

Report On

The Synergy Between Industry 5.0 and Green Supply Chain Management as a Sustainable
Development of Bangladeshi RMG Industries

By

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An internship report submitted to the BRAC Business School in partial fulfillment of the
requirements for the degree of Bachelor of Business Administration

Brac Business School

Brac University

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Declaration

It is hereby declared that

1. The internship report submitted is my/our own original work while completing degree at Brac University.
2. The report does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.
3. The report does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. I/We have acknowledged all main sources of help.

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Letter of Transmittal

Nusrat Hafiz, PhD

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Subject: Submission of Internship Report

Dear Sir / Madam,

It is my pleasure to inform you that I have successfully completed and submitted the report titled "The Synergy Between Industry 5.0 and Green Supply Chain Management as a Sustainable Development of Bangladeshi RMG Industries." This report is based on my internship at Bitopi Group, where I worked in the Group HR Department under the esteemed guidance of the Honorable Assistant Manager.

I have devoted my utmost effort to prepare this report with essential data, proper analysis, and practical recommendations in a concise yet comprehensive manner. I am confident that it will meet the expected standards.

I therefore humbly request you to kindly accept this report.

Sincerely yours,

Mumtahina Billah

21204160

BRAC Business School

BRAC University

Date: 6th May, 2026

Non-Disclosure Agreement

This agreement is made and entered into by and between Bitopi Group and the undersigned student at Brac University, Business School.

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Mumtahina Billah

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Executive Summary

This report is based on a partial requirement of the Bachelor of Business Administration degree at BRAC Business School as the internship experience of Mumtahina Billah in the Human Resources Department of Bitopi Group in the period between December 2025 and March 2026. The major HR functions that were undertaken during the internship included screening of CVs, management of recruitment database and creating internal communication materials. The host organization, Bitopi Group, is one of the leading Bangladeshi conglomerates with a notable presence in the Ready-Made Garments (RMG) industry, boasting of LEED Platinum-certified, zero-waste manufacturing plants. The report also introduces an original research study that looks at the role of the synergy of Industry 5.0 technology adoption, top management commitment, and workforce training in driving environmental performance within a Green Supply Chain Management (GSCM) framework, which is interpreted through the Triple Bottom Line (TBL) theory. The results indicating that these three variables are mutually reinforcing pillars strengthening each other reveal that the findings are based on qualitative interviews with seven RMG industry experts.

Keywords: Green Supply Chain Management (GSCM); Sustainability; Top Management Commitment; Triple Bottom Line (TBL); Industry 5.0 Technology; Workforce Training

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List of Acronyms

SWOT	Strength, Weakness, Opportunity, Treat
VRIN	Valuable, Rear, Inimitable, Non-substitutable
RMG	Ready-Made Garments
SDG	Sustainability Development Goals
HRM	Human Resource Management
EPZ	Export Processing Zone
BGMEA	Bangladesh Garment Manufacturer and Exporter Association
TNA	Training Needs Analysis
ETP	Effluent Treatment Plant
TBL	Triple Bottom Line
GSCM	Green Supply Chain Management
MTO	Management Trainee Officer

Chapter 1 Overview of the Internship

1.1 Student Information

My name is Mumtahina Billah a student of the Bachelor of Business Administration (BBA) course majoring in Human Resource Management (HRM). The internship was done as a course of study requirement of my undergraduate degree. My educational experience in HRM helped equip me with theoretical information in the field of recruitment, selection, training, and performance management, and organizational behavior, which I could apply to practice in the course of my internship.

1.2 Internship Information

The internship was scheduled over an interval of three months between 22 December 2025 and 22 March 2026. I was under the Human Resources Department of Bitopi Group and served in the rank of HR Intern. The internship was full time as such and was on the usual organization working hours. The main aim of the internship was to have first hand experience in the operations of HR, particularly recruitment and supporting activities and to learn how the HR operations are run in a large corporate organization that serves on the Bangladesh business and industrial landscape.

1.2.1 Organizational Description.

Bitopi Group is the common corporate group in Bangladesh, which has diversified business operations. Even though it began as an advertising agency, the organization has diversified its business to include various fields, such as the Ready-Made Garments (RMG) business, merchandising, business development and corporate services. The company has a well organized HR department that handles recruitment, employee records, training coordination as well as internal communication. The HR department is extremely important in the organization facilitating the growing workforce by facilitating the correct hiring, documentation and coordination of the various departments. Being an HR intern, I experienced these kinds of organizational working processes and was able to understand the role of HR in making an organization effective.

1.2.2 Supervisor's Information

I was an intern of the Bitopi Group in the direct supervision of Mr. Nafis Ahmed, Assistant manager. To ensure that I was fully guided, given responsibilities, controlled my performance, and received feedback, my supervisor met me on an ongoing basis. His supervision enabled me to learn about the expectations of the profession, the discipline of the workplace, and the aspect of practical HR decisions.

1.2.3 Job Responsibilities and Scope of Work.

My internship experience at Bitopi Group gave me a vast assortment of duties that enabled me to be an active contributor to HR operations. I was not restricted to observation, but I was engaged in real-world activities, which assisted in daily HR activities. My responsibilities are detailed in the following paragraphs. Part of my significant tasks was helping in the recruitment and selection process especially in the Management Trainee Officer (MTO) program. I was also assisting the HR team in gathering and analyzing the CVs sent by the candidates via various channels. My responsibility was to sort and organize the CVs according to the educational background, skills and experience. This was a very sensitive task, which needed close attention and confidentiality since the information on recruitment is sensitive. I made CV summary sheets using Microsoft Excel after first screening. Key details about the candidate, including name, education qualifications, major subjects, university, CGPA, skills and relevant experience were incorporated in those summary files. HR supervisors and managers did the comparison of the candidates and shortlisting decisions were made using the CV summary sheets. Writing these summits made me realize how human resource can assess job applicants and align job specifications with applicant profiles. Besides the recruitment support, I also engaged in a lot of data entry and record keeping. I changed recruitment trackers, candidates databases and Excel sheets periodically. It was necessary to have proper records to make HR practices transparent and efficient. This piece of work enabled me to master the use of Microsoft Excel and the essence of using accurate data in HR decision-making. The other significant duty that was bestowed on me was organization of HR files. I helped to sort out HR files including physical and electronic ones, such as CV folders, recruitment information and in-house records. The

labeling, classification and proper storage were done in such a way that files could be easily retrieved whenever they were in demand. This assignment has made me realize the significance of documentation and record management on HR operations. Other than recruitment and documentation, I was also engaged in the designing of posters and communication materials related to the HR. The most important materials I had to create was a poster on General Meeting Etiquette that presented the dos and don'ts of how the employees should behave during the meetings. The guidelines that were provided in the poster were to be on time, to listen actively, to talk distinctly, to avoid the use of phones, and to avoid side conversations. The materials have been developed to ensure that the organization, through professional behavior and good communication, is fostered. To design these posters, the HR team needed to work together so that the content used in the posters was in line with the corporate culture and the communication standards. This task offered me a practice in internal communication and I learnt that HR plays a role in defining the workplace behavior. I was also involved in developing a written question paper to be used in intern recruitment evaluation. The question paper contained multiple choice tests and analytical reasoning tests, simple mathematics, grammar in English and general knowledge questions and tests concerning the RMG industry in Bangladesh. It also had paragraph writing and case study questions to evaluate the communication skills of the applicants, their ability to solve problems, and also their professional judgment. Question paper preparation had to be done with due regard to the level of difficulty, relevancy and fairness. This assignment provided me with the understanding of how organizations compare intern candidates to their academic performance and evaluate their practical thinking and communication capabilities. During the internship, I also helped with general HR administrations, including coordinations of team members, answering simple questions, and day-to-day HR activities, as directed by my supervisor. These tasks made me realize how to communicate in the workplace, hierarchy, and how to behave professionally.

1.3 Internship Outcomes

1.3.1 Student Contribution

- Practical Introductions to Human Resource Functions.

The internship period exposed me to different practical fields of human resource management that are usually theorized in academic courses. Such challenges like planning of recruitment, evaluation of employees, documentation, discipline at work place, and communication within an organization were better understood through practical engagement. Instead of watching, I was an active participant of these processes, and this fact improved my knowledge of the way HR functions work in the real business environment. Among the most significant things I discovered in the course of the internship was that HR activities are quite demanding in terms of precision, confidentiality, and consistency. All the activities, data entry, screening CV, and organizing files had either a direct or an indirect influence on the decision-making. In my day-to-day activities, I came to understand how HR practitioners strike equilibrium between the organizational need and ethics in particular when dealing with candidate information and internal records.

- Recruitment Process Observation and Participation.

One of the most common and important tasks that took place during my internship was recruitment. I noted that recruitment process was systematic and it began with the identification of manpower requirements up to the final selection of the candidates. Even though final decisions were being made by senior HR personnel, as an intern I was involved in assisting every step in the process. I was actively involved in CV receiving, application classification, and shortlisting without considering any other factor. These criteria were in terms of educational background major subject, CGPA, relevant skills and internship or work experience. The process allowed me to appreciate how organizations can receive plenty of applications and sieve them effectively but without unfairness and irrelevance. In addition, making CV summary sheets enabled me to learn how recruiters can reduce complicated data about the candidates to simple formats that can be easily

assessed. This is a lesson that enhanced my analytical skill and attention to detail, which are essential skills as an HR professional.

- The Design of Intern Recruitment and Assessment

The preparation of a written assessment question paper in order to help intern recruitment was one of the most unique and important tasks given to me. This task equipped me with an understanding of the manner in which organizations consider the potential interns besides academics. The question paper was modeled in such a way that it could evaluate several competencies such as English language proficiency, logical reasoning, numerical ability, general knowledge, and situational judgment. Also contained in it were paragraph writing and case study parts to test the communication skills of the candidates, their problem-solving skills, and their attitude towards their profession. In the preparation of this question paper, I have also come to know how human resource practitioners do make sure that assessment devices are balanced, unbiased and in tandem with the organizational needs. This made me realize the need to have structured evaluation techniques on recruitment and selection.

- Addition to the Domain of Internal Communication and Workplace Etiquette

The other significant area that I assisted in was internal communication. I helped in the development of meeting etiquette posters that were printed in the organization. These posters themselves defined the professional practices that should be observed in the meetings, including not being late, having good listening skills, communicating effectively, and not being distracting. This task helped me to understand that the organizational culture and employee behavior are developed by HR departments. Even such minor initiatives like the visual communications resources may have a positive impact on the professionalism in the workplace. The development of these posters made me realize how HR can assist the management in encouraging the required behavioral norms.

- Documentation and Record Management Experience.

My work was greatly involved with documentation and record management. I dealt much with Excel sheets and physical files, making sure that any records were updated, correct and organized. I was informed of the difficulties in incorrect documentation causing

misinterpretations, time wastage and mistake in the HR work. The need to maintain orderly records meant that there must have been consistency and discipline. The experience also helped me to incorporate an organized system of files management that will be useful in my future career life. Another thing I got to know is that confidentiality is important when dealing with sensitive HR information.

- Building of Technical Skills.

Through the internship, my technical skills were developed especially in Microsoft Excel. Excel was used in summarizing CVs, recruiting tracking and providing data entries. In the long run, I got familiar with formatting, filtering data, and sorting of big datasets. Besides Excel, I had some basic experience on how to prepare documents and visual materials using the standard office and design tools. These are technical skills that an HR specialist will need because contemporary HR functions are intensive in terms of digital systems and data management. Another major aspect that developed in the internship was in professional communication.

I got to know how to address the supervisors, colleagues and candidates formally. It was necessary to be clear and professional in the correspondence via emails, oral instructions, and written summaries. My engagement with team members enabled me to learn the hierarchy in the workplace and the need to be respectful. