Pertanika J. Soc. Sci. & Hum. 30 (1): 253 - 281 (2022)

PERTANIKA JOURNALS

SOCIAL SCIENCES & HUMANITIES

Journal homepage: http://www.pertanika.upm.edu.my/

Nexus of Stakeholder Integration, Green Investment, Green Technology Adoption and Environmental Sustainability Practices: Evidence from Bangladesh Textile SMEs

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ABSTRACT

This study investigates the sway of stakeholder integration and green investment on Environmental Sustainability Practices (ESP), as well as the moderating role of Green Technology Adoption (GTA) in Bangladesh Textile small and medium enterprises (SMEs). A questionnaire has been used to collect data from 140 textile SMEs and analysed using the quantitative survey method. The findings have revealed that Buyer Pressure (BP), Governmental regulations (GR), and Green Investment (GI) have significant effects on ESP, but not Supplier pressure (SP). The study has also evidenced the insignificant moderating influence of GTA on the relationships among BP, GR, GI, except SP. This study makes a conceptual contribution by highlighting the relationships among these constructs and confirming the lack of stakeholder integration. The findings of the research extend the understanding and comprehensiveness of Stakeholder theory (ST) and Transaction Cost Economics (TCE) theory by providing empirical insights from the firm level. Consequently, the outcomes promote environmental practices and offer food for thought for policymakers, compliance managers, entrepreneurs, and relevant stakeholders.

Keywords: Bangladesh, environmental sustainability practices, green investment, green technology adoption, stakeholder integration, SMEs, textile

ARTICLE INFO

Article history:
Received: 11 May 2021
Accepted: 28 July 2021
Published: 10 March 2022

DOI: https://doi.org/10.47836/pjssh.30.1.14

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ISSN: 0128-7702
e-ISSN: 2231-8534

INTRODUCTION

Environmental sensitivity has gradually received much attention for business initiatives' considerations whereby being a stakeholder, consumers play a crucial role. The awareness, preferences and willingness of customers' mitigation towards ecological deterioration are seen as the fundamental push for introduction of green technology in business' initiatives (Ogiemwonyi et al., 2020; Uddin et al., 2021).

Undoubtedly, manufacturing is the main user of natural resources relative to other businesses. Therefore, the environmental impact of the manufacturing industry is higher than that of other businesses. For example, manufacturing firms account for 36% of CO_2 emissions and consume about one-third of the globe's energy (Tatoglu et al., 2015). Certainly, the manufacturing sector's consumption of resources and generation of waste is a cause for concern (Bhanot et al., 2017). However, a firm is liable to ensure that the environment and human life are not affected by its actions. Thus, firms should take the initiatives to incorporate Environmental Sustainability Practices (ESP) into their corporate strategies.

Internal and external factors (e.g., stakeholder collaboration, long-term commitment, trust, and knowledge exchange) affect ESP. Increased interdependence between operations and stakeholders has emerged as a prime consideration in the management of a ubiquitous supply chain because it requires adequate governance frameworks for effective management (Ciravegna et al., 2013). However, developing economies experienced a weak institutional environment and underdeveloped regulatory frameworks causing a lack of collaboration between stakeholders. Adedeji et al. (2020) claim that all stakeholders do not equally impact firms. Thus, it is crucial to find out the prime stakeholders and their relationship based on the nature of the industry, geographical and cultural aspects. This study focuses on the textile SMEs in a developing country, Bangladesh. It is mainly because the collective impact of SMEs on the environment is higher than large firms (Dey et al., 2018). Thus, there is a burning need for investigation on SMEs.

Stakeholder integration may be defined as the relationship process, which guides the actions of parties to achieve common objectives. Accordingly, to Plaza-Ùbeda et al. (2010), stakeholders integration is a "description of a set of practices, which characterise corporate management" and conceptualise it into three dimensions. They are: "knowledge dimension," which is comparable with the rational level, "interaction dimension" involves the process level and "adaptation" includes the transactional level. Further, Saudi et al. (2019) propose stakeholders' integration as an intervening variable on the relationship between ESP and completeness and claim that stakeholder integration was not investigated adequately in earlier studies. Finally, stakeholder theory (ST) has been widely used to describe the applicability of

stakeholders in management, but this theory ignores the stakeholder's integration (Plaza-Úbeda et al., 2010).

Perfidious behaviour and discrepancies in priorities and operational routines are the main causes for non-relational governance. On the other hand, Liu et al. (2017) demonstrate that transactional and relational mechanisms are effective for improving operational efficiency. Thus, it has been asserted that sustainable practices are positively related to sustainable outcomes through the mediating influence of collaboration and trust.

Confidence, transparency, and integrity are among the most critical factors in the successful creation of a responsible and ethical relationship, in this regard, meticulous selection, continuous effort, and intense monitoring are believed to have a positive effect on ESP (Kumar & Rahman, 2015). In addition, it has been contended that among stakeholders, it is a power that dictates the value and risk of sustainability. Therefore, one of the objectives of this study is to extend the stakeholder theory by integrating selected stakeholders' integration and their impact on environmental sustainability practices. Furthermore, the study is novel in that it introduces and empirically tests the moderating construct, namely green technology adoption, which contributes to the body of knowledge.

For the implementation of ESPs in business entities and the organisations in their supply chains, funding is essential. For example, green investment acts as a financing strategy for green ventures. The green investment includes selecting projects that reinforce the basis for sustainable growth, thus reducing the likelihood of deterioration of the environment; hence, sustainability implies efficient management and the conservation of conventional and renewable resources from environmental pollution (Tran et al., 2020). The successful implementation of environmental sustainability practices requires not only internal support but also resources from external stakeholders (Bollinger, 2015). In the developing countries and SME context, where firms with financial limitations and dependency on external funding, i.e., investment from investors or flexible loan, tax waived policy from government and banks; the entire financial eco-system should be restructured and consolidated (Tran et al., 2020). In this regard, stakeholders' vision and action to transform to a "green economy" is important. Bollinger (2015) defines the green economy as a dynamic process of economic transformation to low-carbon development by increasing environmental resource efficiency. The green economy simultaneously facilitates green product distribution; reduces pollution; reduces energy and resource use; encourages re-use and recycling; protects natural resources; creates job opportunities; and revitalises the local economy (D'Amato et al., 2019). However, financial institutions tend to have less interest in green projects due to a lower rate of return and higher risk in green technologies (Taghizadeh-Hesary & Yoshino, 2019).

Consequently, the promotion of green projects should be supported by financial institutions where government authorities and banks can promote preferential green loans on favourable terms to fund environmentally friendly projects. The establishment of green credit guarantee schemes (GCGSs) and returning a portion of the tax return can reduce the above-mentioned risk of green finance (Taghizadeh-Hesary & Yoshino, 2019). Green finance is often used interchangeably with green investment. However, in practice, green finance is a wider lens than investments, which includes the operational cost of green investment (Yu & Huo, 2019). Tran et al. (2020) considers green investment as a main component of green finance besides green capital. In addition, policymakers should compel banks to build green frameworks; and in relation to Foreign Direct Investment (FDI)—which is pivotal for the economic growth of developing nations to enhance green finance accessibility and motivate investors. Green FDI ventures can be encouraged by offering financial incentives proportionate to their green fund investment.

This study focuses on the Textile industry, particularly the textile manufacturing Small and Medium Enterprises (SMEs) of Bangladesh. The textile industry of Bangladesh has substantial ramifications on its environment and economic growth. In 2018 the global textile industry annual sales were approximately US$2 trillion; in context, the economic development of Bangladesh is largely dependent on the export of textile goods to the West. Bangladesh is the second-largest ready-made apparel exporter in the world, and this industry creates 45% of the employment in Bangladesh (Rahman & Chowdhury, 2020). It is also the biggest contributor to GDP. Unfortunately, the toxic effluents discarded by textile factories have caused enormous environmental pollution: More than 200 rivers are directly and indirectly impacted by waste and toxic chemicals from these factories. Partnership for Cleaner Textile reports that in Dhaka, 719 textile factories discharge 300 metric tons of wastewater into four rivers and it has been estimated that 50% of textile SMEs contribute to environmental pollution (Iamrenew, 2019). Despite being encircled by four rivers, Dhaka's water supply to its 18 million inhabitants is increasingly becoming endangered by escalating pollution; thus, the environment is crying out for more sustainable textile production and consumption.

Green technology (GT) refers to technologies (such as new or modified processes, techniques, and systems) that, in a circular economy, guarantee less water pollution, lower carbon emissions, green transport, green supply systems, and sustainable production processes (Uddin & Miah, 2020) and considered as a solution for minimising the firms' environmental pollution. Green technologies are used to monitor emissions, implement systems for contaminant management and minimise negative emissions (Klassen & Whybark, 1999). In addition, GT leads to efficient production processing with minimal waste in the supply chain; sustainable product

innovation is also enhanced wherever GT is practised (Chong et al., 2019). Currently, there are several sustainability barriers in SMEs, but GT is an effective solution (Saudi et al., 2019). Thus, the adoption of GT should be fostered.

However, most GT research originates in developed economies whilst GT research in developing countries is limited, especially in the textile industry. Given the major role of Asian countries in textile development, this disparity warrants the need for further research. Therefore, this paper does not explicitly compare current ESP practices on both sides of the divide; rather, it stresses that developing countries have unique challenges in the adoption of GT.

This study extends the literature on green investment. It investigates stakeholder integration and elucidates the moderating influence of GTA on Bangladeshi Textile SMEs—these have not previously been addressed in the field. Additionally, this research contributes theoretical, empirical, and analytical insights into stakeholder influence in promoting ESP.

The remaining sections of this paper are literature review, theories on ESP, green investment, and stakeholders. Finally, these will be followed by methodology and data collection strategies. Finally, this paper concludes with a section on findings, implications, limitations, and final remarks.

LITERATURE REVIEW

Environmental Sustainability Practices (ESP)

As a strategic construct, ESP is the reflection of a company's understanding, dedication, and proclivity for environment conservation activities (Roxas & Chadee, 2012). From the corporate perspective, a commitment to sustainability leads to the adoption of recycling strategies and result in waste minimisation (Adedeji et al., 2020); application of green technologies (Kasbun et al., 2016); decreases in the use of water, and increases in the purchase of green goods; decreases in the use of conventional fuels and, finally, decreases in harmful effects on animal species and the natural environment. These strategies are the mechanisms for the industry to transform conventional business practices into environmentally sustainable ones; thus, balancing economic and environmental objectives (Roxas & Chadee, 2012).

Buyer Pressure and ESP

Stakeholder pressure finds to be the most dominant factor in improving manufacturing firms' environmental performance (Meixell & Luoma, 2015). This pressure involves meeting the environmental requirements, standards through strict scrutiny. The firms then transfer this requirement to their suppliers as well. However, the environmental requirement is not limited to providing guidelines rather comprises introducing green technologies, new standards, and eco-designs (Shumon et al., 2019).

Previous literature evidences the significance of the relationships between buyers and the company in improving ESP; particularly, the foreign international buyers

can collaborate with local suppliers to boost green manufacturing capability (Yu & Huo, 2019), and this activity is likely to lead to sustainable business relationships with higher competitiveness (Ong et al., 2021).

In the Bangladesh textile industry, the major buyers are from Europe, Canada, the USA, Japan, Australia, and India. Therefore, they consistently pressurise manufacturing text firms by introducing stringent green compliance (Sarkar et al., 2020). However, this green compliance involves huge investments, and the return of the investment is also low and long term (Taghizadeh-Hesary & Yoshino, 2019). As a result, cost-profit negotiations regarding strategic collaboration between both parties are crucial. In addition, local government and financial institutions' eco-friendly policies can act as a catalyst to mitigate issues, such as narrow-focused regulation, single-performance centred, and misfit with the process (Simpson et al., 2012).

In exploring an organisational environmental initiative, the significance of buyer engagement as a research topic has become an area of intensive focus by researchers (Helmig et al., 2016). According to Hall (2006), if firms have adequate capability and network with authority to operate under specific environmental pressure, an organisations' commitments towards environmental challenges becomes easier to follow. It implies that it is essential for buyers to know their standing; thus, it becomes necessary for buyers to know their capacity to impact their suppliers, as well as to possess the knowledge of their suppliers' operations and capabilities. The environmental goals of both parties should be aligned. The environmental performance of firms improves when buying firms have engaged in greater collaboration and resource-sharing cooperation.

The starting point of environmental practices lies in information exchange between the buyers, suppliers, and companies. Parker et al. (2009) investigate the moderating influence of relationships between buyers and their suppliers on the commitment and efficiency of environmental activities by the supplier organisations. Where the levels of relationship-specific investment increase, buyers become more responsive to their suppliers' environmental performance needs. Simpson (2007) finds that suppliers' environmental commitment relies on buyer environmental requirements and suppliers' relationship conditions with the buyers. Ong et al. (2021) also demonstrate that buyer requirements become stringent or stricter in relation to the specifications of the requirements and to the timeline of meeting those requirements. Overall, the literature shows that buyers' pressure does influence SMEs environmental performance. Accordingly, the following hypothesis is proposed:

H_1: There is a positive and significant relationship between buyer pressure and Environmental Sustainability Practices (ESP)

Supplier Pressure and ESP

Besides buyers, suppliers also play a vital role in enabling businesses to better environmental performance. For example, suppliers may influence firms to appreciate ecological impacts concerning the supply chain (Lamming & Hampson, 1996); thus, under certain circumstances, a supplier may push to fulfil environmental standards, especially where the buyer organisations are dependent on key components from the supplier. Consequently, supply partners can push for a more holistic appreciation of ecological issues, encouragement of insights, and sharing of resources.

When choosing their suppliers, businesses must be sceptical and strict because supplier actions can harm the corporate image and credibility of the business. That notwithstanding, businesses still need to work closely with their suppliers to produce environmentally friendly products (Kasbun et al., 2016). Meanwhile, suppliers should have environmental understanding because suppliers who have environmental certifications, such as ISO 14001:2004, LEED (Leadership in Energy and Environmental Design), Oeko-Tex (textiles screened for hazardous substances), CU certificates, WRAP, OE-100 & OE-Blended and GOTS (global organic textile standard) (Reza et al., 2017), can influence and meet stakeholder demands. In fact, the influence of the suppliers in the supply chain is growing day by day, and they are in a strong position to influence eco-friendly brand images with their clients (Yang et al., 2020). That is why the suppliers-buyers dependency, information sharing, vision exchange is increasingly important. The relationship period is also a key factor. The long-term contact motivates both suppliers and buyers to engage in sustainable activities (Ong & Teh, 2009). Accordingly, the following hypothesis is proposed:

> *H_2: There is a positive and significant relationship between supplier pressure and Environmental Sustainability Practices (ESP).*

Governmental Regulation (GR) and ESP

As environmental sustainability has become a prime driving force towards sustainable development across the world governments are more proactive in taking green initiatives to attain sustainable development than before (Fraj-Andrés et al., 2009). It is undeniable that governments have the supreme power to impose environmental rules and regulations and provide regulatory pressure (Hossain et al., 2020). For example, banning plastic bags by the Bangladeshi government in 2002 resulted in a reduction in its use (Hafezi & Zolfagharinia, 2018). Currently, urban areas of Bangladesh generate 633,129 tons/year of plastic waste, of which 51% of plastic waste gets recycled, and the recycling of the remaining could save USD 801 million every year (Waste Concern, 2016). It has been reported that about 5115–11,760 MWh/d electricity can be generated through gasification or incineration energy recovery from the daily plastic wastes. The government has

initiated the installation of two waste-to-energy power plants in Dhaka, one at the Aminbazar landfill and the other at Matuail landfill, using daily waste produced, aiming at making it habitable and a clean city (Hossain et al., 2021).

Wong et al. (1996) find that environmental rules are a major factor that pressures businesses to invest in environmental innovations that are safe for the environment. Furthermore, Ong et al. (2021) argue that highly regulated companies are most likely to see the use of advanced environmental technologies to maintain their competitiveness. Moreover, Jajja et al. (2019) also evidence that GR exerts significant pressure on businesses to pursue an environmental policy; and government collaborates with top management to influence the ESP. In addition, the government can subsidise and provide taxation rebates to create a positive influence on total investment efficiency (Adedeji et al., 2020). Moreover, Gouda and Saranga (2020) suggest that government regulations, being a significant pressure factor, should be specific and customised for specific regions, locations, and industries.

Bangladesh, with its consistent economic growth for the last decade, aims to become a middle-income economy by 2021. To achieve this goal, development in the industrial, especially the textile sector, is essential (Sarkar et al., 2020). For ensuring the continuous growth of the textile industry, following the international environmental standard is crucial. Consequently, the local firms also confront the pressure. In some cases, the government is forced to implement environmental policy due to trade barriers and get a special opportunity, such as a Generalized System of Preferences (GSP) facility from a developed country. Some scholars and practitioners conclude that such laws and restrictions on businesses will improve environmental performance (Simpson et al., 2007; Zhu & Sarkis, 2006). For example, Tatoglu et al. (2015) performed a study on the adoption of ESP in Turkey and found that the pressure from the government has a significant influence on the firm environmental strategies. Furthermore, governmental regulation is considered the most crucial driving force to implement ESP (Awan, 2017). Accordingly, the following hypothesis is proposed:

> *H_3: There is a positive and significant relationship between government regulation and Environmental Sustainability Practices (ESP).*

Green Investment (GI) and ESP

A significant solution to environmental destruction and sustainable growth is fostered through green investment. Eyraud et al. (2013) define green investment as "the investment for diminishing carbon emissions and controlling other pollutants, without substantially hampering the current production." It has been accepted that it is not possible to protect the environment with conventional investment policy. An integrated approach is needed that enables policymakers to provide a clear understanding of the consequences of

human behaviour and their harmful acts on the environment. Only this integrated approach can protect the environment and improve the usage of resources.

In the management decisions domain, the cost is the primary deciding factor. High costs often impede top managers' decisions and ability to participate in such environmental activities; for example, to boost the environmental performance of the organisation, capital expenditure must be allocated (Klassen & Whybark, 1999). However, some scholars state that they expect companies to realise financial benefits because ESP implementation can lead to reductions in production costs (Zhu & Sarkis, 2006). According to Rao and Holt (2005), implementing the ESP requires substantial investment initially, but the returns will come in many ways. Partalidou and Kodra (2017) evidence the positive relationship between green investment and environmental performance. Zhang et al. (2020) find that green investment taken by the rival firms often motivates the focal firm to invest so. Foreign buyers and retailers may share the green investment cost and offer a special subsidy to adopt ESP.

Accordingly, the following hypothesis is proposed:

H_3. There is a positive and significant relationship between green investment and Environmental Sustainability Practices (ESP).

The Moderating Role of Green Technology Adoption (GTA)

The adoption of environmental sustainability practices can be seen as a process of gaining competitiveness because new technical and administrative knowledge constitutes innovation and development. Hossain et al. (2020), Ong et al. (2019), Saudi et al. (2019), and Yacob et al. (2019), are some of the researchers who, from a technology perspective, have explored environmental concerns and offered insights into the impact on GT on organisational and environmental factors. Management style, financial capital, development activities, human resources, creative ability, technical approach, and external cooperation are important factors affecting the adoption of GT in SMEs (González & Barba-Sánchez, 2020).

Bollinger (2015) also find a positive relation between GTA and sustainability in the textile industry. Wang et al. (2018) conducted a study on the impact of competition on the development and adoption of GT and found that with the increasing competitiveness of the market, embracing of GT in the textile industry is rising. Similarly, among logistics firms, the implementation of environmental sustainability practices is affected by technology, organisational, and environmental factors. For example, the Swedish Chemicals Agency has identified more than 900 chemicals used during the production of clothing, which is dangerous and harmful for the environment (Busi et al., 2016). Bangladeshi rivers are badly impacted by the harmful chemicals thrown by textiles as most of the textile SMEs

still use conventional technology. Using the technology that restricts pollution by wastewater treatment is the only solution (Sakamoto et al., 2019). Optimistically, Busi et al. (2016) claim that 40% of the pollution caused by the chemical liquid can be protected by implementing high-end technology.

Despite the importance of green technology to improving environmental performance, the strategic management literature has failed to explain whether and how green technology can contribute to this performance (Przychodzen et al., 2018). Previous literatures such as Hossain et al. (2020), Ong et al. (2019), Saudi et al. (2019), and Yacob et al. (2019) confirm that these technologies do have positive and negative effects, resulting from the adoption or use of these technologies on environmental performance. However, these studies did not investigate the stakeholder aspects of the phenomena. These lacks in comprehensiveness and empirical inconsistency have led to a degree of controversy within academia regarding the indirect effect of GTA on the relationship between stakeholder influence and ESP. Accordingly, the following hypotheses are proposed:

H_5: GTA moderates the relationship between BP and Environmental Sustainability Practices (ESP).

H_6: GTA moderates the relationship between SP and Environmental Sustainability Practices (ESP).

H_7: GTA moderates the relationship between GR and Environmental Sustainability Practices (ESP).

H_8: GTA moderates the relationship between GI and Environmental Sustainability Practices (ESP).

THEORETICAL BACKGROUND

Stakeholder Theory (ST)

According to Freeman (2015), when viewed from a strategic management perspective, stakeholder theory is based on the idea that a business needs to adapt its policies and strategic efforts to meet the needs of several different stakeholders in the organisation. In essence, Stakeholder Theory was a response to the competitive climate, dynamic environment, and globalised context in which businesses find themselves (Schaltegger et al., 2019). Since it was first proposed, ST has been enhanced to accommodate a scheme to link different aspects and multiple environments related to the operations of companies (Schaltegger et al., 2019). Three attributes govern relations between businesses and their stakeholders: "Legitimacy" includes the assertion that one stakeholder is entitled to act in a particular way towards another stakeholder (Mitchell et al., 1997). "Urgency" includes the assertion that the idea of time affects the relationship between the stakeholders and that this relationship can be viewed as something fundamental between the stakeholders. "Power" in terms of a stakeholder's ability to promote its interests against resistance is combined with access to the political process

and media. As a result, businesses are now implementing sustainable supply chain practices to respond to various demands from various stakeholder groups, including employees, shareholders, and environment-conscious bodies. Schaltegger et al. (2019) recently argued that organisations need to go beyond optimising the resources of shareholders and they should address the needs of stakeholder groups and individuals who may influence, or be impacted by, the purpose and life of the organisation. Those stakeholders have deemed potential recipients or bearers of any danger caused by the organisation.

Understanding the participating stakeholders is vital for organisational success (Ardito et al., 2018). Matthews et al. (2019) have divided stakeholders into primary and secondary groups; where the primary stakeholders have the greatest effect on an organisation's environmental policy because they have a direct influence on the sustainability, production, and profitability of the business (Ardito et al., 2018) and the secondary stakeholders, who are equally important, and they safeguard and enhance the social reputation of the company (Ardito et al., 2018). In this study, buyers, suppliers, and governmental regulators are identified as the stakeholders that influence the ESP.

This study provides an intensive focus on three stakeholders: buyers, suppliers, and governmental regulators, considering their proximity to the textile industry of Bangladesh. A previous study (Clarkson, 1995) on this context also suggests that these stakeholders are more powerful in influencing the ESP than NGOs, media, consumers. Secondary stakeholders like NGOs, media, and communities indirectly influence firms' environmental practices (Islam & Deegan, 2008). In a developing country, consumers are not highly conscious about the environmental effect of the company, which impacts their green purchasing behaviours consequently (Ogiemwonyi et al., 2020).

Transaction Cost Economics (TCE)

TCE theory is a widely used management theory and is highly relevant in the organisational sustainability domain. This theory explains how the firms' decision to adopt any technology or system is influenced by their ability to "buy" by contacting suppliers instead of "making" (Birken et al., 2017). The three key constructs of TCE are asset specificity, uncertainty, and frequency of the transaction (Williamson, 2008). Asset specificity determines the transferability of resources where "Uncertainty" involves ambiguity about transaction factors and "Transaction frequency" refers to how often parties engage in a transaction; increased transaction frequency increases transaction costs (Birken et al., 2017). Moreover, Grover and Malhotra (2003) ensure the consolidated effort of stakeholders through adding a "Governance mechanism" with these constructs, which relates to the suppliers, process, and technology. TCE theory has been coined that any transaction has a transaction cost. These costs have extensive consequences on economic and organisational fundamentals. This

transaction cost depends on the relationship between buyer-supplier, duration of the contact, firms' capability, and identity (Williamson, 2008). Levels of uncertainty also influence the bargaining for cooperation and investment decision (Yang et al., 2020). This study considers TCE theory in realising the influencing factors of buyers' or other stakeholders' green investment decisions on supplying firms. Moreover, through this theory, the foreign textile buyers and ready-made Bangladeshi garments SMEs can review their length of the contacts and restructure the governance mechanism to adopt green technology and ESP. Furthermore, Grover and Malhotra (2003) have demonstrated the usefulness of TCE to assess stakeholder relationships.

Figure 1 indicates the research framework of the study.

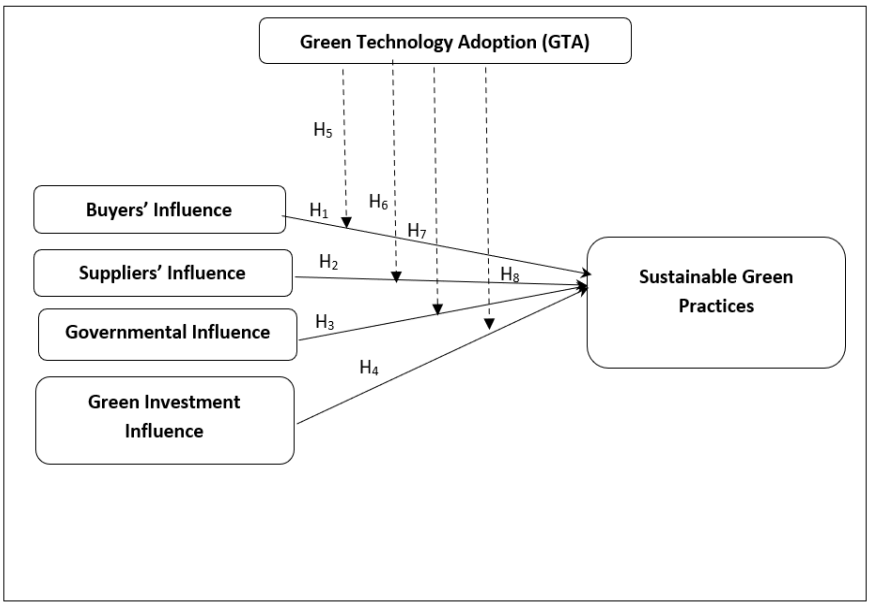

Figure 1. Conceptual framework

Measurement of the Constructs

Buyer Pressure. The questionnaire to measure BP was adapted from existing pieces of literature. The items are tight environmental regulatory requirements from buyers; Boycotting of products by buyers; Negotiation capability of buyers; Monitoring capability of buyers; Buyers' collaboration approach with the company; and financial stability of buyers (Kumar & Rahman, 2015).

Supplier Pressure. SP is measured by following adapted items: Minimising the risk of damage to reputation by dealing with environmentally responsible suppliers; Pressure from suppliers; Clear communication of environmental policies to suppliers; Emphasis on environmental

certification by suppliers (Ong et al., 2019); Appraisal of the environmental performance of suppliers; and Environmental performance as criteria for supplier selection (Romero et al., 2019).

Green Investment. The questionnaire items adapted to measure GI include Green investment knowledge (Awan, 2017); Difficulties in accessing loans to finance green investment activities (Eyraud et al., 2013); Enterprises' plans to implement green investment projects (Ong et al., 2019); Government support for green investment development policy (Tran et al., 2020); Bank support for green investment development policy; and Incentives for green investment activities when accessing loans (Tran et al., 2020).

Green Technology Adoption (GTA). Adapted measurement of GTA consists of Adopting Green Buildings; Having GT financing schemes (Yacob, 2019); Installing water-efficient devices and equipment; Using green chemicals; Installing effluent treatment plants (ETP); Using energy-efficient electrical equipment (Reza et al., 2017).

Environmental Sustainability Practices (ESP). Based on the existing pieces of literature, the adapted items to measure ESP comprise Using sustainable energy sources; Manufacture products in an eco-friendly way; Zero waste policy; Recycling of waste (Ahmed et al., 2018); Use Life Cycle Analysis to assess the environmental impact of products; Carry out environmental audits at regular intervals (Yacob, 2019).

METHODOLOGY

This study focuses on environmental sustainability validation as practised by textile SMEs in Bangladesh. The need for numerical verification of the applicability and causality of proven predictors in the implementation of ESP in Bangladesh necessitates the use of a deterministic philosophy, such as post-positivism, with its well-defined framework for accurate variable measurement.

The validation of GTA and ESP in SMEs requires numerical assessment of the relationships between constructs and their requisite hypotheses; this is so that relationships may be tested. This nature of the study inspires the researchers to apply the quantitative method and deductive statistical approach.

Research Design

The essence of causal research explains the cause-and-effect relationship between an observed variable and an outcome variable. This research examines the association between the six variables to understand how diverse stakeholders and GTA impact ESP.

Strategy of Inquiry

This research followed a quantitative approach, and data has collected through questionnaires. This approach is effective for obtaining data from many respondents. Questionnaires make it easier to ask multiple questions to promote data collection. The questionnaire was developed by adapting the items for each construct from the existing pieces of literature and then refined through pre-tests with three (3)

academicians and three (3) sustainability compliance managers, and then a pilot test was conducted. The wordings of some questions were changed after the discussion with the pre-test panellists. Definition of the terms was included in the questionnaire to enhance the clarity of the questions. Few questions were dropped based on the practitioners' suggestions considering the country's context and practices. A five-point scale was mainly used (1= strongly agreed to 5= strongly disagree) in the questionnaire.

The time horizon for this research is the cross-sectional analysis of the phenomena where data are collected at a specific period (Saunders et al., 2016). A pilot study was conducted for the following: 1. Eliminate vague or double-barrelled questions; 2. Test for effective questionnaire layout; and 3. Ensure flow and consistency of statements. These steps helped decrease the questionnaire errors, which would have rendered the questionnaire ambiguous (Brace, 2018). The collected data were analysed using the SPSS and PLS-SEM software.

Population and Sample Size

The total population of 1,695 SMEs is obtained from the latest data of the Bangladesh Textile Mills Association (BTMA, n.d.). In Dhaka city, 38% of textile SMEs are situated, estimated at 641 SMEs. According to the Ministry of Industries (2016), small and medium-sized manufacturing enterprises (SMMEs) are the manufacturers whose employee number is below 300 in Bangladesh.

The respondents were top and middle management, including supervisors. Information obtained was from individuals who knew the implementation of sustainability initiatives and had ample experience in their organisations to ensure quality. The proportional random sampling method was used after selecting four types (Washing, Dyeing, Spinning, Weaving) of textile SMEs. For analysis, one questionnaire from each firm was used. Six hundred forty-one questionnaires were distributed, and 152 were returned; of these, a total of 140 questionnaires were usable for analysis.

ANALYSIS OF DATA

Respondent Demographics Profile

Table 1 shows that 30.7% of participating textiles were spinning SMEs; 25.7% of the sample companies were engaged in dyeing; 23.6% from weaving, and 20% from washing. Most of the companies (32.1%) were in operation for not more than two years. The majority (28.5%) of the textile SMEs had an average of 81–130 employees. 52.8% of these SMEs had annual incomes not exceeding 10 million BDT. It could be one of the main factors that hinder the adoption of expensive green technologies and practices. Textile management were mostly males (77.8%), and only 22.2% were females. A possible reason for this might be the nature of the job and the immense workload. The highest number of respondents was from the age category of 30–36 years (35%) and worked for 6–8 years (35.29%).

Table 1

Demographic profile of companies and respondents

Type of Company	**Frequency**	**Percent**
Washing	28	20.00
Dyeing	36	25.71
Spinning	43	30.7
Weaving	33	23.6
Company Age	**Frequency**	**Percent**
Less than 2 years	45	32.14
3–5 years	39	27.86
6–8 years	35	25.00
9–11 years	18	12.86
12 years or above	3	2.14
Number of Employees	**Frequency**	**Percent**
31–80	26	18.57
81–130	40	28.57
131–180	31	22.14
181–230	25	17.86
231 or Above	18	12.86
Company's Annual Income	**Frequency**	**Percent**
Not exceeding 10 million BDT	74	52.86
Between 11–20 million BDT	29	20.71
Between 21–30 million BDT	13	9.29
Between 31–40 million BDT	21	15.00
More than 40 million BDT	3	2.14
Gender	**Frequency**	**Percent**
Male	109	77.86
Female	31	22.14
Employee Age	**Frequency**	**Percent**
Less than 30 years	5	3.57
30–36 years	49	35.00
37–43 years	40	28.57
44–49 years	32	22.86
More than 50 years	14	10.00
Job Experience	**Frequency**	**Percent**
Less than 2 years	25	17.86
3–5 years	22	15.71
6–8 years	48	34.29
9–11 years	24	17.14
12 years or above	21	15.00

Measurement Model Results

Construct Validity and Reliability. Table 2 shows that the composite reliability condition was satisfied as it achieved higher than the cut-off value of 0.70. In addition, Cronbach's α has found higher than the suggested value of 0.7 (Cronbach, 1951).

Convergent Validity

Table 2 shows that convergent validity has been demonstrated—the Average Variance Extracted (AVE) for every latent variable has been greater than the suggested cut-off value of 0.5 (50%) (Fornell & Larcker, 1981).

Table 2

Internal consistency and convergence validity results

Constructs/Items	CA	CR	AVE
BP	0.920	0.938	0.716
GI	0.928	0.943	0.736
ESP	0.941	0.953	0.773
GR	0.932	0.946	0.746
PGTA	0.924	0.941	0.727
SP	0.925	0.941	0.726

Notes: CR: Composite Reliability; AVE: Average Variance Extracted; CA: Cronbach's Alpha

Discriminant Validity

Table 3 shows that the square roots of the AVE of all constructs are bigger than their corresponding inter-correlations. Therefore, the evaluation of validity and reliability advocates that the measurement model is acceptable.

Table 3

Discriminant validity—Fornell and Lacker Criterion

Constructs	BP	GI	ESP	GR	PGTA	SP
BP	0.846					
GI	0.008	0.858				
ESP	0.201	0.134	0.879			
GR	0.270	0.116	0.210	0.864		
PGTA	0.230	0.037	0.239	0.278	0.853	
SP	0.187	0.144	0.135	0.202	0.215	0.852

Note: The off-diagonal values are the correlations between latent variables, and the diagonal is the square root of AVE.

To further confirm the discriminant validity of the model, a second technique was used: Heterotrait-Monotrait Ratio (HTMT). Compared to Fornell Larcker, this approach seems to be the superior test. According to Henseler et al. (2015), HTMT values must be below 0.90. In this study, the upper threshold value has been found less than 0.90 (Table 4); thus, satisfying the < 0.90 cut-offs.

Table 4

Results of Heterotrait-Monotrait Ratio (HTMT)

Constructs	BP	GI	ESP	GR	PGTA	SP
BP						
GI	0.042					
ESP	0.214	0.139				
GR	0.290	0.128	0.221			
PGTA	0.252	0.050	0.255	0.299		
SP	0.205	0.154	0.138	0.216	0.230	

Structural Model

Coefficient of Determination (R^2). Table 5 shows the R^2 value of ESP to be 0.137, which is above 12%, thus demonstrating that this model has a moderately acceptable level of prediction for empirical research (Cohen & Levin, 1989). In contrast, the value of R^2 for the endogenous variables demonstrates a high acceptance level of prediction for empirical research (Cohen & Levin, 1989).

Table 5

R-square result

Endogenous Variables	R Square	R Square Adjusted
ESP	0.160	0.137

Note: Substantial > 0.25; Moderate > 0.12, Weak > 0.02 (Cohen & Levin, 1989)

Effect Size (f^2). The effect sizes of the predictor constructs were analysed using Cohen's f^2 (Cohen & Levin, 1989). The results of the f^2 for this study are presented in Table 6, where BP, CP, and GTA had a small effect size on ESP; however, SP did not affect ESP.

Multicollinearity (Inner VIF)

According to Henseler et al. (2015), the presence of VIF values higher than ten and lower than 0.1 demonstrate the presence of multicollinearity. Table 7 reveals that the highest VIF value was 1.237 and the lowest VIF value was 1.058; thus, the absence of multicollinearity among the independent variables is confirmed.

Table 7

Result of multicollinearity—Inner VIF values

Exogenous Variables	ESP
BP	1.181
GI	1.094
GR	1.228
PGTA	1.237
SP	1.172

Predictive Relevance (Q^2 value). The model demonstrated an adequate fit with high predictive relevance—the Q^2 values were higher than zero (Table 8).

Table 8

Result of predictive relevance

Endogenous Variables	Q^2 (=1-SSE/SSO)	Q^2 (=1-SSE/SSO)
ESP	0.119	0.676

Direct Effect (Path Coefficient) Analysis. The path coefficient assessment shows that out of four direct relationship hypotheses, three have been supported, and one has not been supported (Table 9). Furthermore, the supported hypotheses have been found significant at the 0.05 level, had the expected sign directions (i.e., positive), and consisted of path coefficient values (β) ranging from 0.101 to 0.130.

Table 9

Path coefficient result

Hypotheses	OS	SM	SD	T	P Values	Decision
BP -> ESP	0.111	0.110	0.051	2.202	0.028	Significant
GI -> ESP	0.103	0.107	0.049	2.101	0.036	Significant
GR -> ESP	0.101	0.100	0.051	1.991	0.047	Significant
SP -> ESP	0.014	0.020	0.046	0.311	0.756	Not Significant

Note: Significant: $p < 0.05$

Moderation Effects. Table 10 shows that among the four moderating hypotheses, one hypothesis was statistically significant ($p \leq 0.05$; $t > 1.96$). SP was found significant, and BP, GI, GR remained statistically insignificant.

Table 10
Moderation analysis result

Hypotheses	OS	SM	SD	T	P	Decision
BP*PGTA -> ESP	0.039	0.040	0.047	0.846	0.398	Not Significant
GI*PGTA -> ESP	-0.040	-0.034	0.051	0.784	0.434	Not Significant
GR*PGTA -> ESP	0.088	0.085	0.051	1.738	0.083	Not Significant
SP*PGTA -> ESP	-0.117	-0.113	0.054	2.162	0.031	Significant

Note: Significant: $p < 0.05$

DISCUSSION

The outcomes (Table 9) reveal that BP ($t = 2.2$, $p<0.05$); GI ($t = 2.1$, $p<0.05$), GR ($t = 1.9$, $p<0.05$) display significantly positive impact on ESP across the study sample except for SP ($t = 0.3$, $p>0.05$). Thus, H_1, H_2, H_3 were supported, but H_4 was not supported. It indicates that BP plays a crucial role in fostering ESP. Foreign buyers from developed countries tend to trade with companies that practice standard ESP norms (Sarkar et al., 2020). Hence, if a focal company adopts ESP, it will potentially attract purchasing companies, as well as enhance the corporate image of both parties.

GR has a significant positive association with ESP (Table 9); this outcome supports Stakeholder Theory empirically. Governments have significant power and influence to determine the policies and services regarding sustainability maintenance and enforcement—by imposing laws and codes, governments can achieve sustainable growth. In this regard, governments can promote sustainability practices by encouraging compliance with the LEED Green Building Guidelines (Uddin & Miah, 2020), designing robust sustainability plans, improving sustainable procurement policies, regularly conducting ecological impact measurement audits, building green industrial parks, and recommending innovative ways of meeting sustainability requirements (Busi et al., 2016). A prior study by Fraj-Andrés et al. (2009) has confirmed that GR exerts substantial influence over the industry and that if companies do not comply with the requirements, fines, and penalties would follow as consequences, thus forcing companies to embrace the environmental initiative more comprehensively.

GI evidenced its significant and positive effect on ESP in Table 9. Datta (2019)

has poised two benefits of GI; reducing emissions and partially offsetting carbon taxes to increase profitability. In effect, GI is an essential investment for reducing pollution (Tran et al., 2020); and GI enhances the practical capability of firms to implement ESP. This research finds further support by Partalidou and Kodra (2017), who found that GI impacts environmental performance. As a developing country, Bangladesh highly depends on foreign countries for its technology; consequently, GI can enhance the financial resources and, at the same time, foster green practices. However, Tran et al. (2020) show that GI can be costly. It is why GI requires higher returns in comparison to conventional investments. Therefore, the level of profitability of GIs should be supported by government and financial institutions through price mechanisms or other instruments, such as green certificates, green awards, or tax exemptions on importing expensive green technologies. Moreover, investors tend not to invest in GT unless the risk-return becomes stable; thus, financial institutions should provide the necessary instruments to mitigate risks. The non-significant relationship between SP and ESP suggests that the supplier has less interaction of implanting ESP in Bangladesh. For SMEs, not only is the loan process quite complex, even the payback for green investments can take as long as three years, which is difficult for many textile suppliers to bear. Other problems besetting the industry are the lack of preparation for sustainability and a general low sense of priority (Wang et al., 2018). Unquestionably, cost reductions are a top priority of suppliers, followed by quality enhancement and on-time delivery; consequently, implementing ESP by suppliers is not a priority (Tran et al., 2020).

Table 10 has depicted the indirect relationship of the GTA on constructs. The moderation analysis has revealed that the moderating effect of GTA on SP and ESP is significant ($t = 2.1$, $p<0.05$). It suggests that when suppliers are empowered with the technology, their eco-proactivity should correspondingly increase. Also, GTA has shown a negative moderating influence on the relationships among BP, GR, and GI. A possible explanation for this finding is that few Bangladeshi SMEs consider the implementation of GT as an important issue, and therefore, they do not have any green strategy. This finding is consistent with Sakamoto et al. (2019). The number of LEED-Certified green garments factories in Bangladesh is only 91, though the garments industry is the largest GDP contributing industry of the country, and the market size is around 28 billion dollars (Sarkar et al., 2020).

To some extent, some buyers, particularly foreign buyers, do put pressure on suppliers and strictly monitor them; but they do not provide investment or technological support. The TCE theory shows that the transaction cost and frequency of the transaction are key demotivation factors for the stakeholders to invest in green projects. Most of the contacts between Bangladeshi textile suppliers and foreign buyers are short-term (Sarkar et al., 2020). Opportunistic behaviour is also

responsible for short-term contacts (Yang et al., 2020). Merely putting pressure is not sufficient and sometimes creates adverse effects. On the shade of stakeholders' theory, as stakeholders benefit from the firms' performance and profitability, they would show supporting behaviour with the other stakeholders on environmental initiatives, which leads to improving the brand value and competitiveness. Most stakeholders' limits within the ''Dialogue and issues advisory'' have limited decision-making influence. Nevertheless, lack of engagement and influence can lead to frustration of stakeholders (Schaltegger et al., 2019).

In this aspect, the government can come forward and play an important role as a catalyst. However, research also found that the Department of Environment (DoE) officials of Bangladesh still lack knowledge, investment, and human resources (Sakamoto et al., 2019) of various aspects of Effluent Treatment Plant (ETP) and pollution control methods. Lack of enforcement political instability, high corruption (Sakamoto et al., 2019), are several constraints. In addition, Bangladesh depends on developed countries for high-end technology. Thus, the high cost of importing green technology into Bangladesh remains a major constraint. This situation is compounded by the bureaucracy, or 'red tape', that causes unexpected delays in the approval of applications by SMEs (Hossain et al., 2020). Notably, the Global Innovation Index (GII) 2019 rankings evidenced the poor standing of Bangladesh in green technology adoption. Bangladesh ranked 116 out of 129 third-world countries in the world; moreover, on environmental issues, Bangladesh ranked 126. It has evidenced the lower level of technological adoption from a country perspective.

The inherent risks in each emerging green technology are related to the issues of usefulness and functionality; thus, implementing emerging technology tends to be more complicated, but the risk can be mitigated by support from the public and/or private institutions. In general, investors are reluctant to finance projects unless the risk-return relationship becomes stable.

CONTRIBUTIONS, IMPLICATIONS, AND CONCLUSION

Theoretical Contributions

This research contributes to the literature on sustainability by elucidating and providing nuanced information about the state of Green Technology Adoption and green investment opportunities among the textile SMEs in Bangladesh. To the best of the researchers' knowledge, GTA and GI are incorporated as two new contributing variables previously not empirically investigated with ESP. It is the first theoretical contribution.

The second theoretical implication is to apply the Stakeholder Theory and Transaction Cost Economics theories in relation to GTA and ESP among the SMEs of Bangladesh, thus broadening their usefulness and applicability. This theoretical contribution sheds light on how stakeholders implement GTA and ESP within their firms and other stakeholders, which enriches the application of organisational context. The

findings conclude that suppliers become more proactive when they are empowered with green investment and green technology due to their proximity with the usages of raw materials and technologies. Furthermore, the study confirms that transaction cost plays an important and key role in small-medium suppliers' decisions, particularly green technology adoption behaviour.

Thirdly, this study contributes to advancing ST and TCE theories and the extant literature by extending the existing conceptual framework of both theories and by investigating the pivotal role of green technology adoption. The existing conceptual model of ST and TCE is generic and does not encompass the green technology adoption on small-medium firms, which are significantly different from large firms due to resource availability, sufficient investment, and many more factors. The findings provide an overview and guidelines to the Southeast Asian developing and textile manufacturing countries regarding which stakeholders deserve the priority and to which extent. Other countries from geography also can take lessons on this aspect.

Empirical Implications

The first empirical implication extends the perspective from the firm-level green technology adoption in textiles, particularly SMEs. Most studies focused on technological adoption in large companies. However, it has been recognised that SMEs differ from large companies in terms of their size and possess unique characteristics, such as an informal management style, owner-manager domination in all decision-making, and strong community ties. However, their combined impact on the environment is significantly higher than big companies (Dey et al., 2018; Ong & Teh, 2009).

The second empirical implication is identifying factors that influenced ESP in the textile industry and providing beneficial information to managers in the green industry. As a result, future development on green technology usages could be encouraged. Finally, the study depicts that financial institutions and governments must consolidate effort from policy level to implementation. Since our conclusion was established from Bangladeshi respondents' profiles, it makes a stronger and more sensible viewpoint of evaluative antecedent on green technology adoption and environmental sustainability practices easier.

Above all, this study filled the gap to empirically examine the green technology adoption and green investment in the Bangladeshi textile SMEs. It complements the literature on sustainability in SMEs and enriches the literature on sustainability implementation in the textiles manufacturing industry.

Practical Contributions and Implications

The study offers considerable practical contributions and implications. Firstly, increasing stakeholders' awareness of the environmental impact of their performance and their willingness to reduce their ecological footprint has created new market

opportunities as well as stakeholders' pressure. Green adoption by one stakeholder naturally influences the other stakeholders (Hossain et al., 2020; Ong et al., 2019). The regulatory bodies and concerned authorities, institutions should set their priority, policies, and strategies by identifying key pollution-creating stakeholders.

Secondly, this study can assist companies to reshape their strategies and restructuring their commitment towards green practices. Implementing ESP improves own performance besides supply chain partners' performance. It is a win-win situation. Since importing green technologies requires huge investment, so, stakeholders, financial institutions should consolidate their effort to tackle this challenge. Knowledge and resource sharing among neighbouring SMEs or stakeholders can improve the resource constraint.

Thirdly, this research inspires and creates awareness on government and policymakers about the importance of emphasising ESP among stakeholders and developing collaborative relationship among stakeholders in the textile industry of Bangladesh. At the same time, we argue that it is not sufficient for the government, associations, and investors to stick to the stage of dialogue rather than engage on the implementation level impactful.

Recommendations

In response to the significant relationship among SP, GTA, and ESP, suppliers and multinational buyers would engage in long-term purchasing contracts, which can resolve the concerns about the high cost of high-end technology and longer paybacks. The government can follow the following recommendations to support this: 1) Credit guarantee schemes in the forms of mortgages and guaranteed free loans to stimulate acceptance; 2) Duty-free importation facilities on various green machinery and equipment; 3) Tax incentives for green initiatives; 4) Create investment instruments, such as green bonds and green fund shares reasonable interest rates; 5) Bangladeshi suppliers should build their negotiating skills with international buyers and convince them to invest in sustainable initiatives to create joint win-win investments in green technology adoption. Developing nations are under pressure to raise economic standards and enhance their global position by encouraging foreign customers, particularly Bangladesh. With this in mind, sustainable solutions in all applications, including the manufacturing sector, should be mandatory.

Limitations and Future Research Directions

Although this study provides significant theoretical, practical, and empirical contributions regarding ESP, GTA, SI, and GI, it is not without its limitations. In response to the limitations, researchers can consider those as directions for future studies. Firstly, the low response rate is an issue. Collecting data is a daunting task, especially on the issue of sustainability due to confidentiality concerns and company image. In addition, data were collected

during the Covid-19 pandemic, which resulted in a low response rate. Secondly, this study focused on textile SMEs situated in a single district named Dhaka. Widening the scope by investigating other districts, such as Chittagong, Rajshahi, Khulna, where a large number of textile SMEs are situated, will lead to a better understanding with more interesting findings and enhance generalizability. Thirdly, this research uses a quantitative and cross-sectional sample; thus, a qualitative or mixed-method with a longitudinal study would be appropriate for this research. Fourthly, the moderating effect of GTA is the prime focus of this study with three independent variables. Finally, the inclusion of other exogenous and interacting variables, such as the organisational capability for green technology adoption or the impact of green technology on textile innovation, should be investigated to enhance the efficacy of this model.

ACKNOWLEDGEMENT

The researchers would like to thank all the authors and colleagues for their contribution. This work was supported by the Grant number FRGS/1/2020/SS01/MMU/02/4.

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