Comparative Analysis of the Green Industrialization between Green and Non-green Garments of Bangladesh

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ABSTRACT

The purpose of this study was to determine the extent of green industrialization of Ready Made Garment (RMG) in Bangladesh. Two green industries of Narayanganj District were purposively considered for the study. Data were collected from a sample of randomly selected 263 RMG Workers and Supervisors out of 840 from the mentioned 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. 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.

Index Terms— Green industry, non-green garments, eco-friendly light, fire incident and ETP.

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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. 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.

2 MATERIALS AND METHODS

This research work was conducted on purposively selected two readymade garments (RMG) in Narayanganj district. The RMG workers and supervisors the garments of the selected was which constituted the population of the study. 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 (Yin, R. K. 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. 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.

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

Green industrialization of RMG was the main focus of the study. According to U S Green Building Council (USGBC 2009) 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. 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.Data were collected from 263 RMG workers and supervisors of 2 RMG having green industrialization during the period from June 2019 to August 2019. 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. 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 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 significance was used to reject null hypothesis. **RESULT AND DISCUSSION**

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 Table 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.

Table : 1 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

On the basis of simple t test the green industrialization had play a significant role of RMG in Bangladesh. Hence, it was concluded that more green industrialization is done in green RMGs than that of non-green RMGs. 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.

Comparative item 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 2.

Table 2 Items wise green industrialization of RMGs with rank order as perceived by the workers and supervisors

Items No.	Name of Items	Green industri-alization 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 inci-dent	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 sew-ing	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 hous-ing 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 re-duce 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 2 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". 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

CONCLUSION

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 fac-

tors 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.

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