantial scope for improvement. This paper states that about 45% of the industry has been adopted with green technology followed by service industry 65%, agriculture industry 55%, manufacturing industry 24%. This study also revealed that green industry growth is associated with the national economic development of China, as it increased the annual growth rate of exported green product. This study also revealed that if there was a 1% increase in green product exports, an increased in 0.04% gross domestic product in China.

Hashim et al. (2015) reported that economic profit is not something that should be an issue when it comes to implementation of a green industry as the future yields are substantial in terms of profit, enhanced environmental performance and in general human wellbeing.

Hoque and Clarke in (2013) showed that realizing the potential pollution prevention initiatives in Bangladesh reduces environmental degradation, and in turn, saves cost (Hoque and Clarke, 2013).

Ullah (2013) reported that Bangladesh Bank is already underway facilitating green industries and argues that a better future can be made by changing our mindset about environmental issues in a preventive manner.

Jia et al. (2017) discussed that sustainable development should be ensured through the resource-constrained process of industry. For this purpose, natural resources including water, minerals, fossil fuel, and environmental resources usage should be reduced, thus, environmentally sound product usage and reducing the consumption of resources help towards ensuring long run sustainability.

Ali et al. (2016) investigated the understandings and green initiatives in the construction industry in Kota Kinabalu, Malaysia. Their findings included economic development activities which were fostered with the aid of using green technology. It should also be noted that a focus on green technology solely is not sufficient for a sustainable development. To incur effective change and raising awareness, proper education and broad trainings are also required. This will move towards a more sustainable development.

Ito (2016) investigates the association between CO_2 emissions, renewable and non-renewable energy consumption, and economic development of 31 developed countries. They found that energy consumption policy has a negative

impact on the economic growth but renewable energy uses has significantly reduced the carbon emission of those countries.

Ge and Zhi (2016) demonstrated that there is a complex relationship between the green economy and employment generation in both developed and developing countries. They found that green economy, in general, has a positive effect on employment generation in both developed and developing countries, but it should be noted that it has negative effects on employment generation in Spain.

Hashim et al. (2014) discussed that by green practicing, environmental harmful effects can be reduced and energy saving would be ensured. The authors developed an assignment tool named Green Industrial Performance Scorecard (GIPS) to understand the performance of a green industry. Five essential components namely, energy, water, waste, soil management and air are included in their assignment tool.

Deng and Liu (2011) reported that seven components as green raw material, green exploitation, green store, green transportation, green sale, green consumption, green return, green recycling and green disposal a green supply chain for the oil industry in China.

Negulescu and Doval (2014) reported that the managers‟ position against risk, uncertainty and efficiency within the green industry. The authors found that majority of the companies have implemented and in progressed in environmental standard. Their study also reveals that there are strong correlation between environmental protection investment and company’s risk management efficiency.

Hijioka et al. (2016) showed that to the Inter-Governmental Panel on Climate Change (IPCC) in 2014, Bangladesh has been categorized as a high-risk country from climate change due to erratic climate events, which will, in turn, threaten

the country food and livelihood security Adopting green principles are a definite way to start mitigation methods and ensure that no further damage has been done to the climate.

Zohir (2001) reported that in the modern era of globalization and with aspirations of achieving a middle-income status, Bangladesh has been striving towards industrial reform. The rapid growth of these industries have provided benefits to the socioeconomic development in the country, have created many employment opportunities, reduced poverty and increased the quality of life.

Ahmed and Islam (2014) studied that the scarcity of natural resources and environmental pollution in regards to air and water are one of the major constraints towards sustainable future growth. In Bangladesh, some major concerns are ground water depletion, production processes that use finite resources inefficiently, unavailability of natural gas, lack of waste management and occupational health and safety measures.

BELA (2017) reported that environmental degradation is allowed to be aggregated, cleaning up or controlling any negative ramifications might end up being unfeasible. Indubitably, for the Bangladesh economic growth, this has become one of the major concerns of the government, policy makers, and environmentalists.

The US Environmental Protection Agency (2017) reported that Sustainability is based on a simple principle, ‘Everything that we need for our survival and well-being depends, either directly or indirectly, on our natural environment. Sustainability creates and maintains the conditions under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic and other requirements of present and future generations. Sustainability is important to making sure that we have and will continue to have, the water, materials, and resources to protect human health and our

environment'. (Sustainability basic information http://www.epa.gov/sustainability/basicinfo.htm) Sustainable construction or Green Building emerged to find solutions that limit the impacts of the built environment. The built environment is the human made surroundings including buildings and transportation systems that form neighborhoods that form the urban system. Commercial construction in the United States accounts for 14% of potable water consumption, 30% of waste output, 38% of carbon dioxide (CO_2) emissions, 40% of raw material use, 24% - 50% of energy use, 72% of electricity consumption.

BKMEA (2016) reported that the competitiveness requires special attention for the long-term sustainability because the competition is increasing remarkably within the industry to industry, sector to sector both at national and international levels. There is a rising awareness that current resource (and pollution) intensive business models cannot long continue, creating a negative social and environmental impacts that also creates business risks. The competitiveness of Bangladesh industries is also largely determined by the nature of the resources that are being used and value chain relative to its competitors. To maintain a competitive edge, many factories are adopting green principles.

Barbier (2012) mentioned that the term "green industry" comes from a concept green economy, a pathway towards sustainability that is followed by organizations such as the World Bank and United Nations Environment Programme (UNEP).

UNIDO (2011) reported that strategies, policies, and programs give the rise of a green industry that focuses on the development of production. Green industry has been defined by United Nations Industrial Development Organization (UNIDO) as "A pathway of sustainable growth by undertaking green public investments and implementing public policy initiatives that encourage environmentally responsible private investments."

Hall and Dickson (2011) reported that the green industry is one which is environmentally friendly in all aspects. This industry is not harmful to the environment as traditional industries. A green industry does not put industrial production above and all at the expense of the natural environment and human health.

Fieman and Clarke (1996) reported that the green industry is one that sustainably uses any inputs, where production process requires less use of water, energy, and materials, where solid waste is reused and recycled, any emission of harmful gases are reduced, and production process is free from harmful human toxins. A green industry takes an approach towards any form of growth by reducing its impact on the environment while taking into account of environmental criteria that may or may not directly relate to the development at hand, but to the ecosystem of the world at large. A green industry can help them to reduce costs, fight climate change, re-think long-held business practices and open doors to a myriad of opportunities.

According to UNIDO (2011), two main approaches towards creating such industry are by retrofitting new technologies or starting from scratch. For example, greening an industry relates to an industry or a facility that has already been erected and is functional.

UNEP (2011a) reported that the level of carbon dioxide (CO_2) emissions, which are driven by the combustion of fossil fuels, is one of the most common indicators of such fact and one of the main causes of global warming, which threatens the life on Earth as we know it. Indeed, the concentration of this toxic greenhouse gas in the atmosphere has dramatically increased and currently reached 401.30 ppm in June 2014. This implies a yearly growth rate of 1 % since 1958 (CO2 Now, 2014).

UNEP (2011a) reported that the current CO_2 emissions level is well above the upper safety limit estimated at 350 ppm, which was already reached in 1988. This phenomenon known as the ecological crisis does not occur in isolation. In addition, the world is suffering from the consequences of the financial and economic crisis that started after the bailout of Lehman Brothers in 2008; the so-called Great Recession, which is characterized by high unemployment levels, the credit crunch and falls in Gross Domestic Product (GDP) levels.

UNEP (2011a) reported that perceive the Green Economy as a solution to them. This ambitious strategy of international recognition has been adopted by many developed countries and has recently started to be implemented in developing countries. Its main purpose is to manage an energetic transition with a focus on renewable energies, to create jobs and to eradicate poverty.

LEED (2009) study that Employ an environmentally sensitive, low-impact building exterior and hardscape management plan that helps preserve surrounding ecological integrity. The plan must employ best management practices that significantly reduce harmful chemical use, energy waste, water waste, air pollution, solid waste and/or chemical runoff (e.g., gasoline, oil, antifreeze, salts) compared with standard practices. The plan must address all of the following operational elements that occur on the building and ground.

LEED (2009) study that Improving and/or maintaining off-site areas with native or adapted plants can contribute toward earning this credit provided the improvement and maintenance are documented in a contract with the owner of the off-site area. Every 2 square feet (0.2 square meters) off-site can be counted as 1 square foot (0.1 square meters) on-site.

UNEP (2011) reported that the Green Economy “In its simplest expression, a green economy is low-carbon, resource efficient, and socially inclusive. In a

green economy, growth in income and employment are driven by public and private investments that reduce carbon emissions and pollution.

Morgera and Savaresi (2013) reported that enhance energy and resource efficiency, and prevent the loss of biodiversity and ecosystem services. The aforementioned definition of what constitutes a Green Economy reveals its challenges, namely to sustain economic growth levels and prevent the environment from further harm. This definition also makes reference to the concept of decoupling that will be developed later. One can also perceive from this definition that the main claim of the Green Economy is the possibility of a win-win situation (Wissen, 2014). Even though the Green Economy has made its way onto political agendas and growth strategies in both national and international organizations as well as right-wing and left-wing discourses (Wissen, 2014), 1 there is a need to properly define and unfold the underlying assumptions relating to its implementation.

UNEP (2012a) reported that the participants of the UNEP Conference on Sustainable Development in 2012 which took place in Rio de Janeiro from the 20th to the 22nd of June made clear their commitment in supporting the transition to a Green Economy as a way to attain sustainable development and poverty eradication.

UNEP (2011a) reported that the preconditions that should enable the transition to a Green Economy include national policies, market regulations via incentives, subsidies and taxation and the creation of an international market and legal infrastructure.

Jorgenson et al. (2009 p. 263) reported that the ecologically unequal exchange theory posits that the vertical flow of exports is a structural mechanism allowing for more-developed countries to partially externalize their consumption-based environmental impacts to lesser-developed countries. It is argued that these

structural relationships contribute to environmental degradation in the latter while directly suppressing resource consumption opportunities for domestic populations; often well below globally sustainable thresholds.

Jorgenson et al. (2009) showed that ecologically unequal exchange theory has much of its influences in the theories of the classical trade dependence, unequal exchange and world-system.

BGMEA (2018) has formulated its own code of conduct for the industry, in collaboration with the major trade unions, and has set up a compliance unit that monitors labor conditions in its members' factories in 2006; the Government passed a new labor code, after 12 years of deliberation and activism. It applies to all workers, and the new sections relevant to the garment industry include written contracts and identity cards, timely payment of wages, revised minimum wage, paid maternity leave and explicit laws against sexual harassment.

Haider (2007) reported that the export-quota system and the availability of cheap labor are the two main reasons behind the success of the industry but unfortunately in many RMG factories the labors are often seen being deprived of their rights.

Arghi (2009) showed that Coordinator of the Bangladesh Garment Workers Unity Council (BGWUC), “The garment workers of Bangladesh may be the most deprived labor force in the world. Most are paid between US$14 and US$16 per month, the lowest salary in the world.” He also added “Only a few factories here maintain international standards, and many of them do not implement any worker health and safety measures.”

The Financial Express (2008) referred to a recent study conducted by a local think tank that has revealed that investors in the RMG sector have more than doubled their earnings in the past seven years. Despite this increase, however, it

is a remorse that many owners are not paying their laborers regularly and all sorts of extraneous arguments are put forward for non-payment of their salaries.

New Age (2009) reported that the majority of garment factories do not yet comply with many wage and workplace standards specified in the tripartite agreement of 2006.

International Labor Organization (2010) buyers make sourcing decisions based on four factors: price, quality, how long it takes to get produce to the marketplace and social compliance, including compliance with labor standards. In order to export readymade garments, it is not only the quality parameters that are important towards acceptance of the product as per the intended end use, but also the working environment, in which the garments are to be produced, is equally important so that sweatshop concept is totally taken care of and the code of conduct must be stretched towards achieving the objectives of social compliance issues.

Haider (2007) research showed that when companies that dealt with foreign buyers adhered to codes of conduct, conditions improved for the workers in the factories stated by (Mahmud) in one of her articles. In some large factories, health and safety standards improved and other benefits were introduced such as timely payment of salaries, proper overtime rates and maternity leave. The study stated that the social dimensions of the RMG industry are getting more attention from consumers, social workers, welfare organizations and brand name international buyers. International buyers are very particular about compliance with codes of conduct. Currently, many international buyers demand compliance with their "code of conduct" before placing any garment import order. The factory working environment is not very satisfactory. So in order to sustain in the industry, Bangladesh needs to improve the factory working environment and various social issues related to the RMG industry. Informal recruitment, low literacy level, wage discrimination, irregular payment and short

contracts of service are very common practices in the RMG factories in Bangladesh.

Hall et al. (2005) studied that when compared to the previous economic impact study conducted in the year 2002, the Mississippi green industry generated an expanded level of economic activities and significantly shifted from trade and services to production and manufacturing. The total output impacts created by the Mississippi green industry in 2002 totaled $0.977 billion. With a state gross domestic product of $69.527 billion in 2002 (U.S. Bureau of Economic Analysis, 2012), the Mississippi green industry complex contributed about 1.405% of the state economy. The total employment impacts of the Mississippi green industry increased from 14,236 jobs in 2002 to 15,197 jobs in 2007. There were significant shifts in the employment impacts from trade and services in 2002 toward production and manufacturing in 2007. The production and manufacturing employment impacts increased from 1,789 jobs in 2002 to 5,058 jobs in 2007.

Posadas et al. (2008) reported that the Mississippi nursery and greenhouse operations who participated in a mechanization survey, the number of workers employed by Mississippi nursery and greenhouse operations ranged from 1-28 permanent workers and from 1-33 part-time workers per operation (Posadas, et al., 2010a; 2010b). The employment of an extra full-time worker, on the average, raised total workers' earnings by $18,651 per year, while each added acre placed under production raised total workers' earnings, on average, by $812 per year. The hiring of an additional full-time worker, on the average, would raise total revenues by $69,252 per year, while each additional acre placed under production would raise total revenues, on average, by $959 per year.

Hodges et al. (2011) reported that landmark study of economic contributions of the Green industry for the entire U.S., using primary and secondary data together with regional economic models, estimated total impacts at $175 billion in output

or revenues, 1.95 million full-time and part-time jobs, $107 billion in value added, and $53 billion in labor earnings.

Hardy et al, 2000; Behe et al. (2005) observed that the project sponsored by HRI evaluated the effect of landscaping on home values, in terms of landscape design and plant sizes, in a survey conducted in eight states. Market location and design sophistication were found to be the most important attributes, and a well-designed landscape increased perceived home value by 12% over the base price of the home.

Hall et al. (2010) reported that the members of the committee have combined the latest methodologies with technology advances in eye tracking to portrait a better picture of consumer preferences for green industry products. Recent work has looked at consumers' willingness to pay for biodegradable containers.

Moore (2003) showed that labor management in the Green industry has focused on management of the immigrant labor force and coping with labor regulations, employee empowerment and meeting the needs of Hispanic workers.

UNIDO (2010) observed that the developing countries, the response to the problems outlined lies in enabling output to continue to grow while minimizing growth in inputs of materials and energy, for example, by adopting "three Rs" strategies; reducing consumption of raw materials in production processes; switching to renewable sources of energy and materials; and redesigning products to contain fewer materials and consume less energy, water, etc. during use. Governments can play an important role in supporting awareness-raising, capacity building, and the creation of industry-support institutions and of accreditation and certification bodies.

UNIDO (2010) also reported that the outcome of the International Conference on Green Industry in Asia, organized by UNIDO, together with the Government of

the Philippines, ILO, UNEP and UNESCAP in Manila, in September 2009, is described. The Manila Declaration and Framework for Action adopted by the Conference outlines steps to reduce the resource-intensity and carbon emissions of Asian industries and provides a mechanism for periodically assessing progress in implementing the Framework. UNIDO is proposing to undertake a series of activities to assist Asian countries wishing to implement it. These include the preparation of green industry policy guidelines, the preparation of country status reports on eco-efficiency, and other follow-up activities. In addition, green-industry pilot programmes will be initiated, both in Asia and in other regions. These will refer to low-carbon, low-water and low-materials pathways; reduction in the environmental footprint of a value chain; and designing the factory of the future.

UNIDO (2018) reported that the Climate change is the most prominent example of such threats. It is so dramatic because it has truly worldwide impacts and because it will require us to make fundamental changes to our economies, transforming them from the high-carbon economies they have been for the last two centuries – completely dependent on fossil fuels – into low-carbon economies. But there are other signs that the world's absorption capacity is being stretched to breaking point and that changes in our production and consumption patterns are required. Depletion of the ozone layer is one such example, and recognition of the problem more than 20 years ago finally brought the international community, through the Vienna Convention for the Protection of the Ozone Layer and its Montreal Protocol, to adopt mechanisms to phase out chlorofluorocarbons and other ozone-depleting substances.

UNIDO (2010) found that a fundamental first step is to foster awareness among Member States of the advantages that can accrue to them by promoting green industries in their countries. UNIDO has already initiated this process of awareness-building by holding, together with the Government of the Philippines,

the International Conference on Green Industry in Asia, in Manila, in September 2009.

UNIDO (2010) reported that the primarily focus on identifying and implementing low-carbon pathways to industrial development. It will focus also on the interlink ages between the different environmental dimensions, e.g., carbon, water, materials, etc. In the context of the current round of negotiations leading to the post-Kyoto regime, this choice will give the whole exercise greater resonance. This choice might also allow UNIDO to make connections with the work it will be doing in the coming years as co-conveyor for the UN system on technology transfer for climate change, as well as with some of the clusters that are being developed in UN-Energy.

GAWU (2012) study report showed that in the last twenty (20) years, the issue of global warming has entered the international political agenda. The UN Conference on Environment and Development in Rio de Janeiro in 1992 was a milestone. This led to the adoption of "The United Nations Framework Convention on Climate Change" (UNFCCC), which came into force in 1994. The Convention has been ratified by one hundred and ninety-four (194) states, including those responsible for the largest amount of GHG emissions globally: the United States, Russia, the European Union, China and India. Primarily, the UNFCCC's goal is to ensure that the atmospheric concentration of GHGs is at a level that stabilizes the global climate. Internationally, it is agreed that dangerous climate change is preventable by keeping the global temperature rise within a 2°C limit. Global warming will manifest in varying temperature changes from region to region. For instance, in Africa desertification will rapidly spread. In order to stabilize the global temperature by 2050, global GHG emissions must be reduced by at least eighty percent (80%) in comparison to 1990. This requires an international agreement within the UNFCCC framework, including legally binding emissions reduction targets for all countries.

GAWU (2012) study report showed the Kyoto Protocol, which was adopted at the international climate conference in 1997, and enforced in 2005, established targets and implementation instruments for global climate protection that are binding under international law. In the first commitment period 2008 to 2012, it prescribes an annual reduction of GHG emissions averaging five point two percent (5.2%) in advanced industrialized nations in comparison to 1990. The Kyoto Protocol represents a decisive step towards realizing international responsibility in combating climate change, despite the fact that one of the nations with the highest per capita emission of GHG, the United States, refuses to ratify it.

GAWU (2012) observed that the present international political strategy is to stabilize CO_2 emissions and thus limit global climate change: Future temperature increase will depend on the point at which stocks of CO_2 emission stabilize from now on. As previously mentioned, current estimates, state that a worldwide increase of a maximum of 2°C must be ensured. However, it remains unclear how much time is left to avoid reaching this threshold marker and thereby life endangering climate change. The relationship between a stabilization point and temperature change is uncertain: CO_2 once emitted into the atmosphere remains trapped there and it cannot be estimated when the effects will materialize3. The long-term negative effects of global warming are a reality. Over the last 30-40 years, observations show that Africa is getting warmer: Prognoses predict an overall 2.9°C increase in temperature in sub-Saharan Africa by 2060. Fact is that this region is already extremely vulnerable to food insecurity due to climate variability, which contributes substantially to development problems as key development sectors, i.e. health, agriculture, water, energy and transport are particularly sensitive areas. Examples of far-reaching consequences in Southern and Northern Africa are for instance prognosis that predict a 50 percent decrease in rain-fed agriculture by 2020, number of people suffering from water stress will rise from 15 to 250 million people.

Chung et al (1997) provides a detailed methodological aspect of the ML index. Using the linear programming technique, they measure the green productivity growth index and its decomposed factors for the Swedish paper and pulp mills during the period of 1986–1990. They emphasize that the ML index does not require any information on input and output prices, which is regarded as the main virtue of using the ML index. Also, they compared the traditional Malmquist index and the ML index. Piot-Lepetitand Le Moing (2007) measure the change in green productivity of the French pig sector to examine the relationship between environmental regulations and green productivity between 1996 and 2001.

He et al. (2013) measured energy efficiency and the changes in green productivity of China's iron and steel industry from 2001 to 2008. Empirical results indicate that the average energy efficiency was 61.1% for the period of 2001–2008. Technical change was the main contributor to the productivity growth during this period. They also argue that the productivity growth of China's iron and steel industry is highly likely to be underestimated if the effect of undesirable outputs is ignored.

Chung and Heshmati (2015) measured productivity growth at the industry level and decomposed the green productivity index to obtain in-depth information on the green growth. They used 14 Korean industrial sectorial data from 1981 to 2010 for this purpose.

Emrouznejad and Yang (2016) provide a framework for measuring eco-efficiency with CO_2 emissions in Chinese manufacturing industries. They found that the environmental regulation pushes the technological frontier in the direction of more desirable outputs and less undesirable outputs. This implies that the regulation helps to mitigate CO_2 emissions and sustain the economic growth, and it leads to technological progress.

2.2 Research Gap

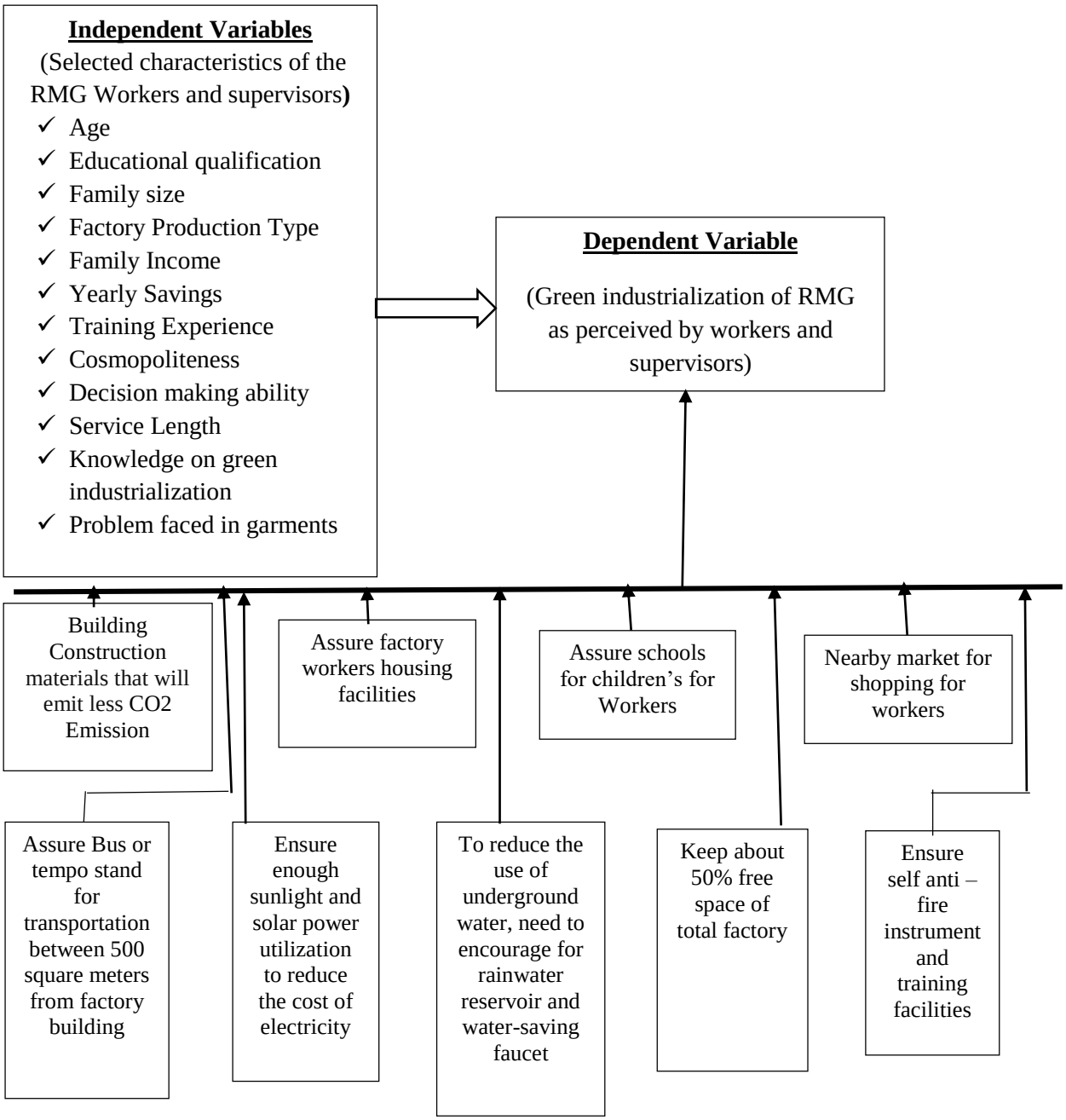
In the first section of this chapter literature were found on the concept of green industrialization and some related matters. But no literature was found: i) to assess the status of green industrialization in Bangladesh of RMG sector, ii) extent of green industrialization in RMG sector of Bangladesh as perceived by the workers and supervisors, iii) compare between green and non-green garments regarding green industrialization and vi) contribution of the selected characteristics of the RMG workers and supervisors to the extent of green industrialization in RMG sector. On these consideration, the researcher of the present study felt necessity to conduct the piece of research.

