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MODERATING EFFECT OF GREEN TECHNOLOGY ADOPTION ON STAKEHOLDER INFLUENCE AND ENVIRONMENTAL SUSTAINABILITY PRACTICES IN SMALL AND MEDIUM TEXTILE ENTERPRISES IN BANGLADESH

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By

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Businesses are increasingly becoming conscious of the environmental aspects of their operations due to increasing consumers awareness with regards to environmental impact of their consumption choices. The willingness to reduce their ecological footprint has created new market opportunities as well as stakeholders' pressure. Consequently, green initiatives are evolving into a crucial part of strategic planning in organizations, including small and medium enterprises (SMEs). Although SMEs differ from large companies not only in terms of their size but also other characteristics, their combined impact on environment is significantly higher than big companies. Green technology adoption (GTA) with the coordinated effort of stakeholders can minimize this negative impact. Thus, the objective of this research is to determine the relationship between stakeholder influence (SI) and environmental sustainability practices (ESP), as well as examining the moderating effect of the perception of green technology adoption (GTA) in Bangladesh Textile SMEs in Dhaka, Bangladesh. The current research follows a post positivist, quantitative, deductive, confirmatory, and cross-sectional approach for the study. A structured questionnaire is used in this research to obtain primary data from 140 textile SMEs. The owners and managers are targeted as they have the supreme power and information about installing any strategic change. SPSS23 and Smart-PLS 3.2.9 are used for data analysis. Analysis of the findings showed that buyers' pressure (BP), community engagement (CE), employees' involvement (EI), government regulation (GR), management support (MS) have positive relationship with ESP except suppliers' pressure (SP). The perception on GTA only moderate suppliers' pressure (SP). The weak integration of stakeholders with the Bangladeshi textile SMEs and low level of technological awareness and adoption, support these findings. This study serves as a pioneer effort to investigate the effect of SI on ESP with the moderation of perception on GTA in Bangladesh textile SMEs. The findings of this research provide new directions for future research and several crucial implications to the other manufacturing SMEs and policymakers.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

KESAN SEDERHANA ADAPTASI TEKNOLOGI HIJAU KE ATAS PENGARUH PIHAK BERKEPENTINGAN DAN AMALAN LESTARI PENJAGAAN ALAM SEKITAR DALAM PERUSAHAAN TEKSTAIL KECIL DAN SEDERHANA BANGLADESH

Oleh

MOHAMMAD IMTIAZ HOSSAIN

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Dunia perniagaan semakin menyedari aspek penjagaan alam sekitar perlu diberi perhatian hasil daripada kesedaran para pengguna dalam membuat pilihan barangan yang digunakan agar tidak meninggalkan kesan negatif kepada alam sekitar. Kesediaan semua pihak untuk mengurangkan kesan ekologi telah membuka peluang baru dalam pasaran dan tekanan kepada pihak yang berkepentingan. Akibatnya, inisiatif hijau semakin berkembang dan menjadi penting dalam perancangan strategik organisasi, termasuklah perusahaan kecil sederhana (PKS). Walaupun terdapat perbezaan yang nyata di antara PKS dan syarikat perusahaan yang besar, bukan sahaja dari segi saiz, tetapi juga ciri-ciri yang lain, kesan yang ditinggalkan daripada gabungan beberapa PKS terhadap alam sekitar adalah lebih nyata daripada kesan yang ditinggalkan oleh syarikat-syarikat besar. Usaha mengadaptasi teknologi hijau yang diselaraskan oleh pihak yang berkepentingan dapat mengurangkan kesan negatif kepada alam sekitar. Justeru itu, objektif kajian ini ialah menentukan hubungkait di antara pengaruh pihak berkepentingan dengan amalan penjagaan alam sekitar yang lestari, dan menyelidik kesan perantaraan persepsi terhadap adaptasi teknologi hijau dalam kalangan PKS tekstil Bangladesh, di Dhaka, Bangladesh. Kajian ini menggunakan kaedah pasca positivis, kuantatif, deduktif, pengesahan dan keratan rentas. Soal selidik berstruktur digunakan dalam kajian ini untuk memperolehi data utama daripada 140 buah PKS. Tuan punya dan pengurus PKS menjadi sasaran sebagai unit pemerhatian kerana mereka ini mempunyai bidang kuasa tertinggi dan maklumat untuk melaksanakan perubahan strategik dalam perusahaan mereka. SPSS 23 dan Smart-PLS 3.2.9 digunakan untuk menganalisis data. Berdasarkan kepada data yang dianalisis tekanan pembeli, penglibatan komuniti, peraturan yang dikeluarkan oleh kerajaan, dan sokongan pengurusan mempunyai hubungkait yang positif dengan amalan lasteri penjagaan alam sekitar kecuali tekanan daripada pembekal. Persepsi tentang adaptasi teknologi hijau hanya menjadi perantara kepada tekanan pembekal. Pengintegrasian yang lemah di antara pihak yang berkepentingan dengan PKS tekstil Bangladesh dan kesederan tentang

teknologi dan adaptasi yang rendah, menyokong penemuan dalam kajian ini. Hasil kajian ini menjadi perintis kepada usaha menyelidik kesan pengaruh pihak yang berkepentingan ke atas amalan lestari penjagaan alam sekitar yang disetarakan oleh persepsi adaptasi teknologi hijau dalam PKS tekstail di Bangladesh. Penemuan kajian ini memberikan petunjuk baharu untuk kajian pada masa akan datang dan beberapa implikasi penting kepada PKS yang memberi tumpuan kepada pembuatan dan penggubal polisi.

