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Future Tradeoff under Fourth Industrial Revolution in Bangladesh: A Study on RMG Sector

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Abstract

Bangladesh's government has taken the 7th Five Year plan to implement Sustainable Development Goals (SDGs) by promoting favorable trade policies along with industrialization, digitization, and inclusive development. Hence, well-running trade is considered as the promising indicator to achieve SDGs which is growing exponentially in our country. Here, the Readymade Garment (RMG) is the most influential trading sector to contribute enormously in the export-earning. In recent times, the sector is facing massive changes due to the automation of the Fourth Industrial Revolution (FIR). To sustain in this digital competitive trade market, has become a major challenge for the small RMG industries. A huge number of Small and Medium Enterprises (SMEs) in our country have already been shut down due to automation. The large factories are also changing their manufacturing system by installing automation to cope with the demand for global competition. These are creating an unstable condition for RMG trade. The

government needs to take a strategic and integrated plan immediately to gain the competitive advantage of FIR. Otherwise, Bangladesh will lose the international market for the RMGs of the country.

Keywords: Fourth Industrial Revolution, Ready-Made Garment, Automation, Tradeoff, Competitive advantage.

Introduction and Background

Trade is the engine of growth which enables exporter countries to acquire domestic competition, economic success, and a high priority in the global market (Belloc & Maio, 2011; Lewis, 1980; Riedel, 1984). Throughout the world, the readymade garment sector is considered as one of the most prominent export industries which exported more than \$750 billion in 2017 employing 75 million workers (Dickerson, 1999; IMF, 2004). In recent, readymade garments manufacturing is facing significant transformation due to the technological advancement of the fourth industrial revolution (FIR). The industry is gaining an increased competitive advantage to manufacture at low costs by adopting the automation of FIR (Kaiser, 2018). It also forecasted that the application of automation in RMG industries will increase productivity by 30% (BDI, 2016). However, the increased use of automation with poor preparation can affect the industries negatively. It has been predicted that 25% of the world's jobs will be in threat due to automation which will hamper the trade by hindering smooth export (CNBC, 2019). The developed countries with strong capital will be facilitated by the benefits of the Trade War created by FIR. On the other hand, the developing countries that have a competitive advantage in cheap labor may be deprived of it.

Most of the developing countries in South Asia including Bangladesh, India, China, Vietnam, Pakistan have been affected by the blow of FIR contribute at least 70% to the global export (Azam, 2018; Islam et al., 2018). These countries are facing structural challenges due to FIR and it has been predicted that automation will create a job loss of more than 80% in the RMG sector (ILO, 2016).

Bangladesh is a committed exporter to the global readymade garment market who exported \$30.1 billion in 2017 (UNCTADstat, 2019). Here 4222 RMG industries exist that employ more than 4 million workers (BGMEA, 2017). It contributes 14% of the GDP and 81% of the total export earnings of the country (A2i, 2020). Bangladesh is the second biggest readymade garment exporter in the world after China. But in recent times, it is lagging from its competitor exporters

Vietnam and Cambodia (A2i, 2020). To gain a more competitive advantage than other countries, Bangladesh has installed advanced technologies in industries to increase productivity (Nuruzzaman et al., 2016). However, Bangladesh is facing huge challenges along with some opportunities for FIR. Automation will promote 80% additional efficiency in productivity in the RMG sector (A2i, 2020). On the contrary, it will be a threat to the low-wage workers that can lead millions of people towards jobless. It is predicted that 60% of jobs in the RMG sector will be at risk due to automation (A2i, 2020). Cheap labor is the strength of the country that will be most affected by automation. The government needs to take proactive measures to automate the RMG sector to gain tremendous benefits of FIR (Azam, 2018). There is a lack of proper empirical study on this issue that needs to be addressed. This study intends to explore the future tradeoff of the Bangladesh RMG sector under the Fourth Industrial Revolution and to recommend ways forward for adapting to the transformations.

Research objective

The specific objectives of the research are:

- To explore the future tradeoff of Bangladesh Readymade Garment sector under the Fourth Industrial Revolution.
- To recommend ways forward for adapting with the technological transformations.