2.3 The Conceptual Framework of the Study

The conceptual framework for this study aims to guide the analysis process and the interpretation of results. Closely linked to the conceptual framework that was chosen for the purposes of this study. Science the birth of this fertile land poverty has been a common problem. Poverty is a chronic and complex problem for Bangladesh and women are severely affected by it due to lack of access to resources, income generating activities, decision-making process and political participation. At present the government has taken various steps for the green industry established in RMG sectors of Bangladesh.

The conceptual framework of Rosenberg and Hovland (1960) was kept in mind while framing the structural arrangement for the dependent and independent variables. This study concerned with the dependent variable “green industrialization of RMG sector of Bangladesh”. The selected characteristics viz. age, education , family size, yearly salary, yearly savings, training exposure, cosmopoliteness, decision making ability, service length, knowledge on green industrialization and pro in garments were considered as the independent variables. It was assumed that these independent variables might have contribution to the green industrialization in the RMG sector of Bangladesh.

Keeping these facts in the mind following concept framework was developed for the study as shown in the figure 2.1.



Figures 2.1 The Conceptual Framework of the Study

CHAPTER III
METERIALS AND METHODS

Appropriate methodology enables the researcher to collect valid and reliable information and to analyze and interpret the information properly in order to arrive at correct conclusion. To fulfill the objectives of the study, the research should be designed to collect both qualitative and quantitative data. A chronological description of the methodologies followed in conducting this research work has been presented in this Chapter.

3.1 Locale of the Study

This research work was conducted on purposively selected two readymade garments (RMG) in Narayanganj district namely Remi Holding ltd and Plami fashion ltd.

3.2 Population

The number of workers and supervisors the garments of the selected was which constituted the population of the study.

3.3 Sampling Procedure

Data were collected from the sample rather than whole population due to lack of time and fund. Sample size calculator developed by Creative Research System (1984) was used to determine the sample size. By setting the population number of 840 with 95% confidence level and confidence interval of 5, the sample size was determined as 263 which distributed proportionately among the two garments workers and supervisors as shown in table 3.1. Separate list of the population of workers and supervisors of the two RMGs were collected from the authority of the garments. Sample respondents were selected randomly and proportionately from the population. Fourteen (14) workers and supervisors were selected for the reserve list those were interviewed in the cause of absence of any respondents listed in the main sample size of 263.

Table 3. 1 Population, sample and reserve list size

Name of RMG	Type of Employee	Population size	Sample Size	Reserve list size
Plami Fashion Ltd	Workers	359	113	05
	Supervisors	20	6	01
Remi Holdings Ltd	Workers	426	133	07
	Supervisors	35	11	01
Total		840	263	14

3.4 The Variables and their Measurement

Various characteristics of the RMG workers and supervisors were considered as the causal variables of the study. These were age, educational, family size, yearly salary, yearly savings, training exposure, cosmopoliteness, decision making ability, service length, knowledge on green industrialization and problem faced in garments.

Green industrialization of RMG in Bangladesh as perceived by the workers and supervisors was the dependent variable. The measurement procedures of the variables are described below:

3.4.1 Age

Age of a respondent was measured on the basis of time from his/her birth to the time of interview. A score of one (1) was assigned for each year of his/her age.

3.4.2 Education

The education was measured on the basis of completed years of schooling by a respondent in educational institutions. A score of one (1) was given for each completed year of schooling. If a respondent does not know reading and writing her score was zero. A score of 0.5 was given to a respondent who only could sign his/her name.

3.4.3 Family size

Family size of a respondent was measured on the basis of the actual number of members in his/her family. The family members included himself/herself, husband /wife, children and other dependent members who jointly lived and ate together at the time of interview. The actual number of members was considered as the family size score of a respondent. For example if a respondent had five members in his/her family, his/her family size score was given as "5".

3.4.4 Yearly Salary

It was measured by taking the total income in the RMG workers and supervisors from garment during a year which included monthly salary, overtime, part time benefit etc. A score of one was assigned for each one thousand Taka.

3.4.5 Yearly savings

It was measured by the total savings of a respondent and members of her family from different sources during a year. A score of one was assigned for each one thousand Taka.

3.4.6 Training exposure

Training experience of RMG workers and supervisors was measured by the total number of days he/she participated in different training programs. A score of one (1) was assigned for each day of training received.

3.4.7 Cosmopoliteness

It referred to the degree to which an individual visit to external places to his/her social system. Cosmopoliteness of respondent was measured by computing a cosmopoliteness score based on his/ her frequency of visit to five (5) different places external to his/ her own social system. Each respondent was asked to indicate the number of times she/ he visited to each of the five different types of places within a specified time frame. Score was assigned to his/ her frequency of visits to different places in the following way:

Place of visit	Nature of Visit	Weight
Outside of your factory (per month)	Not event once a month	0
	1-3 times a month	1
	4-5 times a month	2
	6-7times a month	3
	8 or more times a month	4
Other floor to own factory (per month)	Not event once a month	0
	1-2 times a month	1
	3-4 times a month	2
	5-6 times a month	3
	6 or more times a month	4
Neighbor/ Friends/ relatives (Per month)	Not event once a month	0
	1-2 times a month	1
	3-4 times a month	2
	5-6 times a month	3
	6 or more times a month	4
Floor supervisor (Per month)	Not event once a month	0
	1-2 times a month	1
	3-4 times a month	2
	5-6 times a month	3
	6 or more times a month	4
Buyer (Per month)	Not event once a month	0
	Once a year	1
	2-3 times a month	2
	4 times a month	3
	Above 4 time a month	4

The weight for visit to all places were added together to obtain the cosmopoliteness score of a RMG workers and supervisors. This score could range from 0 to 20, where zero indicates no cosmopoliteness and 20 indicates highest level of cosmopoliteness.

3.4.8 Decision Making Ability

Decision making ability of a respondent was measured by using a rating scale. Each respondent was asked to indicate the extent of his/her decision making ability in each of the five (5) selected items by checking any one of the responses viz. Able to self ‘decision, able to make decision with family members and able to make decision with others. The weights were assigned to the responses as 3, 2 and 1 for able to self ‘decision, able to make decision with family members and able to make decision with others respectively. Finally decision making ability score of a respondent was computed by summing up his/her scores for his/her all the items. Thus decision making ability scores of the respondents could range from 5 to 15, where 5 indicated very lowest decision making ability and 15 indicated highest decision making ability.

3.4.9 Service Length

It was measured by the number of years for which a respondent was serving time in RMG sectors up to the time of interview. It was calculated in terms of years on the basis of a respondent’s response to question and as verified from factory office records. One (1) score was assigned for 1 year of service in RMG.

3.4.10 Knowledge on green industrialization in RMG

Knowledge is those behavior and test situations which emphasized the remembering either by recognition or recall of idea, material or phenomenon (Bloom *et al*., 1956). In this study knowledge was measured by the extent of understanding useful effects of green industry. It was measured as evident from his responses to a set of questions related to green industrialization those were logically and scientifically prepared for this purpose at the time of interview. Score of 1, 2 or 3 were given to each of the correct answer against the nature of the questions and zero (0) for no or incorrect answer. Total knowledge score range was ‘0’ to ‘10’ where ‘0’ indicated very low knowledge and ‘10’ indicated very high knowledge on green industrialization in RMG.

3.4.11 Problem faced in garments

It referred to the extent to which a respondent faced difficulties in performing various activities as a workers and supervisors in the garment. Each respondent was asked to indicate the extent of population he/ she considered to each of the selected ten (10) problem items a five-point rating scale: “very high problem”, “high problem”, “medium problem”, “low problem” and “no problem” at all. Scoring was made was follows:

Extent of Problems	Score assigned
No problem	0
Low problem	1
Medium Problem	2
High Problem	3
Very High Problem	4

Thus possible problem faced in garments scores of the respondents could range from 0 to 40, where zero (0) indicated no problem faced at all and 40 indicated highest problem faced in garments.

3.4.12 Green industrialization of RMG

Green industrialization of RMG was the main focus of the study. According to U S Green Building Council (USGBC) 9 (nine) factors affected to establish in green industry of RMG sectors. These factors are: i) building Construction materials that will emit less CO_2 emission (to use recycled brick, cement, and prefabricated steel to accomplish construction), ii) assure factory workers housing facilities, iii) assure schools for children’s for workers, iv) nearby market for shopping for workers, v) assure bus or tempo stand for transportation between 500 square meters from factory building, vi) ensure enough sunlight and solar power utilization to reduce the cost of electricity, vii) reduce the use of underground water, need to encourage for rainwater reservoir and water-saving faucet ,viii) keep about 50% free space of total factory premises, ix) ensure enough trees in the factory ground and keep enough ventilation facilities to protect heat and ensure self anti fire instrument and training facilities.

Base on the above factors, the scale for green industrialization on readymade garment sector in Bangladesh as perceived by the workers and supervisors was measured upon the following steps:

Item collection: After thorough consultation, searching of relevant literatures and discussion with experts, 30 items were collected to measure the extent of green industrialization on readymade garment sector in Bangladesh as perceived by the workers and supervisors. But some items were similar as such 20 items were selected to send those to the Judges.

Judge rating: The selected 20 items were sent to 30 experts (Judges) to rate the items for the scale of green industrialization on readymade garment sector in Bangladesh as perceived by the workers. A letter was sent to the Experts from the Chairman, Advisory Committee of the present PhD researcher as shown in (Appendix-B). For determining the appropriateness and relevancy of the items of "green industrialization on readymade garment in Bangladesh as perceived by the workers and supervisors. The Judges were requested to rate the items with the scale of 1-9 (1 for least appropriate and 9 for most appropriate).

But out of the 30 experts, 17 experts made their opinions. Based on the ratings of 17 Judges, average appropriateness score of each of the item was measured with the following formula:

$$AAS = \frac{\sum ASJ}{n}$$

Where,

AAS = Average Appropriateness Score

ASJ = Appropriateness Score given by the Judges

n = Number of Judges (here, it is 17.)

After determining the AAS of each of all the items, it was found that AAS of the 15 items out of 20 items had more than 5 out of 9, i.e more than average. Based on the results of AAS, it was decided to include 15 items with slight modification as suggested by some of the Judges in the scale of "green industrialization on readymade garment sector in Bangladesh as perceived by the workers" for the interview schedule. The average appropriateness score of all the items may be seen in Appendix-C.

Pre-testing of scale:

Carefully constructed scale including 15 items was pre-tested with 20 RMG workers from the population but excluded from the sample. The Likert scale was used to serve the purpose.

Final selection of items: After the pre-test, it was found that all the 15 items of the scale were understandable to the respondents. As such all the 15 items were included in the final scale of "green industrialization on readymade garment sector in Bangladesh as perceived by the workers and supervisor" with slightly modifications.

Scoring System: Respondents were asked to indicate their degree of agreement against each of the items of step taken by the RMG authority before and after involvement in green industrialization along with a four-point scale as high, medium, low and not at all. Scores were assigned to these four alternative responses as 3, 2, 1, and 0 respectively for each item. The extent of green industrialization Impact of each item was measured by deducting the score against before situation from after involving with green industrialization. Finally green industrialization as perceived by each respondent was measured by adding his/ her score against all the 15 items. Thus the possible score of green industrialization ranked from 0 to 45, where 0 indicated no green industrialization and 45 indicated highest green industrialization in RMG.

Comparing between green and non-green garments: To compare the steps taken by the authority of green and non-green garments 30 workers and supervisors at non green garments were interviewed. Score of the green industrialization after situation at green garments and present scores of non-green garments were compared by using simple t- test.

Items analysis for compare for items wise comparing the importance of green industrialization, scores of all the respondents against each item was added together to get the index of green industrialization of respective item. Rank order was made based on the descending order of the index of the items to compare the importance of the items.

3.5 Validity and reliability of scales

To give due attention to the validity and reliability of the scales used for collecting data is one of the important tasks on research work. A scale possesses validity when it actually measures what it claims to measure. A scale is reliable when it can consistently produces the same results repeatedly when applied to the same sample (Goode and Hatt, 1952). Enough care was taken to prepare the scales for measuring the variables of the interview schedule in general and the scale in particular to measure the focus variable i.e, "green industrialization on readymade garment sector in Bangladesh as perceived by the workers and supervisor". However, validity and reliability of the scale for measuring "green industrialization on readymade garment sector in Bangladesh as perceived by the workers and supervisors" was examined. Validity and reliability of this scale was tested both from pre-test data and a portion of final data. However, validity and reliability of the scale have been described below:

3.5.1 Validity of the scale green industrialization on readymade garments in Bangladesh as perceived by the workers and supervisors

The content of the scale was obtained by the judgments of relevant Judges/Experts. Initially 30 items were collected for this scale after discussion

with relevant export, extension specialists and review of previous studies made in this connection. Some of these items had similarity. By reducing the similarity of items, 20 items were selected and sent to 30 relevant judges/experts for their judgments. Out of 30 Judges, 17 replied. It was revealed from the ratings of the Judges that 15 items out of 20 items had more than average appropriateness score (>5 out of 9) as shown in Appendix-D of this dissertation.