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LIST OF ABBREVIATIONS

AVE	Average Variance Extracted
BTMA	Bangladesh Textile Mills Association
BS	Business Sustainability
BP	Buyers' Pressure
CA	Cronbach's Alpha
CE	Community Engagement
CR	Composite Reliability
DoE	Department of Environment
ES	Environmental Sustainability
ESP	Environmental Sustainability Practices
EI	Employees' Involvement
ETP	Effluent Treatment Plant
GR	Government Regulations
GT	Green Technology
GTA	Green Technology Adoption
GM	Green Manufacturing
GMP	Green Manufacturing Practices
HTMT	Heterotrait-Monotrait Ratio
MS	Management Support
PGTA	Perception on Green Technology Adoption
SEM	Structure Equation Modelling
SDGs	Sustainable Development Goals
SM	Sustainable Manufacturing

SMP	Sustainability Manufacturing Practices
ST	Stakeholder Theory
TOE	Technology, Organization and Environment Theory

CHAPTER 1

INTRODUCTION

1.1 Introduction

The environmental aspects of business activities are gradually becoming consciously recognized (Jansson et al, 2017). Consumers' awareness is increasing due to the environmental influence in their consumption preferences and their readiness to mitigate their ecological track. This has produced new market opportunities and stakeholders' pressure. The impact of operations on the environment seem to be better understood by the larger businesses organizations rather than the small ones (Schmidt et al., 2018; Chassé, 2017; Loorbach & Wijsman, 2013) due to the former being more dominant with better organizational control, financial stability, and higher tendency to generate sustainability strategies (Potts, 2010), have robust expediency to resources (Lucas, 2004) and ease of determining environmental pollution (Hasan et al., 2020; Salimzadeh, 2016).

Practically, SMEs are different from large firms concerning not only in their size but also their unique characteristics such as an informal management style, owner-manager authority in all decision-making exercise as well as strong community engagement (CE). But SMEs combined impact on environment is significantly higher than big companies (Dey et al., 2018). Undoubtedly, among all the firms, manufacturing firms are considered as the main users of natural resources, so the impact on natural environment in these firms is higher than any other industry. Besides, manufacturing sectors deal with material consumption and generation of wastes (Bhanot et al., 2017; Govindan et al., 2018). It is their liability to ensure that the environment or human life is not affected by their actions.

To maintain firms' competitiveness the importance of stakeholders is very crucial (Bielicki et al., 2019). Fassin (2009) and Kassinis & Vafeas (2006), state stakeholder pressure as the capability and power of stakeholders to impact a firm by swaying its organizational choices. Lee (2008) states that environmental sustainability (ES) could be achieved when all parties are engaged in sustainable practices.

Stakeholders in organizations could be broadly categorised into primary and secondary groups. The primary indicates any class of stakeholder engaged in a formal relationship with a given organization (Quiroga-Calderón et al., 2018). The secondary stakeholder, on the other hand are groups comprise of the media and special interest groups, which are not involved in formal transaction dealings (Quiroga-Calderón et al., 2018). However, they have an impact on establishing company's reputation (Quiroga-Calderón et al., 2018; Parmar et al., 2010). Primary stakeholders are more relevant than the secondary stakeholders concerning the Environmental Management System (EMS)

development based on the recent study by (Shubham et al., 2017; Ghassim & Bogers, 2019 and Frondel 2003).

Based on this research, the terms environmental management and Sustainable Green Practices are interchangeably used to refer to the operations and management activities of the individual textile SME which has been considered as the unit of analysis.

The covered areas in this chapter would be the research background, definitions of the key terms, background of the study, problem statement, objectives, research questions, significance of the study, scope of the study, organization of the thesis and the summary of the chapters. The individual textile SME is considered as the unit of analysis. Based on this research, the terms environmental management and sustainable green practices are interchangeably used to refer to the operations and management activities of the individual textile SMEs.

1.2 Background of the Study

In the global economy, small and medium- sized enterprises (SMEs) play an essential role, and are of pivotal importance to ensure poverty reduction, employment generation, (Battistella et al., 2018), innovation (Ghassim & Bogers, 2019) and prosperity (Sarango-Lalangui et al., 2018); both in the developed and developing nations. Besides, they contribute significantly to job creation and poverty eradication in emerging economies through their labour - intensive manufacturing processes and substantial rate of employment (de Kok et al., 2013). 90% of global businesses are SMEs and they generate 50 to 60 % job opportunities (Gandhi et al., 2018; Shields & Shelleman, 2015; World Bank, 2015; Jayeola, 2015). SMEs provide the strength and foundation of a stable economic development and vitality, through the engagement and development of emerging entrepreneurial talent and capacity building to withstand the storm in multidimensional competitions (Sahoo & Yadav, 2018; Wiesner et al., 2017; Ong, 2015).

In the high-income countries, SMEs contribute to over 55% of GDP and over 65% of total employment. On the other hand, in the context of low-income countries, SMEs and informal enterprises, account for over 60% of GDP and over 70% of total employment, contributing to over 95% of total employment and about 70% of GDP in middle-income countries (Zafar & Mustafa, 2017). Thus, SMEs are important sources for wealth formation and innovation (Williamson et al., 2008).

Consequently, the importance of SMEs could not be denied. The engagement of SMEs in sustainability, would create numerous benefits, such as improvement in competition (Jansson et al., 2017), better product and service quality, better community relations, adequate material utilization, and staff commitment (Jyoti (2019; Pillai et al., 2015). The total environmental impact of large firms could be considerably higher than the united

impact of SMEs (Musa & Chinniah, 2016; Wattanapinyo & Mol, 2013). Previously, the European Commission (2002), has projected that SMEs are accountable for half of the waste and pollution among EU countries. Hillary (1995) also believes that business and industry are the core contributors for global warming. Harris et al., (2017) calculate sustainability measures could lead to a drop in global economic output of between 5% to 20%. Hence, sustainability is considered as the main challenge not only to people and planet but also in economic context (Ghazilla et al., 2015). Environmental pollution creates more than 100 of the world's most deadly diseases (Xu et al., 2019). Recent bushfires in Australia, has burnt more than 48 million acres of land (CDP, 2020). While bushfires are regular occurrences in Australia, reports have estimated an increase of 40 percent environmental issues between 2011 to 2016 (Dutta et al., 2016). Another example of the serious climate shift is the Monsoon rains in Southeast Asia, that have been arriving earlier in recent years accompanied by increasingly heavier rainfall (CDP, 2020). Human health is being significantly affected. Air pollution alone has been calculated to be causing 6 to 7 million premature deaths per year. In Europe, over 400.000 people are estimated to die prematurely due to air pollution (EEA, 2019). According to a recent World Health Organization (WHO) report, deadly diseases and accidents kill 12.6 million people a year, about one in four or 23 percent of all deaths (Osman et al., 2017). From the Rio Earth Summit in 1992, sustainable business has been identified as the solution to the global warming. The green management concept has risen the green technology (GT), green products and green services to the world. The challenge has been identified by Brundtland Report (1987) by recognizing "... humanity has the capacity to develop sustainability to meet the needs of the present without undermining the future generations' ability to fulfil their own requirements". In this respect, ES could serve as a catalyst to transform conventional business into sustainable business (Roxas & Chadee, 2012).