Literature Review

This literature is considered as the nature of Readymade Garments' trade-off due to the potential transformation of the Fourth Industrial Revolution. There five major sectors including RMG and textile, furniture, leather, Agro-food processing, and leather. Among them, the textile and RMG sector is 60 percent which is a high probability of automation (A2i, 2020). For this reason, most of the textile and apparel industry researchers have concentrated on integration and communication skills to establish relationships between various supply chain parties and synchronize activities to gain a comparative advantage (Zhao et al. 2008). In the modern history of the world, technological advancement has been the main engine of economic development. Rosyadi (2018) states that from the early 20th century technologies and machinery are being rapidly developed which have controlled the production process automatically. Garment industries use Programmable Logic Controllers (PLCs) and computer-based automated systems

rather than controlled by human hands which help to reduce the production costs and advance the information technology. This time is considered as the fourth industrial revolution or 4.0 which basically promotes the automation system to replace humans.

Increases in demand introduced by new technologies have been more than enough to offset the labor-saving impact of technology at the macro-level (Vashisht, 2019). Buxey 2005; Lambert & Pohlen 2001; Nuruzzaman et al., 2010; Doukidis, 2007 explained that to enhance comparative advantage and performance, the industries need to implement the different technological applications such as robots replace of labors, ICT, e-commerce, EDI execution that led to time reduction and supply chain cooperation. Mokyr et al (2015) have also clarified that industrial automation can increase efficiency and productivity, which helps to reduce production prices, increases demand, and also creates new jobs to meet this demand in those industries.

Rumi et al (2020) describes that in Bangladesh, the fourth industrial will create new jobs and business opportunities after adopting introduced and advanced new technologies in different sectors like RMG, textile, and software business. Further added that it will turn into a digital landscape where the consumers can order original products without uncertainty. After integrating the automation in garment industries in Bangladesh, productivity increases from 72.57 percent to 72.78 percent, and Standard Minute Value (SMV) of productivity is increased from 73.81 to 83.1 and productivity increases from 21.42 to 24.19 which accounts for around 12.93 percent (Ansari et al., 2019). Besides, due to the comprehensive practice of automation processes in industries, mass unemployment over the next few decades is expected to pose a major problem (Arntz et al., 2016; Autor, 2015; Furman, 2016). Moreover, to install the new technologies of this revolution, Bangladesh has faced some difficulties such as poor infrastructure, unskilled and available labors, expensive installation of new technologies, lack of proper technical knowledge, and so on (Islam et al., 2018).

Zervoudi (2019) recommends that the government would act to reduce the risk of employees being exposed to automation by investing in learning and education for unskilled jobs to adapt better to advanced technologies and digitization. The government of Bangladesh has been attempting to be digitalized through the application of new technologies of 4.0 successfully (Islam et al., 2018). However, previous literature has explained limited discussions on the new path of RMG trade due to the emergence or transformation of new technologies of industrial

revolution 4.0. Particularly, this paper is arranged by Porter's Diamond Model that was not well discussed by the previous studies to assess the fourth industrial revolution and RMG sector.

Theoretical Framework

The Porter Diamond Model is a popular theory of competitiveness of production, offering a systematic structure for national and international-level understanding of differences in competitiveness (Fainshmidt et al., 2016; Zhang & London, 2013). The Porter competitiveness model is frequently cited as the best model that is useful for benchmarking the comparative advantages of the industry. This model also shows that some countries are more benefited in specific business or industries whereas others are not (Porter, 1990; Chobanyan & Leigh, 2006; Grant, 1991; Stonehouse & Snowdon, 2007; Jin & Moon, 2006; Bhaskaran, 2011). The following has given the operational definition of six components of Porter's model.

Firm strategy, structure, and rivalry: To build a strong organizational strategy and unique structure for adopting the upcoming new technologies in RMG sectors such as automation, PLCs, robotics, etc., and intense competition between local and international markets.