Carefully constructed scale including these 15 items was pre-tested with 20 workers from the population but excluded from the sample. The rating scale was used to serve the purpose. After the pre-test, it was found that all the 15 items of the scale were understandable to the respondents. As such all the 15 items were included in the final scale of "green industrialization on readymade garment sector in Bangladesh as perceived by the workers and supervisors" with slightly modifications. Therefore, the content validity was built in the process of constructing the scale.

3.5.2 Reliability of the scale green industrialization on readymade garment in Bangladesh as perceived by the workers and supervisors

The reliability of "green industrialization on readymade garments sector in Bangladesh as perceived by the workers" scale was measured by split-half method. There was done from the data obtained from 17 supervisors' two selected garments as they were more experienced than the workers. All the 15 items of the scale "green industrialization on readymade garments in Bangladesh" scale were divided into 2 parts. One with odd numbered (no.: 1, 3, 5, 7, 9, 11, 13, and 15) and the other with even numbered (no.: 2, 4, 6, 8, 10, 12, and 14). Accordingly two sets of scores were obtained. Coefficient of correlation between the two sets of scores was computed and the value of 'r' was found to be 0.549** which was significant at 0.000 level with 15 degree of freedom. The reliability co-efficient, thus obtained indicated that the 'internal consistency' of the "green industrialization on readymade garment sector in Bangladesh as

perceived by the workers and supervisors" scale developed for the present study was high.

3.6 Field pre-test

Field test was conducted to assess the appropriateness of the developed data collection tools. The pretest was conducted with 20 workers of two selected RMG at Narayanganj. During the field test, the researcher filled in and checked the data collection tools. Based on observations in the field practice and suggestions made by the supervisor, data collection tools were further modified and finalized.

3.7 Field data collection

After completion of the pre-test, researcher re arranged the interview schedule to collect the data for this study. Researcher of the study collected data himself from the respondents. Prior to the data collection from the RMG, necessary documents were collected from the BKMEA, BGMEA and concerned offices. Data were collected from 263 RMG workers and supervisors of 2 RMG having green industrialization during the period from June 2018 to August 2018. These two RMG factories are situated Narayanganj where there are over 100 export-oriented RMG factories which established green industry according to USGBC standard. To compare the impact of green industrialization, data were also collected from 30 workers of a non-green garments.

3.8 Instrument for Collection of Data

An interview schedule was carefully prepared in English keeping in mind the objectives of the research and following the procedures of measurement of different variables. Simple and direct questions and different scales were used to obtain information. Direct questions were included to collect information on such variables. Appropriate scales were developed to operationalize the variables of the study. The draft interview schedule was pre-tested with 20 green RMG workers and supervisors. This pre-test facilitated the researcher to examine the

suitability of different questions and statements in general. On the basis of pre-test result, corrections and modifications were done in the interview schedule. The English version of the interview schedule may be seen at *Appendix A.*

3.9 Hypotheses of the Study

The following null hypothesis was put to test the contribution of the 11 selected characteristics of workers and supervisors to green industrialization in RMGs sector of Bangladesh as perceived by them.

> "There is no contribution of the selected characteristics of the RMG workers and supervisors on the green industrialization RMGs sector in Bangladesh"

3.10 Statistical procedure

On the basis of objectives of the study collected, data were compiled, coded and analyzed. The statistical measures such as range, mean, percentage distribution, standard deviation, rank order, categories etc was used to the interpret the data. Step wise regression test was used to determine the contribution of the selected characteristics of the respondents on their perceived green industrialization. To compare the step taken by the green and non-green RMG for green industrialization, simple t-test was used. Five (5%) percent level of significant was used to reject/ accept null hypothesis.

CHAPTER IV
GREEN INDUSTRIALIZATION OF RMG IN BANGLADESH

The function of this chapter is to explain the findings of the present study in four sections. The first section deals with the status of green industrialization of Ready Made Garments (RMGs) of Bangladesh according to the international standard for green industry development. The second section deals with the extent of green industrialization of RMGs in Bangladesh as perceived by the workers and supervisors. The third section compares the difference between green and non-green garments of Bangladesh regarding green industrialization. The fourth section deals with item-wise green industrialization of RMGs in Bangladesh.

4.1 Status of green industrialization on RMG sector in Bangladesh

A green industry aims to build an industry that intertwines environmental and social consideration with economic considerations of the environmental manners. In a broader sense, a green industry is one that sustainably uses any inputs, where production process requires less use of water, energy, and materials, where solid waste is reused and recycled, any emission of harmful gases are reduced, and production process is free from harmful human toxins. A green industry takes an approach towards any form of growth by reducing its impact on the environment while taking into account of environmental criteria that may or may not directly relate to the development at hand, but to the ecosystem of the world at large. A green industry can help them to reduce costs, fight climate change, and re-think long-held business practices and open doors to a myriad of opportunities.

According to (UNIDO, 2011) two main approaches towards creating such industry are by retrofitting new technologies or starting from scratch. For example, greening an industry relates to an industry or a facility that has already been erected and is functional. This focuses the long term environment

performances regardless of sector, size or location. This also includes any internal process that reduces the environmental impacts by using more efficient resources and most effective use of natural resources, renewable energy, by improving the health safety issues and reducing any overall risks. Additionally, creating green industries relates to a new industry or a facility that needs to be established focusing on zero environment pollution. A company should focus on adopting the cutting edge technologies while installing renewable energy and erecting the business in a way that green principles are embedded in the earlier stages of planning. The number of environment-friendly, "green" RMG factories is on the rise in Bangladesh, revolutionizing the country's apparel industry and slowly uplifting its onward reputation in the world.

Since 2011, a total of 67 Bangladeshi RMG factories have received Leadership in Energy and Environmental Design (LEED) certification from the US Green Building Council (USGBC), one of the top green building rating systems in the world, according to Bangladesh Garment Manufacturers and Exporters Association (BGMEA) data. Out of the 67 factories, 13 have been rated as platinum, 20 as gold and five as silver. At least 222 more factories have been registered with the USGBC for the LEED certification. Industry insiders told that the number of green factories are increasing. Global retailers are looking for eco-friendly apparel manufacturers since consumers around the world are growing concerned about how the production of their clothes affect the environment. This is improving the global image of Bangladeshi RMG industries which has taken several hits in recent years due to a lack of workers safety in factories, which has led to fatal incidents building collapse of Rana Plaza and fire incidents of the RMG sector. Bangladesh has several top-rated eco-friendly factories which are rebuilding our image and drawing the attention of renowned global brands and retailers.

According to the USGBC standard the world LEED platinum certified company, hence Bangladeshi factories ranked 1st, 2nd and 3rd in the world. Remi Holding

limited of Bangladesh ranked first in the world and obtained a score of 97 out of 110. The Tarasima Apparels ltd of Bangladesh ranked 2nd in the world and obtained a score of 93 out of 110 Plummy Fashions limited of Bangladesh ranked third in the world and obtained a score of 92 out of 110.

The green industry has positive effects on establishing environmental management system, occupational health, workplace safety, efficient use of chemicals, and results in increased productivity and cost savings. Out of 11 top LEED certified factories of the world, each (8) factories are situated in Bangladesh as shown in Table 4.1.

Table 4.1 Top 11 LEED Certified factories of the world

Sl. No.	Obtained points out of 110	Factory Name	Country Name
1	97	Remi Holding Ltd.	Bangladesh
2	93	Tarasima Apparels Ltd.	Bangladesh
3	92	Plummy Fashion Ltd.	Bangladesh
4	90	Confidential	Ireland
5	90	AR Jeans	Bangladesh
6	90	Vintage Denim Studio Ltd	Bangladesh
7	88	Green Textile Ltd (unit#3)	Bangladesh
8	87	Columbia Washing	Bangladesh
9	86	Echotex Ltd	Bangladesh
10	86	Bottega Veneta Atelier	Italy
11	86	Method Products PBC	United States

Source: The Daily Star dated 18th July, 2018

Green factories have taken Bangladesh's RMG sector to a new height in terms of environment-friendly manufacturing and compliance issues. Aiming to cut back on carbon emission, the green factories in Bangladesh have been set up with eco-friendly technology and are using water-saving technology, harvesting rain water, and using solar panels and servo motor for power generation. Setting up

a green factory costs more than that for a regular one, but in the long run, the payback is more than worth it. The Green factory helps at different green factories. A green factory uses 40% less energy, 41% less water and emits 35% less carbon compared to a regular RMG factory (USGBC 2009).

Green manufacturers may face difficulties in competing with the regular manufacturers in terms of prices, but eventually global buyers pay more for green products as green manufacturers' care about both their workers and the environment. Green factories provide better working environment and ensures workers' safety, which boosts productivity of the RMG sectors in Bangladesh. Green building construction has been on a rising trajectory for the past decade, ushering in an era of environmental sustainability that is showing a positive indicator of sustainable development in Bangladesh. There are a number of green building rating systems around the world, but the most popular certification system in Bangladesh is granted by the US Green Building Council (USGBC) under the umbrella of Leadership in Energy and Environmental Design (LEED). Currently, Bangladesh has 551 registered buildings, of which a total of 64 buildings are LEED certified, as of February 2018, according to USGBC figures. This includes different kinds of buildings and contains a mix of commercial and industrial buildings. It is interesting in this statistic is that the highest amount of green buildings is registered in the industrial manufacturing sector – with a hopping of 495 registered buildings (89.94 percent of all LEED registered buildings). A LEED certified building then is following the basic indicators of environmental sustainability with lower resource consumption following a systematic waste management system and utilizing resources in the most efficient manner. Industries might as well try to emulate the principles of a green industry (GI) by following the green building (GB) standards as the definitions of a GI and the goals of GB rating criteria match each other.

4.2 Extent of green industrialization of RMGs in Bangladesh as perceived by the workers and supervisors

The score of green industrialization of RMGs in Bangladesh as perceived by the workers and supervisors ranged from 5 to 33 against the possible score of 0-45 with an average of 21.33 and a standard deviation of 5.094. On the basis of perceived green industrialization score, the respondents were classified into three categories as shown in Table 4.2.

Table 4.2 Distribution of the RMG workers and supervisors according to their perceived green industrialization

Categories	RMG workers (n=263)		Mean	SD
	Number	Percent		
Low green industrialization (<Mean–Sd. i.e., 15)	37	14.07	21.33	5.094
Medium green industrialization (Mean±Sd. i.e., 16-26)	185	70.34		
High green industrialization (>Mean+Sd. i.e., 27)	41	15.59		

Data presented in Table 4.2 shows that majority (70.34 percent) of the respondent's perceived medium green industrialization of RMGs while 15.59 percent perceived high green industrialization of RMGs and rest 14.07% perceived as low green industrialization of RMGs in Bangladesh. Findings also revealed that overwhelming majority (89.41%) of the workers and supervisors of the RMGs perceived low to medium green industrialization in RMGs in Bangladesh. Therefore, it may be concluded that there is scope to further improve of the issue in Bangladesh.

4.3 Comparative Green Industrialization between green and non-green RMGs in Bangladesh

The comparative green industrialization between green and non-green RMGs in Bangladesh was tested by using the following null hypothesis:

The present green industrialization of green RMGs and non-green RMGs were 33.22 and 14.89 respectively as perceived by the workers and supervisors shown in Figure 4.1. The calculated "t" value was 193.788 which were significant at .001 levels. The result of 't' value supported to reject the null hypothesis and clearly indicated that improvement of green industrialization of green RMGs than non-green RMGs.

Figure 4.3 Results of t-test showing the mean of present green industrialization of green and non-green RMGs in Bangladesh

Items	N	Mean	SD
Green industrialization	263	36.22	3.03
Non-green industrialization	30	8.03	3.74

Hence, it was concluded that more green industrialization is done in green RMGs than that of non-green RMGs.

4.4 Comparative items-wise green industrialization of RMGs in Bangladesh

Items-wise analysis of green industrialization of RMGs was done for 15 selected items as perceived by the RMG workers and supervisors. Green industrialization scores of all the respondents against each item were added together to get the green industrialization index of that item.

Based on the descending order of the green industrialization index, a rank order was prepared to compare among the items as shown in Table 4.4.