SMEs have paid little attention to sustainability (Revell et al., 2010) although they are the higher (up to 70%) polluters (Mitchell et al., 2020; Hoogendoorn et al., 2015; Johnson, 2015). However, in the Asia Pacific region, SMEs are responsible for 40-50% of industrial pollution whereas, in the UK, 60% of the nation's commercial waste and 8 out of 10 major pollution incidents are traceable to the SMEs (Koirala, 2019; Environment Agency, 2002). Therefore, the SMEs have vital roles to play in the achievement of ES.

Previously, environmental management has been neglected by the organization deliberately since it is considered as cost riser and a constraint to competitiveness (Shrivastava & Hart, 1995). However, given increasing consumer and supervisory focus, sustainability is gradually accepted as a competitive advantage. Thus, sustainability is at the centre of the top managements' agenda. Not less than half of the sourcing executives in a survey believed that sustainable sourcing has a place in the' top managements' agenda in their firm (Sharma et al., 2019). This finding however, is greatly different in the region.

In the context of Bangladesh, the total economic entities are 7.81 million (BBS, 2013), whereby 99% of formal business enterprises are occupied by SMEs which contribute 25% of the GDP in the country (World Bank, 2018; ADB Institute, 2016). Precisely, SME Foundation (2018) reveals approximately 69,902 SMEs in Bangladesh engage 1,937,809 employees. Its turnover is approximately BDT 573.510 million annually. A large proportion of government revenue in various forms such as income tax, VAT, customs duties, etc. are gathered from these industries. It is evident from that SMEs make impressive contributions to the Bangladeshi economic development and without doubts, significantly impact the environment and the social community. Although most of the nations are moving towards greener economy (Jia et al, 2020), Bangladesh is yet to develop green policies in the diverse industries especially in the garments sector.

However, the capability of technology to develop sustainable business and community is widely acknowledged with several constrains (Soni, 2016). The usage of green technology (GT) allows companies to become more efficient and environmentally friendly by reducing the waste and performing green practices. The belief is that GT offers cost-effectiveness and mitigate environmental harm (Foroozanfar et al., 2017). GT involves the application of numerous methods and materials which are needed in producing energy to non-toxic cleaning products. SMEs require a successful appreciation of the complete stakeholder's objectives adopted within organizational practices to benefit from GT.

Green practices literature related to the significance of the stakeholders in SMEs environmental initiatives are subject to contrary opinions. Hillary (2004) opines that local government provides higher effect on the general environmental practices of SMEs compared to the customers. On the other hand, several scholars (Li 2013; Zhao et al., 2009; Wang 2012; Qi et al., 2008), claim that Government Regulations (GR) regarding environment do not produce efficient impact and generate enough pressure required to ensure the attainment of environmental performance goals. But it is undeniable that the government has the power to impose any policy to the business. Many governments are becoming conscious and imposing rules and regulations. A report by Mckinsey, (2019) provides some examples which include the 13th Five Year Plan 2016–2020 in China, France Circular Economy Law-2021 and Zero Waste Campaign by Turkey in 2019. In many other countries, these similar initiatives are being proposed.

A number of the sustainability related issues are discussed with useful insights in the context of SMEs in the developed countries, but little emphasis has been given on how SMEs in developing countries could be eco pro-active with their less-developed institutional framework (Demuijnck & Ngnodjom, 2013; Jamali et al., 2015).

The relationship between buyers and supply company plays an important role in improving Environmental Sustainability Practices (ESP). By sharing one another's capability, resources and working in proximity, this initiative could be fostered. As there have huge investment involves to set up green compliance, the strategic collaboration (Suh & Lee, 2018), cost profit negotiation is crucial. The significance of buyers' pressure

in exploring an organization's environmental initiatives as a concept has become the area of extensive focus by researchers (Helmig, 2016; Baden et al., 2009). The starting point of environmental practices lies in the information exchange among buyers, suppliers and company.

Suppliers also play a vital role in enabling businesses move toward having a higher environmental performance, besides, the buyers. Suppliers may aid firms to appreciate ecological impacts concerning the supply chain (Lamming & Hampson, 1996). Under some circumstances, the supplier finds crucial to fulfil numerous environmental standards, especially where organizations relay on few key products from the suppliers. Thus, supply partners allow for holistic appreciation of ecological issues, encouragement of insights, and sharing of resource based on their unique interests, viewpoints, and collaborations.

Employees' Involvement (EI) in sustainability issues could make the company to significantly enjoy the journey. A good example is Marks & Spencer, which ensures that each store gives its best to ensure the sustainability of its goals, sustainability of the champions in every one of its 1,380 stores. The issue is not many businesses have yet found out how to connect the principles and advocacy for sustainability of their workforce with the employees' daily work and the operations of the company.

People and places provide organizations with basis for having a relationship and sustaining interest in the community initiatives to ensure organizational excellence through a holistic management approach (Shakya, 2019). Considering the above ideas, the concept of sustainability indicates the community has a link to organizational goals alongside those of the stakeholders. Company should focus on establishing collaboration, partnership, strategic relationship, negotiation with community to initiate or improve ESP.

A large number of theoretical and empirical researches (Yang 2018; Jayashree et al., 2015; Tung et al., 2011; Lauring & Thompsen, 2009) have been conducted recently to change the mind-set of the management to be proactive on adopting green practices, since it is considered as one of the strategic tools for management to reduce the firm's negative impact on environment. However, contradictory results are found from different researches (Roy et al., 2020; Dixon-Fowler et al., 2013). The literature (El-Kassar & Kumar, 2018) argues that when employees believe that their organizations support sustainability, they perform in a sustainable way regardless of their personal values. But Roy et al. (2020) find internal stakeholders, such as the management has insignificant relationship with green practices.