Demand condition: The nature of local and international market demand for the products of the RMG sector.

Factors condition: The country possesses specialized factors to get the advantage in production such as cheap labor, installation of new technologies, etc.

Related and Supporting Industries: Presence of competitive related and supporting industries such as dying section, knitting section, etc.

Government: The government role is a catalyst and challenger such as taking policies, industry regulation by BGMEA and BKMEA and moving to even higher levels of competitiveness.

Chance: Chance can be created by different ways such as quota-free trade and installation of new advanced technologies and other competitive countries fell their same production due to natural disasters and economic crises.

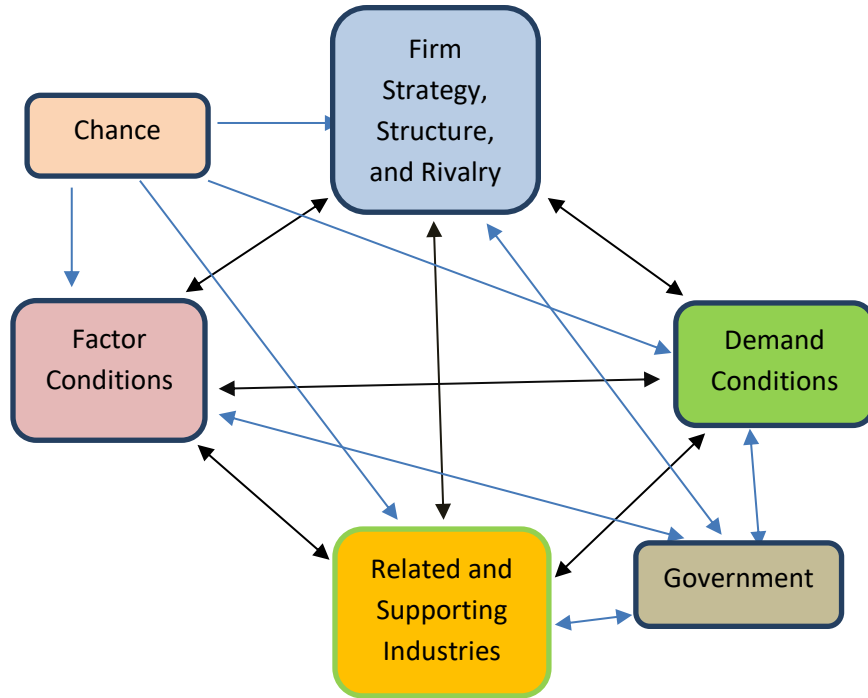


Figure: Porter's Diamond Model of Competitive advantage, 1990

Methodology

The article was based on the qualitative research approach. This qualitative approach explored the future tradeoff of Bangladesh's readymade garment sector under the Fourth Industrial Revolution and gave some way forward regarding this context. The qualitative design allowed respondents to freely disclose their experiences and thoughts about the particular subject. The researchers collected data from both primary and secondary data Collection methods. Primary data was accumulated from Key Informant Interview. 30 KIIs were collected from Expertise, Academicians, Garments officials, and Government employees through purposive sampling technique. 10 questions were asked to the respondents as an open-ended questionnaire structure focusing on the FIR and RMG sectors of Bangladesh. As most of the respondents had approximately similar thinking about the research objective, so the researchers conducted only 20 KIIs. On the other hand, secondary data was collected by using inductive document analysis from various international journals, books, authorized government, and Non-government reports,

newspapers, and authentic documents focusing on the garments sector. This qualitative secondary data was analyzed by using thematic analysis. This procedure enables the researchers to concise and summarize the collected data and helped to define the potential transformational implication of FIR regarding the trade of Readymade Garments of Bangladesh. To ensure avoiding the restriction of a single method; the researchers used triangulation of data in this paper.