Table 4.4 Items wise green industrialization of RMGs with rank order as perceived by the workers and supervisors

Items No.	Name of Items	Green industrialization index	Rank order
1	Use of eco-friendly light in factory	380	5th
2	Use of re-cycling bricks	373	6th
3	Use of sprinkler for fire incident	370	8th
4	Use of fire alarm for factory	360	13th
5	Collection of rainwater for factory	366	11th
6	Access waste water treatment plant (ETP)	365	12th
7	Use of hand gloves during working	367	10th
8	Use of eye guard during sewing	351	14th
9	Use of musk during working	345	15th
10	Use of high solar reflecting paints in rooftop areas	384	4th
11	Assure factory workers housing facilities	390	3rd
12	Assure schools for workers children's	369	9th
13	Assure nearby market for shopping	371	7th
14	Ensure enough sunlight and solar power utilization to reduce the cost of electricity	420	1st
15	Keeping about 50% free space of total factory premises to ensure enough trees for enough ventilation facilities to protect heat	399	2nd

Table 4.4 showed that on the basis of green industrialization index, "ensure enough sunlight and solar power utilization to reduce the cost of electricity" ranked first followed by "keeping about 50% free space of total factory premises to ensure enough trees for enough ventilation facilities", "assure factory workers housing facilities". The next twelve important green industrialization items in descending order were "use of high solar reflecting paints in rooftop areas", "use of eco-friendly light in factory", "use of re-cycling bricks", "assure nearby

market for shopping", "use of sprinkler for fire incident", "assure schools for workers children", "use of hand gloves during working", "collection of rainwater for factory", "access waste water treatment plant (ETP)", "use of fire alarm for factory", "use of eye guard during sewing" and "use of musk during working".

CHAPTER V
SELECTED CHARACTERISTICS OF RMG WORKERS AND SUPERVISORS

The section deals with the salient features of the 11 selected characteristics of the RMG workers and supervisors. Category wise distribution of the workers and supervisors based on the selected 11 characteristics is discussed in this Chapter. Salient feature of the selected characteristics of the RMG workers and supervisors including measuring unit, ranges, mean and standard deviation has been presented in Table 5.1.

Table 5.1 Salient features of the selected characteristics of RMG workers and supervisors (N=263)

Selected Characteristics	Measuring unit	Ranges		Mean	Standard deviation
		Possible score	Observed		
Age	Year	-	18-60	31.26	7.84
Education	Year of schooling	-	0.5-16	6.83	3.74
Family size	Number	-	2-8	4.70	1.28
Yearly salary	Thousand Tk.	-	96-336	179.25	47.11
Yearly saving	Thousand Tk.	-	0-50	3.75	4.88
Training Exposure	Days	-	0-8	2.42	2.12
Cosmopoliteness	Scale score	0-20	0-19	13.86	4.34
Decision making ability	Scale score	5-15	5-13	9.20	2.34
Service Length	Year of scoring	-	1-33	10.73	5.86
Knowledge on green industrialization	Scale score	0-10	1-10	5.76	2.01
Problems faced in green garments	Scale score	0-40	8-36	23.73	5.75

Categories wise distribution of the RMG workers and supervisors against each selected characteristics are described in the subsequent sub sections.

5.1 Age

Age of the RMG workers and supervisors ranged from 18 to 60 years with an average of 31.26 years and a standard deviation of 7.84. On the basis of their age, the RMG workers and supervisors were classified into three categories as shown in Table 5.2.

Table 5.2 Distribution of the RMG workers and supervisors according to their age

Categories	RMG workers (n=263)	
	Number	Percent
Young (upto 35 years)	193	73.4
Middle aged (36-50 years)	66	25.1
Old aged (above 50)	04	1.5

The highest proportion (73.4 percent) of the workers were young compared to 25.1 percent of the being middle aged and 1.5 percent, the old. A close look into the data indicates that decision-making regarding green industrialization of RMG activities were mostly in the hands of young workers. This is quite logical.

5.2 Education

The level of education of the RMG workers and supervisors ranged from 0.5 to 16 years of schooling having an average of 6.83 and a standard deviation of 3.74. Based on their educational qualification scores, the respondents were classified into four categories as shown in Table 5.3.

Table 5.3 Distribution of the workers and supervisors according to their education

Categories	RMG workers (n=263)	
	Number	Percent
Can sign only (0.5)	46	17.5
Primary level (1-5)	46	17.5
Secondary level (6-10)	151	57.41
Above Secondary (> 10)	20	7.6

The highest proportion (57.41 percent) of the respondents had secondary level of education, while 17.5 percent could sign their names only as well as had primary level and 7.6 percent of the workers higher education. It is logical that education is necessary for proper understanding of the information and development of skills for green industrialization of RMG.

5.3 Family size

The number of family members of the respondent ranged from 2 to 8 with an average 4.70 and a standard deviation of 1.28. Based on the family size, the respondents were classified into three categories as shown in Table 5.4.

Table 5.4 Distribution of the RMG workers and supervisors according to their family size

Categories	RMG workers (n=263)	
	Number	Percent
Small family (upto 4)	123	46.78
Medium family (5-6)	121	46.00
Large family (>6)	19	7.22

Data presented in the Table 5.4 show that the highest proportion (46.78 percent) of the respondents felt under small family category compared to 46.00 percent having medium family and remaining 7.22 percent with large family. Thus, more than ninety two (92.78 percent) of the respondents had either small or medium

family size. So, the finding was quite logical in a family setting like the study area of RMG plays role for discouraging the large family size.

5.4 Yearly salary

Yearly salary scores of the respondents ranged from 96 to 336. An average yearly salary score of the respondents was 179.25 and a standard deviation of 47.11. On the basis of yearly salary scores, the respondents were classified into three categories as shown in Table 5.5.

Table 5.5 Distribution of the RMG workers and supervisors according to their yearly salary

Categories	RMG workers (n=263)	
	Number	Percent
Very low income (<132)	17	6.5
low income (132 to 226)	202	76.8
Medium income (>226)	44	16.7

Data presented in Table 5.5 shows that 76.8 percent of the respondents had low income salary, 16.7 percent had medium income and 6.5 percent had very low salary.

5.5 Yearly savings

Yearly savings scores of the respondents ranged from 0 to 50. An average yearly savings score of the respondents was 3.75 and a standard deviation of 4.88. On the basis of yearly savings scores, the respondents were classified into three categories as shown in Table 5.6.

Table 5.6 Distribution of the RMG worker and supervisors s according to their yearly savings

Categories	RMG workers (n=263)	
	Number	Percent
Very low savings (upto 5)	216	82.9
low savings (6-8)	35	13.3
Medium savings (>8)	10	3.8

Data presented in Table 5.6 shows that 82.9 percent of the respondents had very low savings, 13.3 percent had low savings and 3.8 percent had medium savings. So it is found that savings tendency was increasing among RMG workers and supervisors even among the landless community.

5.6 Training Exposure

The training exposure of the RMG workers scores ranged from 0 to 8. An average training exposure score of the respondents was 2.42 and a standard deviation of 2.12. On the basis of training exposure scores, the respondents were classified into three categories as shown in Table 5.7.

Table 5.7 Distribution of the RMG workers and supervisors according to their training exposure

Categories	RMG workers (n=263)	
	Number	Percent
No training recipient (0)	82	31.2
Very low training (1-3)	104	39.5
low training (>3)	77	29.3

Data presented in Table 5.7 shows that the majority 39.5 percent of the respondents had very low training, 29.3 percent had low training and 31.2 percent had no training. So it was found that near about half of the RMG workers and supervisors had no training. Its means that the RMG was non trained workers. Its need to proper trained up for creation of trained workers in the RMG.

5.7 Cosmopoliteness

The cosmopoliteness of RMG workers and supervisors scores ranged from 0 to 19. An average cosmopoliteness score of the respondents were 13.86 and a standard deviation of 4.34. On the basis of cosmopoliteness scores, the respondents were classified into three categories as shown in Table 5.8.

Table 5.8 Distribution of the RMG workers and supervisors according to their cosmopoliteness

Categories	RMG workers (n=263)	
	Number	Percent
Low Cosmopoliteness (0-9)	31	11.8
Medium Cosmopoliteness (10-17)	191	72.6
High Cosmopoliteness (>17)	41	15.6

Data presented in Table 5.8 shows that 11.8 percent of the respondents had low cosmopoliteness, 72.6 percent had medium cosmopoliteness and 15.6 percent had high cosmopoliteness. So it is found that most of the RMG workers had medium cosmopoliteness that's logically proven.

5.8 Decision Making Ability

The decision making ability of RMG related of the RMG workers scores ranged from 5 to 13. An average decision making ability score of the respondents were 9.20 and a standard deviation of 2.34. On the basis of decision making ability scores, the respondents were classified into three categories as shown in Table 5.9.

Table 5.9 Distribution of the RMG workers and supervisors according to their decision making ability

Categories	RMG workers (n=263)	
	Number	Percent
Low decision making ability (upto 7)	53	20.2
Medium decision making ability (8-11)	176	66.5
High decision making ability (>11)	34	13.3

Data presented in Table 5.9 shows that 20.2 percent of the respondents had low decision making ability, 66.56 percent had medium decision making ability and 13.3 percent had high decision making ability of the workers. So it is found that most of the RMG workers had medium decision making ability that's logically proven.

5.9 Service Length

The service length of RMG related of the RMG workers scores ranged from 1 to 33. An average service length score of the respondents were 10.73 and a standard deviation of 5.86. On the basis of service length, the respondents were classified into three categories as shown in Table 5.10.

Table 5.10 Distribution of the RMG workers and supervisors according to their service length

Categories	RMG workers (n=263)	
	Number	Percent
Low service length (0-5)	65	24.7
Medium service length (6-20)	180	68.4
High service length (>20)	18	6.9

Data presented in Table 5.10 shows that 24.7 percent of the respondents had low service length, 68.4 percent had medium service length and 6.9 percent had service length of the workers. So it is found that most of the RMG workers had medium service length that's logically proven.

5.10. Knowledge on green industrialization

The Knowledge on green products practices to established green industry in RMG of the RMG factory ranged from 1 to 10 score average score was 5.76 and standard deviation of 2.01. On the basis of Knowledge on green products practices to established green industry were classified three categories as shown in Table 5.11.

Table 5.11 Distribution of the RMG workers and supervisors according to knowledge on green industrialization

Categories	RMG workers (n=263)	
	Number	Percent
Low knowledge (upto 3)	38	14.1
Medium knowledge (4-7)	174	66.5
High knowledge (>7)	51	19.4

Data presented in Table 5.11 shows that 14.1 percent of the respondents had low knowledge 66.5 percent had medium knowledge and 19.4 percent had high knowledge of the workers. So it is found that most of the RMG workers had medium knowledge that's logically proven.

5.11 Problem faces by the RMG workers and supervisors in garments

Problem faced scores of the respondent ranged from 8 to 36 against the possible range of 0-40 with an average 23.73 and a standard deviation 5.75. On the basis of problem faced by the respondents were classified into three categories shown as Table 5.12.

Table 5.12 Distribution of the respondents according to their problem faced in garments

Problem faced categories (score)	RMG workers (n=263)	
	Number	Percent
Low problem faced (upto 18)	47	17.9
Medium problem faced (19-28)	158	60
High problem faced (>28)	58	22.1

Data contained in Table 5.12 reveal that highest proportion (60 percent) of the respondents faced medium problems in garments. Whereas 22.1 percent of the respondents faced high problems and 17.9 percent faced low problem in the same aspect.

CHAPTER VI

CONTRIBUTION AND EFECT OF THE SELECTED CHARACTERISTICES OF RMG WORKERS AND SUPERVISORS TO/ON THE GREEN INDUSTRIALIZATION OF RMG AS PERCIEVED BY THEM

The purpose of the chapter is to examine the contribution and effect of selected characteristics of the RMG workers and supervisors to/on their perceived green industrialization of RMG in Bangladesh. Green industrialization of RMGs in Bangladesh as perceived by the workers and supervisors was the dependent variable (Y) of the study. Eleven (11) selected characteristics of the workers and supervisors viz age (X_1), education (X_2), family size (X_3), yearly salary (X_4), yearly saving (X_5), training exposure(X_6), cosmopoliteness (X_7), decision making ability (X_8), service length (X_9), knowledge on green industrialization (X_{10}) and problem faced in garments (X_{11}) were the independent variables many of the sales of the variables were ordinal level measurement. Spearman rank correlation test was initially run to test the relation between each of the independent variables and green industrialization of RMG in Bangladesh. Correlation analysis showed that family size (X_3) of the respondents had no significant relationship with green industrialization, problem faced in garments (X_{11}) had significantly negative relationship with green industrialization and other nine (9) age (X_1), education (X_2), yearly salary (X_4), yearly saving (X_5),training exposure(X_6), cosmopoliteness (X_7), decision making ability (X_8), service length (X_9), knowledge on green industrialization (X_{10}) the of workers and supervisors of RMG had significant positive relationship with their perceived green industrialization in RMG in Bangladesh.

Results of Spearman Rank Correlation test of the selected characteristics of the workers and supervisors with their perceived green industrialization of RMG in Bangladesh have been shown in Appendix-E.

6.1 Contribution of the selected characteristics of the RMG workers and supervisors to the green industrialization as perceived by them

The independent variables in isolation would not give a comprehensive picture of the contribution of independent variables to green industrialization of RMG sectors (Y). The different characteristics of the respondents may interact together to make a combined contribution to the green industrialization of RMG. Keeping this fact in view linear multiple regression analysis was used to assess the contribution of the independent variables to green industrialization of RMG.