There have been some studies on general overview of green industry (Reza et al, 2017), social business practices of SMEs in ISO 26000 perspective (Hasan, 2016), environmental effect of garments factory waste (Masud et al., 2019) in Bangladesh. However, researches on the ESP in the Bangladeshi firms especially on SMEs context

are very limited. In actual fact, there is no well-grounded study which deals with the stakeholder's integration and ESP in Bangladeshi SMEs including the indirect effect of Perception on Green Technology Adoption (PGTA). The inconsistent results encourage conducting this research with the aim to develop a single integrated conceptual framework to examine the relationships between stakeholders and ESP within Bangladeshi textile SMEs. This is done by using classifications of environmental management drivers, practices and performance proposed by previous studies.

Therefore, based on the background given above, the issues begging for attention concerning the present study are discussed in the subsequent sub-heading under problem statement.

1.3 Problem Statement

Small firms fail to meet up with the transition which takes place in the global front despite the numerous social, economic, and political pressures in inspiring companies to emphasize on environmentally sustainable practices (Ayuso & Navarrete-Báez, 2017). Numerous surveys confirm that SMEs are accountable for most environmental pollution (Mitchell et al., 2020; Demirel & Ozturk, 2019) and this is an under-researched area (Demirel & Ozturk 2019, Hampton 2018). Previous research by Jayeola (2015), Hoogendoorn et al. (2015) and Johnson (2015) identify that SMEs are responsible for 70 percent of manufacturing pollution. Quintás et al. (2018) estimate that SMEs produces 60 percent of carbon emissions. Manufacturing SMEs accounts for a major portion of the world's consumption of resources, air and water pollution and generation of waste (Koirala, 2019). A report from The European Commission, Directorate General Environment, indicates that SMEs produce more than 50% of the commercial and industrial waste (Woodard, 2021; Halila, 2007; Revell et al., 2010), and the Environment Agency (2003) estimates that 60% of commercial wastes and 80% of pollution accidents are traceable among SMEs in the UK. However, less than 33% of U.S. businesses have initiated practices toward reducing their carbon footprint (Weber & Matthews, 2008). SMEs in the developing countries have lot of barriers to implement sustainability such as access to finance, access to non-financial inputs, high production cost, high tax constraint. However, due to a lack of recent data and the expense of accompanying the required surveys, the results could not be used extensively. The suppliers are prepared to deliver, but there are finance problems and other production constraints (Yin & Wang, 2017). While abundant literature is available on sustainability practices in large organizations, the adoption of sustainability especially in environmental practices by SMEs has generally gained less attention in academia (Moss et al., 2008).

Many researchers have spent time on investigation of environmental management on SMEs (Armas-cruz et al, 2017), such as environmental responsibility in manufacturing (Curkovic & Sroufe, 2016), ESP and firm performance (Adebambo et al, 2014), attitude and awareness towards environmental management practices (Weerasiri & Zhengang, 2012), factors drive lather industry in sustainable initiative in Brazil (Graziani et al, 2018), Strategic intent in the management of green environment within SMEs of UK (Worthington and Patton, 2005), challenges of Malaysian SMEs to go green (Musaa &

Chinniah, 2015), sustainable performance (Wang et al, 2018), sustainability development of SMEs (Hsu et al, 2017), impact of green manufacturing on ES (Abubakr,et al., 2020), sustainable practices in SMEs (Sarango-Lalangui et al, 2018), sustainability assessment for manufacturing sector (Torelli et al., 2020; Sangwan et al, 2018), sustainable business model for SMEs (Battistella et al, 2018). Their findings are not always positive and correlated. Different results are obtained in different sector and different contexts.

Based on the review of literature, it is conclusive that, most of the researches have conducted their researches within the context of developed countries. The latter is due to human resources and knowledge deficiency (Ramasobana & Fatoki, 2014), less awareness (Demuijnck & Ngnodjom, 2013), shortage of training concerning sustainability (Williams & Schaefer, 2013), unwillingness of stakeholders (Roy et al., 2013), and owner-managers' attitude about money as well as their selfishness (Yousuf & Bhutta, 2012). Besides, the perception about ES in developing countries is affected by numerous unique external factors, which comprise of poor socio-economic and regulatory environments, corruption, and insufficient government support (Jamali et al., 2015).

In the context of Bangladesh, especially the garments SMEs, they are also lagging behind in the adoption of ES due to numerous barriers. As an environmental sensitive industry, textile sector has caught the attention of researchers for investigation. Tumpa et al. (2019) list out several barriers in greening in the textile industry of Bangladesh. There are internal factors such as top management support (MS), corporate vision, current organizational structure, current financial capability of the company, and proper environmental measurement system (Sarkar et al., 2020). Boffelli et al. (2019) enrich the literature by providing other barriers; green compliance training plan, regular allocation of budget for operations and maintenance of green initiatives, proper communication concerning green practices, employee involvements, alignment of the company's strategies with greening. (Das et al., 2020) emphases on upgrading the existing compliance management strategy for other standards (product quality, building safety, etc.) position of the textile firm which could increase the proximity with suppliers. Additionally, external factors such as government policies and incentives, buyer demands, market demand for low cost clothing, pressures from the competitors, poor collaboration with the suppliers, technology constraints, pressure from the investors (which is extreme in Bangladesh, as overwhelmingly, most companies are foreign buyers dominated), consumers' low green purchasing behaviour (Hossain et al., 2020) are responsible for the development of an environmental friendly industry. Moreover, the supply chain research suggests that due to conflicts between the diverse stakeholders, have also impede green initiatives (Moktadir et al., 2018; Ling et al. 2015).