No	Areas of triangulation	Ways
01	By study (Thematic Analysis)	International journals, Books, Government, and Non-government reports, newspapers, and Documents.
02	By data Source	Primary & Secondary Method
03	By method	KII, Document analysis
04	By theory and concept	Theoretical Framework

Table 1: Triangulation of data

Result and Discussion

The fourth industrial revolution is intending to further promote this sector by its technological advancement. For this purpose, gaining a competitive advantage is required. Michael Porter has categorized six components of gaining competitive advantage. Bangladesh has a good edge in all these factors which can be further promoted by the fourth industrial revolution. This study has discussed the implications of FIR on the trade of readymade garments of Bangladesh based on Porter's Diamond Theory. The Discussions are below:

Current Business Conditions in the RMG Sector

The study revealed that the Bangladesh garment industry is popular for having cheap labor, but now it is adopting automation to speed up productivity. Most of the RMG factories installed digital technologies and machinery and, each year, 100 new factories adopt modernization in our country. At present, 47% of large-scale factories and 25% of medium-scale factories of the Bangladesh Ready Made Garment sector use the advanced technology of automation (BGMEA, 2020; CPD, 2017). In addition to this, BGMEA is going to launch a 'Digital Wallet' system for the wage digitization of RMG workers (BGMEA, 2020). However, small-scale enterprises of the industry can't equip automation due to poor capital and lack of knowledge of digital technologies. One respondent from experts remarked that '*Bangladesh RMG industry includes few international standard factories who produce and export high-quality products by using the*

technology of FIR. But the other factories are lagging and setting up automated factories is challenging and costly to them'.

Due to the lack of skilled manpower, the RMG industry of Bangladesh employs the greatest number of foreign skilled manpower particularly from India and Sri-Lanka (Mian, 2020). About 16% of RMG industries employ foreign workers and each of the employees has to be salaried on average 500,000 to 700,000 Tk monthly which made up a total of \$500 crore annually (BIDA, 2020; CPD, 2018). In line with this issue, the interviews pointed out that the foreigners are taking away a huge amount of our hard-earned remittance and our dependence on the foreign workforce is prohibiting to build our own skilled professionals.

Future growth potentials and challenges in the RMG sector

Two powerful factors ensure production in a particular industry. Porter (1990) identified the basic factors of production as natural resources, labor force, climate, raw materials, and capital. On the other hand, advanced factors include specialized knowledge, automated technology, and innovation (Abrar et al., 2018).

In the case of the Bangladesh RMG industry, cheap labor, location, and favorable climate were mainly responsible for the rapid growth of the industry (Uddin, 2014). Bangladesh has ranked 8th in the overall population of the country over the world (Worldometer, 2020). This creates a big advantage for Bangladesh to supply a huge labor force for the garments industry. Moreover, Bangladesh has a cheaper labor force comparing to other countries involved in this sector. However, The RMG industry of Bangladesh is highly dependent on the imported raw material. About 90% of woven fabrics and 60% of knit fabrics are imported to make garments for export (Nuruzzaman et al., 2016).



Figure 2: Minimum monthly wages of the workers

Source: NYU Stern Center for Business and Human Rights (Barrett & Pauly, 2019)

With the emergence of the innovative technology of the Fourth Industrial Revolution, advanced factors are encouraged for achieving a higher competitive advantage in the market. One writer opined, *"Advanced factors contribute more to the sustainability of competitive advantage than to basic factors"* (Shafaeddin et al., 2012). Automation and intelligence enhance the speed of production and minimizes the time and waste of production. Therefore, save resources, improve production efficiency, and ultimately gain economic growth (Li et al., 2017). Mohammadi Fashion Sweaters Ltd., one of Bangladesh's top clothing manufacturers, has recently installed 173 German-made equipment, replacing manual knit stations operated by human force (Kaiser, 2018). Rubana Huq, managing director of the Mohammadi Group, said, *"It makes no sense for us to slow down and not automate"* (Emont, 2018).

However, the lack of technologically skilled professionals is recognized as a major hurdle to the growth of the RMG industry. *"The scarcity of trained and skilled human resources is a recognized hindrance to the further growth of the Bangladesh RMG industry and the RMG sector is mostly dependent on foreign nationals to meet these requirements,"* said one of the KIIs (Personal communication, Sep 9, 2020). Therefore, Bangladesh needs to develop the skills of the

human resources otherwise adoption of FIR technology will create further dependency on foreign human resources.

Trade war and opportunities for the RMG sector

The fourth industrial revolution is creating profound opportunities for the Bangladesh RMG industry to enter into the extended global markets. The Bangladeshi RMG has huge opportunities to find new markets and improve the business in the world market. Many scholars thought that the trade war between USA-China will create a great opportunity to grab the market for the Bangladesh RMG (Mian, 2020). Our industries can increase production at low cost and due time through the use of automation in the garment industries. This will attract international buyers which will give a better position to the RMG sector compared to the other competitors.

However, the COVID-19 pandemic has created an unprecedented crisis for the RMG sector of our country. Order cancellation and destruction in exports has decreased the export volume up to 84 percent till April 2020 (Mian, 2020). A high-level strategic plan based on technological advancement can help to fight against these challenges. The automation will promote innovative and designed strategies for the industry. The Bangladesh government has already taken strategies to occupy the benefits of FIR in the trade of readymade garments.

Forward and backward linkage for the RMG sector in Bangladesh

Supporting industries enable the main industry to obtain inputs efficiently and advantageously. In Bangladesh, local textile factories have the capability to fulfill the 90 percent demand for knitted yarn of 124 garments (BTMA, 2019). An approximate 1,476 textile-related factories and 1,683 trims and accessories-producing enterprises have established a strong base for this sector (BGAPMEA, 2017). Research has identified the growth of backward ties as a major strength for the advancement of the knitwear sector. One of the KIIs expressed, "*Bangladesh has made remarkable progress in improving strong backward linkages in the knitted clothing sector*" (Personal communication, Sep 10, 2020).

One of the KIIs opined, "*Having capabilities in knitted sectors, it still lagging in assisting fabrics and woven industries*" (Personal communication, Sep 12, 2020). Secondary information also supports this statement. Bangladesh RMG sectors are dependent on foreign supply importing 90% woven and 60% fabrics from abroad (Nuruzzaman et al., 2016).

Besides primitive industries, the forward linkage is also vital for the growth of RMG sectors in Bangladesh. Local demand for RMG items is very low as people tend to buy low-cost fabrics and custom-made clothing (Nuruzzaman, 2015). Therefore, the RMG sector is based entirely on international market demand for future growth and sustainable development. Research has shown that there are huge potentials for domestic consumer demand due to the quickest growing middle-class population in Bangladesh. According to the World Bank (2016), Bangladesh's middle-income population grew to 20% in 2015 compared to just 9% in 1992. So, the RMG industry should target this market and aim to boost demand from local people and then accelerate exports.

Government Interventions and Policy Challenges for facilitating the Fourth Industrial Revolution in Bangladesh

According to the respondents of this study, the Bangladesh government is playing the role of catalyst to adapt to the automation of FIR in the readymade garments sector to increase export earnings. It extended favorable financial and policy supports to the RMG industry which opened new possibilities in global value chains (Mian, 2020). Bangladesh government has taken program of reskilling 2 million RMG workers by using human-computer interaction methods and 15 lakhs RMG workers through 'Training Programme for Skill Development' for ensuring sustainable development with the challenges of FIR (BGMEA, 2020; WEF, 2020). Along with these, a subsidy of 1% additional cash incentive, 4% cash incentive, the loan with a lower interest rate for automation and modernization, special export monetary policy, a special reserved fund for industry technology import to garment industries have been provided (Mridha, 2020; TextileToday, 2020). To solve the transportation system, the government has planned to implement the 'Multi-modal Transport System' and has amended the 'Labor Law' in 2015 to protect labor rights (BGMEA, 2020).

However, the RMG sector of Bangladesh is facing some policy challenges rather than other competitor countries particularly China and Vietnam. China has the 'Open-Door Policy' and it encourages the SMEs to set modern units with the favorable supply of raw materials which increased the competitive advantage of the country link to Bangladesh (CPD, 2018). On the other hand, Bangladesh is facing strong competition from Vietnam as Vietnam invests high in education regarding Textile and Apparel industry technology. The Free Trade Agreement of

Vietnam with the EU has also created a challenge for Bangladesh in the global market (TextileToday, 2020).

Conclusion and policy recommendation:

This study has discussed the future tradeoff of FIR of readymade garments of Bangladesh based on Porter's Diamond Theory. This article highlighted that the FIR is intending to promote the Garments sector by its technological advancement. We have found that this competition helps the businesses to innovate new strategy & design that promotes the industries to compete with the others competitors both in local and international markets by exporting the quality products in a short time. This study has presented that technological advancement increasing the productivity, efficiency, and quality of the products that give it a further step towards national economic development. Forward and backward industries are strongly linked with the RMG sector. Besides this, the Human and natural resources of Bangladesh will create a huge potentiality to develop the garments sector in the future FIR era according to the finding. The article also pointed out that the foreigners are taking away a huge amount of our hard-earned remittance by employee upper-level post of our garment industries. Concerning the demand condition, Bangladesh has to create local consumers of the RMG sector to reduce the dependency on foreign buyers and employees. Interestingly we found that the trade war between USA-China will create a great opportunity to grab the market for the Bangladesh RMG. To cope with the blow of FIR, the Bangladesh government has taken human-computer interaction methods, financial incentives, policy incentives, Cash incentives, favorable economy policy, GSP facilities, and required trade agreements in both national and international arenas which opened new possibilities for global value chains. All these are creating a competitive advantage for the RMG export and preparing this sector to adapt with FIR.

But there are some challenges also, like COVID 19 pandemic, unskilled labor, lack of capital incentive, SMEs lagging, etc. Automaton is majorly made up for the big giant but for the SME industry is worsen being. The main drawback of this research is that it was time-consuming and the verification of the result was difficult. The unskilled labor force is a barrier to the growth of the RMG sector in the era of automation. As technology is developing rapidly and the labor cost is increasing, it is the better way to replace labor with automation that will promote trade, but at the same time, this will create huge unemployment within the country. Adjusting with the

automation of FIR to cope up with the international market will be another challenge for Bangladesh. For the lack of skilled manpower in the domestic arena, Skilled manpower was imported from other countries that create a foreign dependency for the country. FIR may be a blessing for our country if the state authority responds timely to create a favorable environment for the automation adaptation. To make the fourth industrial revolution some policy concerns need to be considered. These are:

- The government should identify the automation applicable sectors of readymade garments and invest in infrastructural development. By the 7th Five Year Plan government have to try resolving the long-term RMG development. Ministry of planning, ministry of commerce has and ministry of finance have to work negotiable way.
- Small and Medium enterprises are crucial for employment generation. The government should support SMEs to get access to the technology that can increase their production, competitiveness, and export-led earning. Small and Medium Enterprise Foundation under the ministry of commerce will be the supporting authority for the SMEs and other small RMG owners.
- The government should enhance training programs for skill development of the workers that will be beneficial for the future job market of Bangladesh. Commerce ministry, labor and employee ministry, department of textile, BEPZA, BGMEA, and the deputy director of EPB have to make strategic policy coordinately to train up the unskilled employees for the future automaton era.
- To reduce the foreign skilled employee in our industry the government must envision an education system that increases communication and language skills and focuses on the internal creativity of the indigenous employees. The national skill development authority, ministry of education, and ICT ministry should be more serious to achieve this goal.
- The government needs to enhance the budget for government-based research institutions to identify new strategies to adopt automation and compete in the global market. Various government research institution, BGMEA, Ministry of agriculture, ministry of planning has to focus in the garments sector for adapting the FIR.
- By using digital technology government should try to establish an effective social safety program, especially for the garment s workers. Insurance and a healthy environment will attract skilled employees in the garments sector.

Finally, it can be anticipated that government and private sector should make planning in the adjustment period to be prepared to face the fourth industrial revolution and be a beneficiary of export-led earning through the application of FIR.

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