Full model multiple regression analyses were initially run by independent all variables with green industrialization of RMG sectors (Y) as the dependent variable.

It was observed that the full model regression results of almost all the variables were misleading due to the existence of interrelationships among the independent variables. It was evident from correlation matrix showing the interrelationships among the independent variables and existence of contradiction in the sign of correlation coefficients and regression co-efficient.

Droper and Smith (1981) suggested running stepwise multiple regression analysis to insert variables in turn until the regression equation is satisfactory. Therefore, in order to avoid the misleading results due to the problem of multi-collinearity and to determine the best explanatory variables, the method of step-wise multiple regressions was employed by involving all the independent variables with the green industrialization of RMG. The objective of the step wise multiple regression models were to find out the contribution of the variables, which were significant only. Results of these variables of step wise multiple regression analysis is presented in the Table 6.1. Detailed result of step-wise multiple regression analysis may be seen in Appendix-D.

Table 6.1 Summary of stepwise multiple regression analysis showing the contribution of all the 11 independent variables to green industrialization of RMG

Variables entered	Standardized Partial 'b' coefficient	Value of 't' (with probability level)	Adjusted R^2	Increase in R^2	Variation explained in percent
Decision making ability (X_8)	0.370	8.438 (0.000)	0.408	0.408	40.8
Knowledge (X_{10})	0.295	5.928 (0.000)	0.584	0.176	17.6
Cosmopoliteness (X_7)	0.258	5.462 (0.000)	0.628	0.044	4.4
Education (X_2)	0.113	2.402 (0.000)	0.635	0.007	0.7
Total				0.635	63.5

Multiple R = 0.8

R^2 = 0.640

Adjusted R^2 = 0.635

F-ratio = 114.812 at 0.000 level of significance.

Data presented in Table 6.1 indicated that the multiple R, R^2 and adjusted R^2 in the multiple regression analysis were 0.8, 0.640 and 0.635 respectively, and the corresponding F-ratio of 114.812 was significant at 0.000 levels. The regression equation so obtained is presented below:

$Y = 4.402 + 0.370 X_8 + 0.295 X_{10} + 0.258 X_7 + 0.113 X_2$

Adjusted R^2 = 0.635, F-ratio = 114.12, Constant = 4.402

After running above stepwise multiple regression analysis, it was found that out of 11 individual variables, namely age (X_1), education (X_2) ,family size (X_3), yearly salary (X_4), yearly saving (X_5), training exposure (X_6), cosmopoliteness (X_7), decision making ability (X_8), service length (X_9), knowledge on green industrialization (X_{10}) and Problem faced in garments (X_{11}) of the RMG workers and supervisors were entered into regression equation only four (4) independent variables such as decision making ability (X_8), knowledge on green

industrialization (X_{10}), cosmopoliteness (X_7) and education (X_2) with green industrialization of RMG sector(Y) as the dependent variable.

The result indicated that the whole model of 11 independent variables explained 63.5 percent of the total variation in green industrialization of RMG. But since the standardized regression coefficient of 4 variables formed the equation and were significant, it might be assumed that whatever contribution was there, it was due to these 4 variables.

Analysis of data presented in (Table 6.1) and regression equations indicated that in different combinations, standardized partial regression coefficient 'b' of 4 independent variables were significant out of 11 independent variables with green industrialization of RMG sector as the dependent variable. It could logically happen due to the existence of significant interrelationship among the four (4) independent variables. Similar observations were experienced by different researchers like Supe and Singh (1972), Pathak and Mazumdar (1978), Pathak (1981), Hossain (1987), and Karim and Mahboob (1992). On the basis of stepwise regression analysis, contributions of significant 4 independent variables to green industrialization of RMG as the dependent variable are presented below in order of importance.

Decision making ability (X_8)

The co-efficient of correlation also showed significant positive relationship between decision making ability (X_8) of the respondents and their perceived green industrialization of RMG (Appendix-E). Step-wise multiple regression analysis indicated that decision making ability (X_8) had strongly significant and positive contribution to their perceived green industrialization of RMG. Decision making ability (X_8) was by far found to be the most important positive contributor to the green industrialization of RMG. Decision making ability (X_8) of the RMG plays a vital role of green industrialization of RMG in Bangladesh.

By the arranging motivational programme of the factory owners could improve perception of the workers and supervisors regarding green industrialization.

Knowledge on green industrialization (X_{10})

The co-efficient of correlation showed significant positive relationship between knowledge on green industrialization (X_{10}) of the respondents and their perceived green industrialization of RMG.

Step-wise multiple regression analysis indicated that knowledge on green industrialization (X_{10}) of the respondents had strongly significant and positive contribution to their perception on green industrialization of RMG. Knowledge on green industrialization (X_{10}) of the respondent was the 2nd important positive contributor to the green industrialization of RMG.

Knowledge on green industrialization (X_{10}) of the RMG workers and supervisors of RMG plays a vital role to their perception on green industrialization of RMG in Bangladesh. Arranging training and motivational for the RMG workers and supervisors by the factory owners improve the perception of the workers and supervisors on green industrialization.

Cosmopoliteness (X_7)

Correlation matrix revealed that cosmopoliteness (X_7) of the RMG workers and supervisors positive relationship with their perceived green industrialization of RMG sector of Bangladesh.

Step-wise multiple regression analysis (Table 6.1) indicated that cosmopoliteness (X_7) of the RMG workers and supervisors had remarkable significant and positive contribution to their perception green industrialization of RMG sector of Bangladesh and it was found to be the third important contributor.

Education (X_2)

Spearman Rank Correlation co-efficient of the RMG workers and supervisors had significant positive relationship with their perceived green industrialization in RMG.

Step-wise multiple regression analysis indicated that education (X_2) of the workers and supervisors of RMG had significant positive contribution to their perceived green industrialization of RMG sector of Bangladesh and it was found to be the fourth important contributor.

It is amity logical that a higher education individual can increase his/her level of knowledge and cosmopolitness can make decision by her/ himself. She/he can independent the benefits of green industrialization and can provide correct information regarding this issue. Therefore, It may be concluded that RMG workers and supervisors having more decision making ability, more knowledge, more cosmopolitness and more education had more correct perception on green industrialization green industrialization of RMG in Bangladesh.

6.2 Direct and Indirect Effects of the Selected Characteristics of the RMG workers and supervisors on their perceived green industrialization

In the present study Spearman rank correlation and stepwise multiple regression analysis were conducted. It is not possible to find out the direct effects and indirect effects separately by these tests. But, in path analysis, it is possible to get direct effects and indirect effects separately.

Path coefficient is simply a standardized partial regression coefficient and as such measures the direct influence of one variable upon another and permits the separation of the correlation coefficient into components of direct and indirect effects (Dewey and Lu, 1959). This allows the direct effect of an independent variable and its indirect effect through other variables on the dependent variable (Sasmal and Chakrabarty, 1978). Path coefficient analysis was employed in

order to obtain clear understanding of the direct and indirect effects of selected independent variables. Path analysis was done involving the significant variables of step-wise multiple regression analysis. Similar procedure may followed by Ali (2008), Hossain (2017) and Ahamed (2019).

Direct effect of an independent variable on the dependent variable is the standardized beta co-efficient (value of 'b' of regression analysis) of the respective independent variable. Whereas indirect effect of an independent variable through a channeled variable was measured by the formula used by Hossain (2017) with slight modification as follows:

$e = b_c \times \rho_{ic}$

Where, e = indirect effect of an independent variable through a channeled variable

b_c = Direct effect of the variable through which indirect effect is channeled (channeled variable)

p_{ic} = Spearman correlation co efficient between respective independent variable and variables through which indirect effect was channeled

Total indirect effect of an independent variable was determined by adding the indirect effects of that variable though channeled variables.

Path coefficients showing the direct and indirect effects of significant 4 independent variables of step-wise multiple regression analysis on the green industrialization of RMG in Bangladesh presented in Table 6.2.

Analysis of data furnished in Table 6.2 indicated that among the independent variables, decision making ability (X_8) had the highest direct positive effect (0.370) in the direction on workers and supervisors perception on ' green industrialization of RMG in Bangladesh'. Knowledge (X_{10}) and cosmopolitness (X_7) had appreciable positive direct effect green industrialization of RMG in

Bangladesh. Education (X_2) had the lowest direct effect (0.113) in the positive direction on green industrialization of RMG in Bangladesh.

Here, it may be mentioned that without path co-efficient analysis it is not possible to know the indirect effects of an independent variable through other variables on the dependent variable. Therefore, emphasis has been given on the indirect effects which have been obtained from path co-efficient analysis as shown in Table 6.2.

Table 6.2 Path coefficients showing the direct and indirect effects of 4 significant independent variables of stepwise multiple regression analysis on green industrialization of RMG

Independent Variables	Variables through which indirect effects are channeled	Indirect effects	Total Indirect Effects	Direct Effect
Decision making ability (X_8)	Cosmopoliteness (X_7)	0.101	0.233	0.370
	Knowledge (X_{10})	0.095		
	Education (X_2)	0.037		
Knowledge (X_{10})	Decision making ability (X_8)	0.119	0.287	0.295
	Cosmopoliteness (X_7)	0.103		
	Education (X_2)	0.065		
Cosmopoliteness (X_7)	Decision making ability (X_8)	0.146	0.268	0.258
	Knowledge (X_{10})	0.118		
	Education (X_2)	0.044		
Education (X_2)	Knowledge (X_{10})	0.168	0.391	0.113
	Decision making ability (X_8)	0.123		
	Cosmopoliteness (X_7)	0.100		

On the basis of path analysis, the independent variables having indirect effects on green industrialization of RMG have been presented below in descending order.

Path analysis showed that education (X_2) had the highest total indirect effect (0.391) and a positive direct effect of 0.113 (Table 6.2) on green industrialization

of RMG. The indirect effect was mostly channeled positively through Knowledge (X_{10}), decision making ability (X_8) and cosmopoliteness (X_{7}).

Therefore, it may be inferred that other variables remaining constant, decision education (X_8) was a determinant of the perception of RMG workers and supervisors on green industrialization of RMG.

Path analysis showed that Knowledge (X_{10}) had the 2nd highest total indirect effect (0.287) and a positive direct effect of 0.295 (Table 6.2) on green industrialization of RMG. The indirect effect was mostly channeled positively through decision making ability (X_8) and cosmopoliteness (X_7). The indirect effect of Knowledge (X_{10}) was somewhat positively channeled through education (X_2).

Therefore, it may be inferred that other variables remaining constant, Knowledge (X_{10}) was a determinant of the perception of RMG workers and supervisors on green industrialization of RMG.

Path analysis showed that cosmopoliteness (X_7) had the 3rd highest total indirect effect (0.268) and a positive direct effect of 0.258 (Table 6.2) on green industrialization of RMG. The indirect effect was mostly channeled positively through decision making ability (X_8) and knowledge (X_{10}). The indirect effect of cosmopoliteness (X_7) was somewhat positively channeled through education (X_2).

Therefore, it may be inferred that other variables remaining constant, cosmopoliteness (X_7) was a determinant of perception of RMG workers and supervisors on green industrialization of RMG.

Path analysis showed that decision making ability (X_8) had the 4th highest total indirect effect (0.391) and highest positive direct effect of 0.370 (Table 6.2) on

green industrialization of RMG. The indirect effect was mostly channeled positively through cosmopoliteness (X_7). The indirect effect of decision making ability (X_8) was somewhat positively channeled through knowledge (X_{10}) and education (X_2).

Therefore, it may be inferred that other variables remaining constant, decision making ability (X_8) was a determinant of the RMG workers and supervisors perception of green industrialization of RMG.

CHAPTER VII

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the summary, conclusions and recommendations of the study.

7.1 Summary

7.1.1 Introduction

The greening of industries has become a core determinant of economic competitiveness and sustainable growth of the Sustainable Development Goals (SDGs) oriented activities. Since resource inputs represent an important production cost for industries, improving efficiency gives industries a competitive advantage. The greening of industries also plays vital role in poverty alleviation of the country as well as eco-friendly environment through promoting energy security, occupational health and safety, jobs creation, and reducing costs through increased productivity of the (Ready Made Garment (RMG) sectors of Bangladesh.

Bangladeshi RMG manufacturers have improved the safety standard, which enhanced the buyer's confidence and they are now placing more orders. Another thing is, buyers are concerned about the new minimum wage for the garments workers which will be applicable from December 2018, so they did more order throughout the year. Bangladeshi RMG manufacturers have improved the safety standard, which enhanced the buyer's confidence and they are now placing more orders.

The industry plays a key role in employment generation and reduction of poverty in remote areas. Nearly 4.5 million workers are directly and more than 15 million inhabitants are indirectly associated with the RMG industry. Bangladesh is not only producing lower segment RMG product but also quality product across the world.

On the basis of above consideration, the overall objective of study was to find out the green industrialization of Ready Made Garments as perceived by the workers and supervisors in Bangladesh.

1. To assess the status of green industrialization of Ready Made Garment (RMG) in Bangladesh according to the international standard for green industry development
2. To determine the extent of green industrialization of the RMG in Bangladesh as perceived by the workers and supervisors
3. To compare the green industrialization between green and non-green garments
4. To compare the items wise green industrialization of the readymade garments in Bangladesh
5. To determine and describe the follows selected characteristics of the RMG workers and supervisors of RMG:

i. Age
ii. Education
iii. Family size
iv. Yearly salary
v. Yearly savings
vi. Training exposure
vii. Cosmopoliteness
viii. Decision making ability
ix. Service length
x. Knowledge on green industrialization
xi. Problem faced in garments

6. To explore the contribution effect of the selected characteristics of the workers and supervisors of RMG of Bangladesh to/on the green industrialization of RMGs as perceived by them.

7.1.2 Findings

7.1.2.1 Green industrialization on RMG sector in Bangladesh

According to the USGBC standard the world LEED platinum certified company, hence Bangladeshi factories ranked 1st, 2nd and 3rd in the world. Remi Holding limited of Bangladesh ranked first in the world and obtained a score of 97 out of 110. Plummy Fashions limited of Bangladesh ranked third in the world and obtained a score of 92 out of 110.

The green industry has positive effects on establishing environmental management system, occupational health, workplace safety, efficient use of chemicals, and results in increased productivity and cost savings. Out of 11 top LEED certified factories of the world, each (8) factories are situated in Bangladesh.

7.1.2.2 Extent of green industrialization of RMGs in Bangladesh as perceived by the workers and supervisors

The score of green industrialization of RMGs in Bangladesh as perceived by the workers and supervisors ranged from 5 to 33 against the possible score of 0-45 with an average of 21.33 and a standard deviation of 5.094. On the basis of perceived green industrialization score, the respondents were classified into three categories. Findings also revealed that overwhelming majority (89.41%) of the workers and supervisors of the RMGs perceived low to medium green industrialization in RMGs in Bangladesh.

7.1.2.3 Comparative Green Industrialization between green and non-green RMGs in Bangladesh

The comparative statement of green industrialization of green RMGs and non-green RMGs were 33.22 and 14.89 respectively as perceived by the workers and supervisors. The calculated "t" value was 193.788 which were significant at .001 levels. The result of 't' value supported to reject the null hypothesis and clearly

indicated that improvement of green industrialization of green RMGs than non-green RMGs.

7.1.2.4 Comparative items-wise green industrialization of RMGs in Bangladesh

The comparative statement of items-wise analysis of green industrialization of RMGs was done for 15 selected items as perceived by the RMG workers and supervisors. Green industrialization scores of all the respondents against each item were added together to get the green industrialization index of that item. On the basis of green industrialization index, “ensure enough sunlight and solar power utilization to reduce the cost of electricity” ranked first followed by “keeping about 50% free space of total factory premises to ensure enough trees for enough ventilation facilities”, “assure factory workers housing facilities”. The next twelve important green industrialization items in descending order were “use of high solar reflecting paints in rooftop areas”, “use of eco-friendly light in factory”, “use of re-cycling bricks”, “assure nearby market for shopping”, “use of sprinkler for fire incident”, “assure schools for workers children”, “use of hand gloves during working”, “collection of rainwater for factory”, “access waste water treatment plant (ETP)”, “use of fire alarm for factory”, “use of eye guard during sewing” and “use of musk during working

7.1.3 Selected Characteristics of RMG workers and supervisors

Age: The highest proportion (73.4 percent) of the workers were young compared to 25.1 percent of the being middle aged and 1.5 percent, the old.

Education: The highest proportion (57.41 percent) of the respondents had secondary level of education, while 17.5 percent could sign their names only as well as had primary level and 7.6 percent of the workers higher education.

Family size: The highest proportion (46.78 percent) of the respondents felt under small family category compared to 46.00 percent having medium family and remaining 7.22 percent with large family.

Yearly salary: The yearly salary 76.8 percent of the respondents had low income salary, 16.7 percent had medium income and 6.5 percent had very low salary.

Yearly savings: The yearly saving that 82.9 percent of the respondents had very low savings, 13.3 percent had low savings and 3.8 percent had medium savings.

Training Exposure: The majority 39.5 percent of the respondents had very low training, 29.3 percent had low training and 31.2 percent had no training.

Cosmopoliteness: The cosmopolitness 11.8 percent of the respondents had low cosmopoliteness, 72.6 percent had medium cosmopoliteness and 15.6 percent had high cosmopoliteness.

Decision Making Ability: The Decision making ability that 20.2 percent of the respondents had low decision making ability, 66.56 percent had medium decision making ability and 13.3 percent had high decision making ability of the workers.

Service Length: Service length 24.7 percent of the respondents had low service length, 68.4 percent had medium service length and 6.9 percent had service length of the workers.

Knowledge on green industrialization: Knowledge on green industrialization that 14.1 percent of the respondents had low knowledge 66.5 percent had medium knowledge and 19.4 percent had high knowledge of the workers.

Problem faced in garments: The reveal that highest proportion (60 percent) of the respondents faced medium problems in garments. Whereas 22.1 percent of the respondents faced high problems and 17.9 percent faced low problem in the same aspect.

7.1.4 Contribution and effect of the selected characteristics of RMG workers and supervisors to/on the green industrialization

The stepwise multiple regression analysis, it was found that out of 11 individual variables, namely age (X_1), education (X_2), family size (X_3), yearly salary (X_4), yearly saving (X_5), training exposure (X_6), cosmopoliteness (X_7), decision making ability (X_8), service length (X_9), knowledge on green industrialization (X_{10}) and Problem faced in garments (X_{11}) of the RMG workers and supervisors only four (4) independent variables were entered into regression equation such as decision making ability (X_8), knowledge on green industrialization (X_{10}), cosmopoliteness (X_7) and education (X_2) with green industrialization of RMG sector (Y) as the dependent variable.

The result indicated that the whole model of 11 independent variables explained 63.5 percent of the total variation in green industrialization of RMG. But since the standardized regression coefficient of 4 variables formed the equation and were significant, it might be assumed that whatever contribution was there, it was due to these 4 variables.

7.1.5 Direct and Indirect Effects of the Selected Characteristics of the RMG workers and supervisors on their perceived green industrialization

The education (X_2) had the highest total indirect effect (0.391) on green industrialization of RMG. The indirect effect was channeled positively through other these variables.

The Knowledge (X_{10}) had the 2nd highest total indirect effect (0.287) on green industrialization of RMG. The indirect effect was channeled positively other these variables.

The cosmopoliteness (X_7) had the 3rd highest total indirect effect (0.268) on green industrialization of RMG. The indirect effect was channeled positively through other these variable.

The decision making ability (X_8) had the 4th highest total indirect effect (0.391) on green industrialization of RMG. The indirect effect was channeled positively through other these variables.

7.2 Conclusions

On the basis of the findings of the study and the logical interpretation of their meaning in the light of the other relevant facts enabled the researcher to draw the following conclusions:

1. From the findings, it was found that out of 11 LEED certified green industry of the world, 8 are in Bangladesh. Overwhelming majority of the RMG workers and supervisors perceived that their garments have low to medium level of green industrialization. Therefore, it may be concluded that there is still scope for improving the green industrialization in RMG sector in Bangladesh.

2. The findings indicated that decision making ability of the RMG workers and supervisors had highest contribution on their perceived green industrialization in Bangladesh. The indirect effect of decision making ability was mostly channeled through education, cosmopolitness and knowledge. Therefore, it may be concluded that decision making ability of the RMG workers and supervisors was an important factor to form correct perception on green industrialization of RMG sector in Bangladesh.

3. The findings indicated that knowledge on green industrialization of the RMG workers and supervisors had second highest contribution on their perception on green industrialization in Bangladesh. The indirect effect of knowledge on green industrialization was mostly channeled through education, cosmopolitness and decision making ability. Therefore, it may be concluded that knowledge of the RMG workers and supervisors was an important factor to form correct perception on green industrialization of RMG sector in Bangladesh.

4. The findings indicated that cosmopolitness of the RMG workers and supervisors had third contribution on their perception green industrialization in Bangladesh. The indirect effect of cosmopolitness was mostly channeled through knowledge, education and decision making ability. Therefore, it may be concluded that cosmopolitness of the RMG workers and supervisors was an important factor to form correct perception on green industrialization of RMG sector in Bangladesh.

5. The findings indicated that education of the RMG workers and supervisors had fourth contribution on their perception on green industrialization in Bangladesh. The indirect effect of education was mostly channeled through knowledge, decision making ability and cosmopoliteness. Therefore, it may be concluded that education of the RMG workers and supervisors was an important factor to form correct perception on green industrialization of RMG sector in Bangladesh.

7.3 Recommendations

7.3.1 Recommendation for policy implication

RMG sector has emerged as the single most important contributor towards employment generation, income and foreign earning, and growth of Bangladeshi economy. However, different factors such as weak infrastructure, lack of energy and supportive regime, inefficient management, and lack of industrial integration

have prevented the RMG sector to realize its full potential. By managing these factors through collective efforts, Bangladesh economy may realize its development dream and enhance the standard of living and approach towards a middle-income economy. RMG sector can be a catalyst to achieve the goal of becoming a middle income country within reasonable time. Based on these considerations and conclusions of the study, the following recommendations were made:

1. Out of 11 LEED certified green industry of the world, 8 are in Bangladesh. Overwhelming majority of the RMG workers and supervisors perceived that their garments have low to medium level of green industrialization. Therefore, it may be recommended that the government and garments contributing authority like Bangladesh Knitwear Manufacturer and Exporter Association (BKMEA) and Bangladesh Garment Manufacturer and Exporter Association (BGMEA) could take necessary steps for increase the green industrialization in Bangladesh.

2. Decision making ability, knowledge, cosmopoliteness and education of the RMG workers and supervisors had significant contribution on their perceived green industrialization in Bangladesh. Therefore, it may be recommended that necessary training, awareness campaigning and exchange visit may be arrange by the concerned authorities like BKMEA and BGMEA for the RMG workers and the supervisors to improve their level of education, knowledge, cosmopoliteness and decision making ability to form their current perception on green industrialization in Bangladesh.

7.3.2 Recommendation for further research

A small piece of study conducted in some specific location could not provide all information for proper understandings about green industry development in Bangladesh and related matters. The following recommendations are suggested in this connection for research:

1. Perception on green industrialization of RMG Sector of the workers and supervisors of only two garments of Narayanganj district was recorded and analyzed for this study. Findings of the study may be verified and compared by similar study in the other districts of Bangladesh.

2. Similar study may be conducted on other leading RMGs of the country in order to gain more meaningful insights.

3. This research examined the effect of 11 selected characteristics of the RMG workers and supervisors on their perceived green industrialization in Bangladesh. Therefore, it is recommended that further research may be undertaken involving other characteristics of the RMG workers and supervisors on their perceived green industrialization in Bangladesh.

4. The study was conducted by considering the perception of the RMG workers and supervisors. Further study may be conducted based on the information provided by other stakeholders of EMG.

5. Further study may be conducted on the impact of green industrialization in Bangladesh.

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Appendix-A
Interview Schedule
(English version)
Department of Agricultural Extension and Information System
Sher-E-Bangla Agricultural University, Dhaka.
Questionnaire
On
"GREEN INDUSTRIALIZATION OF READYMADE GARMENTS SECTOR IN BANGLADESH"

Serial no.....

(Please answer the following questions)

Name of the Respondent.....

Factory Name.....

Upazila.....

District .....

01. Age

What is your present age? ……. Years

02. Educational qualification

Please mention your educational qualification

a) I can sign name only (…….)

b) I can't read in school but read in house and my educational qualification …..... class

c) I have studied up to class ……

03. Family size

Please mention your total number of family members (including yourself)

Sl. No.	Age range of the family member	Number of family member		
		Female	Male	Total
1	Below 14			
2	14 to 18			
3	Above 18			
Total family member				

04. Yearly salary

Please mention your yearly salary

Monthly Salary ……..
Overtime ……..
Part time…….

Others …….
Total in Year …….BD

05. Yearly Savings

Please give the information relating to your annual family savings

Sl No.	Types of saving	Amount of saving (Taka)
1	Saving in NGO group	
2.	Saving in Bank	
3.	Cash in hand	
4.	Others	

06. Training Experience

Have you received any training till date?

Yes No

If yes please furnish the following information

Sl No	Name of the Training Courses	Duration of training (Days)	Name of organization conduct training
1			
2			
3			
4			
5			

07. Cosmopoliteness

Please indicate your extent of visit to the following places

Sl. No	Place of visit	Frequency (Day)
1	Outside of your factory (per month)	
2	Own factory (per month)	
3	Neighbor/ Friends/ relatives (Per month)	
4	Floor supervisor (Per month)	
5	Buyer (Per month)	

08. Decision making ability

Please mention the extent of your decision making ability by putting tick mark (√) in appropriate column.