One of the most substantial impacts to the global economy and the environment are created by the textile industry. By 2018, the global textile industry's annual sales (including the apparel and footwear sectors) are estimated to be greater than US $2 trillion (Lee, 2017). The textile industry generates one of the greatest detrimental effects to the environment because of the usage of chemical materials and processes and the

significance of their market size (Gardetti & Muthu, 2015). The consistent energy supply and a large quantity of water in the textile factories are prerequisites and, at the same time, endanger the environment through the development of large quantities of pollutants (Ahmed et al., 2018). Another study refers this industry as a "Stylist killer" as it accounts for 10% of the global emissions (I am renewed, 2020). There is an eventual destruction of the soil, water, and the environment due to the accumulated harmful chemical residuals used in textile production, which are released, often untreated and directly into water sources (Oecotextiles, 2013). These harmful effects become feasible all through the life cycle of textile products (Resta et al., 2016), which include the cultivation of raw materials, raw material production processes (e.g., fibres, yarns, and textiles), garment production processes (e.g., assembly and packaging), and consumption of manufactured textile products for example the end user, recycling, and discarding in the textile industry (Peters et al., 2019; Khan & Islam 2015). In addition, an excessive amount of water, fossil fuels, and electrical energy are consumed apart from the chemical discharge into water sources during textile manufacturing processes, such as dyeing, printing, and finishing (Lee, 2017; Sivaramakrishnan 2009). For example, in global terms, 40 % of clothing is produced from natural cotton fibre, which apparently is one of the most chemically dependent crops that consumes 10 % of all chemicals and 25 % of the insecticides used in agricultural industries worldwide (Lee, 2017). Currently, more than 60% of textiles are made of polyester and other petroleum-derived fibres (Ögmundarson et al., 2020). However, in Bangladesh, Natural Resources Defences Council (NRDC) has reported, industrial pollution accounts for 60% of pollution in the Dhaka watershed, and the textile industry is the second largest contributor. Textile manufacturing in the country has a massive ecological impact, generating as much as 300 metric tons of wastewater per ton of fabric, with a host of harmful chemicals (iamrenew.com, 2019). Textile factories produce huge toxic effluents containing colours, sodium sulphate, sodium chloride , sodium hydroxide, in the dyeing process that cause water and air pollution (Peters et al., 2019; Rahman, Ho, & Rusli, 2014; Islam & Khan, 2014; Islam, Mahmud, Faruk, & Billah, 2011; Patwary, 2016) and several health problems (Alay et al., 2016).

These textiles often produce waste water from garments or fabrics 'after dyeing' and 'after washing' (Pattnaik, 2019). The produced waste water is called 'Dye Bath Water' after dyeing, and the produced waste water is called 'Wash Water' after washing. Dye bath water contains higher solids (4-5%) whereas washing water contains just 0.5-1%. Based on the facts described above, it is important to implement a technology that could process such waste water and convert it into reusable water (Osman et al., 2017).

Report by Partnership for Cleaner Textile Pact shows that 719 washing, dyeing and finishing factories in Bangladesh discharge wastewater to the rivers in its capital city, Dhaka. Despite being encircled by four rivers, Dhaka's water supply to its 18 million inhabitants is being endangered by the exceptionally high levels of pollution. Thus, environment demand for a more sustainable textile production and consumption.

Green technologies could be an effective solution for improving sustainable green practices (Iravani et al., 2017). The textile industry would also have the benefit of constantly using the same water in the dying process; the salt used for dyeing may also be reused or sold in the market. Through its development, GT has been able to provide an environmentally friendly commodity in both the process and the greening of an industry (Osman et al., 2017).

Environmental technologies include technology to avoid emissions, monitor emissions and systems for contamination management (Klassen & Whybark, 1999) GT is used as proper tools which are designed to enhance efficiency in production and also managing industrial wastes. Such tools could remarkably help to produce sustainable products because of cogent utilization of natural resources and also reduction of waste generation that minimizes the power of consumption (Mirjalili & Zohoori, 2016). Severo et al. (2017) believe that cleaner production and environmental management could affect sustainable product innovation and financial performance. With respect to the latter, green innovation could aid companies to cover their environmental costs through the increase in resource productivity (Burgos-Jiménez et al., 2013). Based on the study conducted by Sheldon and Atherton (2011), there are many green technologies and systems which could reduce correctional institutions' expenses. In addition, implementing environmental practices could help companies to develop new landscape to extend business and increase their market share (Chen, 2015). An improved non-financial performance includes increased customer retention, new consumers, and an enhanced brand image and credibility of a firm to provide long-term operational objective (Burgos-Jiménez et al., 2013). Chen (2015) proposes that the "first-mover value" would be achieved by businesses that are pioneers of green innovation, i.e. higher product rates, an enhanced brand profile, new market prospects and competitive advantages. Demand for new, greener goods and the opportunity to cut costs through resource efficiency are significant drivers for green SMEs. At the tail end of survival, numerous SMEs owners/managers who are severely reliant, and are trying to figure out ways to restrict and control the amount of money spent on electricity has become a common item in the cost composition of SMEs in recent years (Chong et al., 2012). The identification and adoption of the energy efficiency measures based on changing times require SMEs to consider their sustainable green practices, market image and market presence position (Silva, 2020; Hirsig et al., 2014). Moreover, (Mirjalili & Zohoori, 2016) it is important to note that GT has the following values: a) It reduces environmental deterioration; b) It minimises greenhouse gases (GHG) emission to zero and its utilization is safe because it enhances healthy and improved environment for all and sundry; c) Natural resources and energy are conserved; and d) Renewables utilization is enhanced.

Considering the harmful effect of textile dyeing causes, the government of Bangladesh labels this industry industries as "Red industries" (most polluted) under the Bangladesh Environment Conservation Act, 1995 and the Environment Conservation Rules, 1997 and demand green technologies such as Effluent Treatment Plants (ETPs) mandatory for the factories. But higher cost of ETPs has restricted majority of 5,000 export-oriented dyeing factories from setting or using them. Department of Environment (DoE) claims that they have issued ETP installation permission to 1,376 textile factories. According

to Bangladesh Textile Mills Association (BTMA), the country has approximately 450 spinning mills, 1,200 weaving mills and around 5,000 export-oriented dyeing factories. So, the technological usages are very low.

Two deadly incidents occurred in 2013 in Bangladesh. 1,136 workers died when a textile factory building, known as Rana Plaza collapsed. In another incident,112 employees lost the lives due to a fatal fire at Tazreen Fashions. As a consequence, a nation- wide inspection has been conducted by EU, ILO, foreign buyers supported by local government; and 39 factories have been closed down for posing an immediate danger to workers due to the unavailability of green structures (Osman et al., 2017). A study conducted by Hossain (2018) discovers special financial support, lack of technological knowledge, and awareness from stakeholders are the factors that have restricted the adoption of green technologies in Bangladesh. Thus, this study intends to investigate the indirect effects between PGTA and ESP in textile SMEs of Bangladesh.

Environmental innovation requires multi stakeholders' participation due to its distinctive characteristics of double externality and ambiguity (Salem et al., 2020; De Marchi, 2012). Without understanding the relationship between stakeholders and the firms as well as the stakeholders influence, it is impossible to assess the impact of stakeholders into any kind of managerial strategy including environmentally sustainable green practices and adoption of green technologies (de Bakker et al., 2019). More or less proactive or reactive environmental strategy is undertaken by companies based on the Stakeholder Influence (SI). When firms are keen to take actions and go beyond the law, they indicate proactive and reactive firms. These are characterized by just complying with the regulations. If there is a gap or discrepancies between the stakeholders and green practices, then it influences the operation and overall environmental pollution. These gaps could be created from the following issues such as lack of awareness, lack of resources, policy gap, and communication gap.

Besides these gaps, the empirical evidence is also inconsistent regarding the impact of stakeholder influence and environmental practices. The degree of pressure varies as the importance of all stakeholders are not similar (Betts, Wiengarten, & Tadisina, 2015; Delmas & Toffel, 2004). Tatoglu, Bayraktar, and Arda (2015) study the adoption of environmental policies in Turkey. They found primary stakeholders significantly influence the environmental practices in the firms. Banerjee, Iyer, and Kashyap (2003) also found internal stakeholders and regulators are significantly impacted on' ecological behaviour of the firms. Betts, Wiengarten, & Tadisina (2015) and Ni (2012) also found constant results. But, Delmas, (2009) claims secondary stakeholders have a great influence on the environmental behaviour of the company. More precisely, Salimzadeh (2016) provides the evident that government does not appear to be an effective sustainability driver for Australian SMEs. But Kerr (2006); and Salimzadeh (2016) devise that owner/managers, employees of SMEs are an internal group which is effective in the adoption of sustainability in regional SMEs. Quiroga-Calderón et al., (2018) found no evidence with regulator and green practice. So, there have disparity on the various stakeholders' impact on green practices.

Dawal et al. (2015) investigate on Malaysian SMEs and found advance manufacturing technology has positive effect on firms' capabilities. Umar et al. (2016) found technological innovations influence green practices. Horbach, Rammer, and Rennings (2012) claim technologies determine the intensity of the environmental adoption. Demirel and Kesidou (2011) state the level of investment on green technology integrates cleaner production with technology adoption. Stucki and Woerter (2016) provide a different prospective as they claim different types of environmental policy influence the environmental adoption. Frondel, Horbach, and Rennings (2007) also investigate the same situation in Germany and the results suggest that the adoption of cleaner production technologies rarely depends on regulatory measures.

Despite the importance of green technology in improving environmental performance, the strategic management literature has failed to explain whether and how green technology could contribute to this performance (Watson et al., 2010). The few existing qualitative (Seidel et al., 2013; Petrini & Pozzebon, 2009) and empirical research papers (Mithas et al., 2010; Wang et al., 2015) confirm that these technologies have positive effect on the achievement of environmental aims. However, certain theoretical (Bengtsson & Ågerfalk, 2011) and empirical studies (Stucki, 2019; Przychodzen et al., 2018; Hottenrott et al., 2016) highlight both positive and negative effects on the adoption or use of these technologies on environmental performance.

Particularly, GTA may require major investment in physical assets, machineries, employee's knowledge, the technical and managerial integration and coordination between different business functions of the firm, the commitment by the top management team and engagement of its stakeholders (Forés, 2019; Wang et al., 2015; Chan et al., 2018). Sa'adi & Zainordin (2019) found that majority of the firms in Sarawak refuse to use green technology due to limited knowledge and expertise. In another study, Yacob et al., (2019) used GTA as a moderator with the intention to use green and sustainable green practices without embedding the stakeholders' prospective. The moderation analysis of their study reveals that GTA does not have an influence on environmental sustainability in manufacturing SMEs.

The lack of comprehensiveness and empirical inconsistency have led to a degree of controversy within academia regarding the sign of the effect of green technology adoption at the firm levels, which no research to date appears to have resolved. Indeed, to the best of the researcher knowledge, there is no empirical study that explores the possibility of moderating effect of PGTA on stakeholder influence and ESP in the textile SMEs in Bangladesh. This study applies the principles of the stakeholder theory and Technology Organization Environment (TOE) theory in an attempt to fill that gap. To do that it is indispensable to understand the existing scenario in the sustainable environmental management among textile SMEs in Bangladesh.

Furthermore, Hasan (2016) conducts a study of social responsibility on SMEs in Bangladesh. He reconfirms the "attitude-behaviour" gap but the form and scale of the company and the academic attainment of the owner-managers have no major influence on the extent of adoption by Bangladeshi manufacturing SMEs.

The lack of environmental practices has created a monumental problem among the companies of textile manufacturers as well as the lifestyles of customers and product purchasing patterns due to the extreme negative environmental contribution by the textile industries (Khan & Islam, 2015). Hence, textile companies have the duty of embarking on initiatives that can stimulate their stakeholders which include the owners, supply chains, and retailers to be engaged in eco-friendly textile business practices (de Abreu, 2015).

However, there is a huge gap in understanding the influence of various stakeholders in the manufacturing industry specially textile SMEs and their environmentally sustainable performance in Bangladesh. So, the purpose of this research is to keep the gap in mind and reach out for the objective of this research by identifying the relationship between the stakeholder influence and environmental sustainability practices in the textile SMEs in Bangladesh as well as the moderating effect of perception on green technologies adoption (PGTA).

1.4 Research Questions

Based on the problems encountered in the previous studies which have been discussed and elaborated, the following research questions are formulated to guide the researcher in the present study:

a) What is the relationship between the stakeholder influence and environmental sustainability practices in textile SMEs in Bangladesh?
b) Does perception on green technology adoption moderates the relationship between stakeholder influence and environmental sustainability practices in textile SMEs in Bangladesh?