Items of decision making	Extent of decision making	
	Able to make self-decision	Able to make decision with outside family
a) Adoption new technology for		

Green industrialization		
b) Leading the same working floor in factory		
c) Ability to bargaining in the management		
d) Family affairs		
e) Participation in social activities		

09. Service Length: Please mention the service length

Present Organization …… years

Previous organization ……. Years

Total Service Length……Years

10. Knowledge on Green products practices to established green industry in RMG:

Please answer the following questions.

Sl no.	Items	Full marks	Marks obtained
1	What are green products?	01	
2	Name any three important green technologies for RMG?	03	
3	Major three premises for green products?	03	
4	How can green products protect our nature?	01	
5	State two clean materials for RMG?	02	
	Total		

11. Problems confrontation in Green industry

Please indicate problems that you faced factory level

Sl. No.	**Problems**	**Extent of Confrontation**				
		Very High	**High**	**Medium**	**Low**	**Not at all**
1.	Lack of modern factory machineries and tools					
2.	Lack of solar power in the floor					
3.	Regularity of the monthly salary					
4.	Manners of floor supervisor					

5.	Lack of modern manufacturing technologies of RMG					
6.	Do you have job satisfaction					
7.	Lack of trained workers					
8.	Time to time pay the overtime wages					
9.	High cost of production of green products					
10.	Political Inability of take markets place					
Total						

10. Green industrialization of RMG in Bangladesh

Please mention the extent of green industrialization of your factory you in connection with the following items:

Sl. No	Items	Before involvement in Green Industrialization				After involvement in Green Industrialization			
		High (3)	**Moderate (2)**	**Low (1)**	**Not at all (0)**	**High (3)**	**Moderate (2)**	**Low (1)**	**Not at all (0)**
1	Use of Eco friendly Light in Factory								
2	Use of Re cycling Bricks								
3	Use of Sprinkler for fire incident								
4	Use of Fire alarm for factory								
5	Collection of rainwater for factory								
6	Access waste water treatment plant (ETP)								
7	Use of Hand gloves during working								
8	Use of eye guard during sewing								

9	Use of musk during working								
10	Use of high Solar reflecting paints in rooftop areas								
11	Assure factory workers housing facilities								
12	Assure schools for workers children's								
13	Nearby market for shopping								
14	Ensure enough sunlight and solar power utilization to reduce the cost of electricity								
15	Keeping about 50% free space of total factory premises to ensure enough trees for enough ventilation facilities to protect heat								

Thank you for your co-operation
Date …….

Signature of interviewer

Appendix-B

Letter from the Supervisor to the Judges to rate the items of the scale on "Green industrialization of readymade garments sector in Bangladesh"

From Date: 24.03.2019

Dr. Md. Sekender Ali
Professor, Department of Agricultural Extension & Information System
Sher-e-Bangla Agricultural University, Dhaka

To

.....

Subject: Judgment of items of the scale on "Green industrialization of readymade garments sector in Bangladesh" of Interview schedule for collecting data of a PhD research

Dear Sir

This is in connection with the study of one of my PhD student, **Md. Taibur Rahman.** He has undertaken a research study on "GREEN INDUSTRIALIZATION OF READYMADE GARMENTS SECTOR IN BANGLADESH". This study requires suggestions from Judges for selection of items for measuring Impact of green industrialization of RMG in Bangladesh as perceived by the workers selected factory of Bangladesh. This would be very helpful to design and prepare research instrument for the study. In this regard, I have the pleasure to inform you that you have been selected as one of the Judges for selecting and rating items of the scale. You are requested to rate the items of "**Green industrialization of readymade garments sector in Bangladesh**" with the scale of 1-9 (1 for least appropriate and 9 for most appropriate) at the right side of the items.

You are also requested to edit the whole questionnaire for necessary correction, modification, addition and deletion of different questions of the interview schedule. Your efforts will be definitely helpful to the quality of the PhD research. The aforesaid scale and the interview schedule are attached herewith for your necessary action.

Please return the materials back at your earliest convenience after completing the work.

With personal regards sincerely yours,

Prof. Dr. Md. Sekender Ali
Supervisor of the Concerned PhD Candidate
Department of Agricultural Extension & Information System
Sher-e-Bangla Agricultural University, Dhaka

The questions will be used for collecting data from the farmers. The Judges are requested to just **rate the items on the last column** by mentioning '1 to 9' where '1' indicated 'Less Appropriate' and '9' indicated 'Most Appropriate'.

GREEN INDUSTRIALIZATION OF READYMADE GARMENTS SECTOR IN BANGLADESH

Please mention the degree of effectiveness as perceived by you for using of selected impact on green industrialization of RMG in Bangladesh

Sl. No.	Items	Before involvement In Green Industrialization				After involvement In Green Industrialization				**Judges' Rating (1 to 9)**
		High (3)	**Moderate (2)**	**Low (1)**	**Not at all (0)**	**High (3)**	**Moderate (2)**	**Low (1)**	**Not at all (0)**	
1	Use of Eco friendly Light in your Factory									
2	Use of Re cycling Bricks									
3	Use of Sprinkler									
4	Use of Fire alarm									
5	Collection of rainwater									
6	Access waste water treatment plant (ETP)									
7	Potential options for 3Rs (Reduce, Reuse and Recycle) policy for water & wastewater treatment									
8	Availability safe chemical facility									
9	Use of Hand gloves during working									
10	Use of Sprinkler for fire incident									
11	Use of eye guard during sewing									
12	Use of Extinguisher for fire incident									

13	Use of musk during working									
14	Use of high Solar reflecting paints in rooftop areas									
15	Use of Generator for source of Energy									
16	Assure factory workers housing facilities									
17	Assure schools for workers children's									
18	Nearby market for shopping									
19	Ensure enough sunlight and solar power utilization to reduce the cost of electricity									
20	Keeping about 50% free space of total factory premises to ensure enough trees for enough ventilation facilities to protect heat									
21	Ensure self anti – fire instrument and training facilities									
	Total									

Thank you for your kind co-operation

……

Signature of the Judge

Appendix-C

Appropriateness of the items of **"Green industrialization of readymade garments sector in Bangladesh"** scale

No.	Items	Average Appropriateness score (out of 9)
1	Use of Eco friendly Light in your Factory	5.82*
2	Use of Re cycling Bricks	7.23*
3	Use of Sprinkler	7.18*
4	Use of Fire alarm	6.68*
5	Collection of rainwater	5.09*
6	Access waste water treatment plant (ETP)	5.45*
7	Potential options for 3Rs (Reduce, Reuse and Recycle) policy for water & wastewater	4.77
8	Availability safe chemical facility	3.73
9	Use of Hand gloves during working	5.55*
10	Use of Sprinkler for fire incident	2.32
11	Use of eye guard during sewing	6.32*
12	Use of Extinguisher for fire incident	4.86
13	Use of musk during working	5.50*
14	Use of high Solar reflecting paints in rooftop areas	6.95*
15	Use of Generator for source of Energy	4.45
16	Assure factory workers housing facilities	7.23*
17	Assure schools for workers children's	6.86*
18	Nearby market for shopping	6.82*
19	Ensure enough sunlight and solar power utilization to reduce the cost of electricity	6.64*
20	Keeping about 50% free space of total factory premises to ensure enough trees for enough	7.32*
21	Ensure self anti –fire instrument and training facilities	2.32

Appendix-D

Detailed step-wise multiple regressions analyses

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	dma	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
2	know	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
3	cosmo	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
4	edu	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: impact

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.641[a]	.410	.408	3.91921
2	.766[b]	.587	.584	3.28682
3	.795[c]	.632	.628	3.10689
4	.800[d]	.640	.635	3.07867

a. Predictors: (Constant), dma
b. Predictors: (Constant), dma, know
c. Predictors: (Constant), dma, know, cosmo
d. Predictors: (Constant), dma, know, cosmo, edu

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2789.209	1	2789.209	181.587	.000[b]
	Residual	4009.011	261	15.360		
	Total	6798.221	262			
2	Regression	3989.395	2	1994.697	184.640	.000[c]
	Residual	2808.826	260	10.803		
	Total	6798.221	262			
3	Regression	4298.153	3	1432.718	148.426	.000[d]
	Residual	2500.067	259	9.653		
	Total	6798.221	262			
4	Regression	4352.842	4	1088.210	114.812	.000[e]
	Residual	2445.379	258	9.478		
	Total	6798.221	262			

a. Dependent Variable: impact
b. Predictors: (Constant), dma
c. Predictors: (Constant), dma, know
d. Predictors: (Constant), dma, know, cosmo
e. Predictors: (Constant), dma, know, cosmo, edu

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	8.532	.980		8.706	.000
	dma	1.390	.103	.641	13.475	.000
2	(Constant)	5.170	.882		5.864	.000
	dma	1.044	.093	.481	11.280	.000
	know	1.136	.108	.449	10.540	.000
3	(Constant)	4.248	.849		5.003	.000
	dma	.824	.096	.380	8.602	.000
	know	.892	.111	.353	8.054	.000
	cosmo	.314	.056	.268	5.656	.000
4	(Constant)	4.402	.844		5.216	.000
	dma	.804	.095	.370	8.438	.000
	know	.745	.126	.295	5.928	.000
	cosmo	.302	.055	.258	5.462	.000
	edu	.153	.064	.113	2.402	.017

a. Dependent Variable: impact

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	age	.116[b]	2.447	.015	.150	.986
	edu	.335[b]	7.357	.000	.415	.903
	famsiz	.002[b]	.051	.960	.003	.999
	yrsal	.141[b]	2.971	.003	.181	.976
	yrsav	.060[b]	1.243	.215	.077	.981
	train	.126[b]	2.594	.010	.159	.930
	cosmo	.418[b]	8.568	.000	.469	.744
	serlength	.193[b]	4.125	.000	.248	.970
	know	.449[b]	10.540	.000	.547	.874
	probl	-.056[b]	-1.141	.255	-.071	.925
2	age	.017[c]	.411	.681	.026	.931
	edu	.136[c]	2.767	.006	.169	.639

	famsiz	-.017[c]	-.430	.668	-.027	.997
	yrsal	.047[c]	1.140	.255	.071	.926
	yrsav	-.008[c]	-.202	.840	-.013	.956
	train	.024[c]	.559	.577	.035	.877
	cosmo	.268[c]	5.656	.000	.332	.630
	serlength	.061[c]	1.422	.156	.088	.867
	probl	-.079[c]	-1.915	.057	-.118	.923
3	age	.014[d]	.368	.713	.023	.930
	edu	.113[d]	2.402	.017	.148	.634
	famsiz	-.037[d]	-.986	.325	-.061	.988
	yrsal	.024[d]	.605	.545	.038	.915
	yrsav	-.023[d]	-.589	.557	-.037	.952
	train	-.006[d]	-.154	.878	-.010	.862
	serlength	.035[d]	.868	.386	.054	.856
	probl	-.065[d]	-1.665	.097	-.103	.919
4	age	.027[e]	.686	.493	.043	.915
	famsiz	-.021[e]	-.561	.575	-.035	.955
	yrsal	.019[e]	.485	.628	.030	.913
	yrsav	-.047[e]	-1.204	.230	-.075	.898
	train	-.019[e]	-.460	.646	-.029	.849
	serlength	.042[e]	1.038	.300	.065	.853
	probl	-.047[e]	-1.180	.239	-.073	.875

a. Dependent Variable: impact
b. Predictors in the Model: (Constant), dma
c. Predictors in the Model: (Constant), dma, know
d. Predictors in the Model: (Constant), dma, know, cosmo
e. Predictors in the Model: (Constant), dma, know, cosmo, edu

Appendix-E

Correlation Matrix between Dependent and Independent Variables

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	Y
X_1	1											
X_2	.101	1										
X_3	.520**	-.035	1									
X_4	.510**	.255**	.415**	1								
X_5	.215**	.266**	.067	.528**	1							
X_6	.202**	.305**	.167**	.294**	.338**	1						
X_7	.179**	.386**	.085	.297**	.295**	.266**	1					
X_8	.138*	.333**	.047	.171**	.188**	.245**	.394**	1				
X_9	.820**	.208**	.553**	.494**	.239**	.239**	.295**	.192**	1			
X_{10}	.244**	.571**	.078	.292**	.253**	.317**	.400**	.322**	.313**	1		
X_{11}	.014	-.232**	.037	-.133*	-.068	.020	-.195**	-.310**	-.037	-.057	1	
Y	.199**	.486**	.025	.243**	.268**	.286**	.513**	.700**	.250**	.532**	-.273**	1

**Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed).

X_1=Age	X_9= Service length
X_2= Education	X_{10}= Knowledge on green industrialization
X_3= Family size	X_{11}= Problem faced in garments
X_4= Yearly salary	Y= Green industrialization of readymade
X_5= Yearly savings	garments in Bangladesh
X_6= Training exposure	
X_7= Cosmopoliteness	
X_8= Decision making ability	