The perception on green technology adoption as the moderator variable is introduced in this study, to detect the relationships between the independent variable and the dependent variable which have not been included in the previous studies.

1.5 Research Objectives

The research objectives are drawn out in line with the problem statements and indicated below:

a) To evaluate the relationship between stakeholder influence and environmental sustainability practices in Textile SMEs of Bangladesh.
b) To determine the moderating effect of perception on Green Technology Adoption in the relationship between Stakeholder Influence and Environmental Sustainability Practices in Textile SMEs of Bangladesh.

1.6 Significance of the Study

The following parties specified below are to benefit from the research outcomes.

1.6.1 Organization and Management

Recent organizational and management efforts have emphasized on the concept of economic and social sustainability, but little attention and study have been undertaken on the adoption of environmental sustainability practices (ESP) by SMEs. Despite the disagreements about the degree of sustainable practices for SMEs, a lack of clarity also exists in determining the best way to implement sustainable practices by adopting GT in the context of small enterprises (Salimzadeh et al., 2013) and, in particular, the roles of SMEs in such practices practically are not clear. The results of this study would provide a guide for entrepreneurial management on policy development and implementation that is consistent with the involvement in sustainable activities in SMEs.

1.6.2 Local Communities and Stakeholder's Awareness

The economic and political drivers at national and international levels are essential to establish a sustainability framework. Local communities have imperative role to maintain the sustainability within the region (Helmig, 2016). In addition, public scrutiny and sanctioning by the community make SMEs activities at the regional levels highly sensitive (Smith & Oakley, 1994). SMEs in the regional areas could also take advantage on the sustainability initiatives due to flexible organizational structure and close relationships with local communities (Sarbutts, 2003). This research is expected to raise awareness among employees, as well as customers and suppliers to implement sustainability.

1.6.3 Academia

This research would contribute to the existing knowledge in sustainability literature, by developing a conceptual model that would be useful for researchers in understanding further research on the related areas of study. Many studies have analysed the environmental sustainability issues, barriers, and adoption. However, the studies on the implementation of green technologies among manufacturing SMEs in Bangladesh are scarce. Part of the aim of this research is to provide a practical contribution to further enrich the knowledge and understanding on Green Technology Adoption (GTA) among the manufacturing textile SMEs. There is a necessity to initiate more studies in Bangladesh because many academicians around the world such as in China, India, Brazil and Australia have been working on the sustainability issues. Therefore, the study intends to bridge the literature gap by providing data that could support the subject matter to enable researchers to establish more study in a similar scope in future. Moreover, (Sing et al., 2019), identify external stakeholders include consumers, customers, local and public authorities and stakeholder theory provides the guideline to recognize the external impacts of various stakeholders on SMEs environmental operations. This research would examine and validate both internal and external factors.

1.6.4 Policymakers

This research intends to encourage the policymakers in Bangladesh to acknowledge the current progress on green practices among small and medium-sized enterprises by providing the insights of the related issues. The policymakers would also understand the challenges faced by the SMEs concerning the execution of green technologies adoptions (GTA) and the efforts that could be exercised by the policymakers to further improve on the current situation. Besides, the policymakers would be able to effectively outline the measures required for planning, developing and executing the GTA among SMEs in Bangladesh. Further development of SMEs to the next level in green practices and application of green practices in their current setting is possible when there is sufficient support and resources from the policymakers.

1.6.5 Government and Environmental Agencies

Findings of this study can assist the Government and environmental agencies in establishing the extent to which companies have adopted GT. This can also help the Government to know the factors that companies take into consideration before adopting GT. Such information can hopefully be used to develop ways of mitigating the identified challenges.

1.7 Scope of the Study

The research entails the examination of sustainable green practices in manufacturing SMEs, especially the textile sector. The unit of analysis is the textile manufacturing SMEs registered with the Bangladesh Textile Mills Association (BTMA). According to BTMA (2019) there are 241 Dyeing, 399 Spinning, 809 Weaving mills and 246 Washing mills (textile learner, 2014) in Bangladesh. This study would also cover the stakeholder integration and GTA especially in the SMEs of Dhaka. The capital city of Bangladesh, Dhaka is selected due to the large number (38%) of SMEs that have been established in this area (SME Foundation, 2018). Furthermore, the scope of this study also covers three key points namely (1) environmental practices that are presumed to have been established in textile manufacturing SMEs based on systematic guidelines outlined by the government, (2) green practice activities varies across subsectors in the manufacturing industry due to the diverse product characteristics. If other industry subsectors are taken into consideration, the findings could be different (3) the companies are presumed to execute generic manufacturing or assembly processes.

1.8 Definitions of Key Terms

The definitions of the key terms to be engaged in the study are provided in the order below so that they are easily understood and applied in the study.

1.8.1 Small and Medium-sized Enterprises (SMEs)

Depending on the country, SMEs definition considers the size of the enterprise for example the number of employees, annual sales, assets, or any combination of these. However, the criteria set by the government of Bangladesh to define SMEs is based on the type of industry, cost of replacement, and size of workforce as attached in Table 1.1.

1.8.2 Sustainability, Business Sustainability and Environmental Sustainability (ES)

Gaweł (2013) refers sustainability as a broad concept that is applicable in every sphere of human life. Sustainability thrives on three pillars namely economy, society, and environment. These three pillars connote the Triple Bottom Line approach of defining sustainability (Ciegis and Martinkus, 2009). Therefore, sustainability is concerned with ensuring the stability of the organizations, environment, and economies beyond the short-run (Emas, 2015). Business sustainability (BS) has the social, environmental and economic conditions in business management systems and is the bottom line (Elkington, 1997).

ES is a firm's performance concerning its environmental responsibilities (Yang, Hong and Modi, 2011). Morelli (2011) defines ES as "a condition of balance, resilience and interconnectedness that allows human society to satisfy its needs neither by exceeding the capacity of its supporting ecosystems to regenerate the services necessary to meet those needs nor by the action to diminish biological diversity".

ES, which emphasizes on mitigating the deterioration of the natural environment, is one of the prime concerns for scientists, corporations and governments globally (Ardito et al., 2018). Salimzadeh (2016) refers to ES as a dimension of business sustainability. A strategic construct in which businesses are conscious, participate and contribute to activities that assist to protect and preserve the natural environment is called ES. The acts of recycling, waste reduction, energy efficiency, use of environmentally friendly products, reduction of carbon emission and environmental management policy culminate into environmentally sustainable business practices (Jayeola, 2015). The maintenance of ecosystems and global life supporting systems at an appropriate level for the continued supply of nature's services makes up ES (Moldan et al., 2012).

1.8.3 Green Technologies Adoption (GTA)

GTA amounts to the creation and application of products, equipment, and system to conserve the natural environment and resources, which lead to the minimization and reduction of the adverse effects of human activities (Soni, 2016).

GT entails the recycling, water purification, sewage treatment, remediation, flue gas treatment, solid waste management, renewable energy, and solar energy (Omamo, 2012). GT is a wider term to ensure environmentally friendly solutions. GT provides an environmental healing technology that minimizes environmental damages which have been created by the products of conventional technologies. They constitute the technologies, which retain and assure development. The use of GT ensures the environmental healing could make lives comparatively better. GT guarantees the augmentation of firm profitability alongside the reduction of environmental degradation and conservation of natural resources (Werner, Rhodes and Partain, 1998).

GT is technology innovation, which supports the needs of sustainable development of the green environment. Its strength lies with GT inventions, which include the social benefits, such as enhancing the ecological environment, increasing the life benefits of human health quality, and also focuses on the economic benefits.

1.8.4 Stakeholders

Stakeholders constitute ''any group or individual who can impact or be impacted by the realization of the objectives of organizations.'' (Freeman, 2010). Buysse and Verbeke (2003), consider organizations' stakeholders as primary and secondary stakeholders.

1.9 Operational Definition of the Key Terms

1.9.1 Small and medium-sized Enterprises (SMEs)

For this study, the SMEs definition is based on Bangladesh National Industrial Policy, (2016) provided in Table 1.1. According to this policy, companies which have 31-120 employees are considered as Small manufacturing (SMEs) and companies with 121-300 employees are recognized as medium manufacturing SMEs. In the case of service industry, the range varies.

Table 1.1 : Definition of SMEs in Bangladesh

Type of Industry	Type of Industry	Replacement Cost BDT	Number of Workers
Small Industry	Manufacturing	7.5 mil to 150 mil	31 to 120
	Service	1 mil to 20 mil	16 to 50
Medium Industry	Manufacturing	150 mil to 500 mil	121 to 300
	Service	20 mil to 300 mil	51 to 120

(Source: National Industrial Policy 2016)

1.9.2 Stakeholders

For this study, stakeholders are directly and indirectly influential parties of textile SMEs. These include Government, Suppliers (Bangladeshi textile companies), Buyers (Foreign retail brands or companies), local community, management personnel and employees of the textile SMEs. In Bangladesh, the major buyers of the textile industries are from Europe, Canada, USA, Japan, Australia, and India. Some important buyers are: Adidas, H&M, Wal-Mart, GAP, Levi's (Brand: Dockler, Denizer, Levi-Strauss), Nike, PVH-Phillips Von Heuson (Brand: CK), Li & Fung, Old Navy, Academy, US Polo, American Eagle, Banana, VF Asia (Brand: Lee, Wrangler), Peri Ellis, Zara, Sains Burry, C&A, Hugo Boss, Esprit, Mango, Puma, European Eagle and many more.

1.9.3 Green Technologies Adoption (GTA)

In this study, GTA is defined as a tool or system which is utilized to minimize the pollution and wastages from the textile companies. It involves, green building that include popular and widely used certification known as LEED in Bangladesh; energy efficient electrical equipment namely LED lightings, inverter technology devices and others; water-efficient devices and equipment such as osmosis tanks etc.; green

chemicals, biodegradable packaging, effluent treatment plant (ETP); organic fibres, eco-friendly vehicle and many others.

1.9.4 Environmentally sustainable practices (ESP)

ESP refer to activities carried out by companies with the aim of reducing the effect of their operations and their products and services on the environment. ESP include using sustainable energy sources, green manufacturing, zero waste policy**,** recycling of textile waste and left-over materials, paperless policy, Life Cycle Analysis, environmental audits and others.

1.10 Organization of the Thesis

The thesis is organized in five chapters as highlighted below.

Chapter One delivers an overview of the thesis and its structure. In addition, this chapter sets out the objectives of the thesis, problem statement, research objectives and questions, identifying scope of the study, definition of key terms, the assumptions, and the thesis contribution to literature.

Chapter Two covers the literature reviewed on SMEs and sustainability. The chapter describes the underpinning theories and highlights the relationships among stakeholders, GTA, and sustainable green practices. The research framework, and the underlying research hypothesis are also covered.

Chapter Three emphasizes on the research methods which has been adopted for the study. The chapter includes the research process, the population frame, the survey instrument, data collection, unit of analysis, method of statistical analysis, and the ethics in conducting the research.

Chapter Four focuses on testing the hypotheses and presentation of the results of the quantitative research, which include the demographics of respondents, descriptive statistics, measure of goodness of fit, and multivariate regression analyses.

Chapter Five discusses the outcome of the study based on the data analysis. It provides responses to the research questions. The findings are interpreted by comparing, contrasting and relating them to the existing literature. The summary of the thesis is also provided in this chapter. The conclusions are drawn from the findings of the study and the research contributions are also highlighted in this chapter. Finally, the chapter presents the area for future research and implications.

1.11 Summary

In this chapter, the background to the study, research problem, research questions which integrate the research objectives have been discussed. This follows the expected benefits that derive from this research, the scope of study, and the definition of key terms employed for the research. The next chapter entails a brief look at the literature to explore the nature of development of textile SMEs in Bangladesh. The chapter demonstrate the literature review related to concepts, which are included in the theoretical and conceptual framework and hypothesis development. There is also coverage of the underpinning theories engaged for the research and concepts of SMEs and sustainability, stakeholders, GTA and ESP.

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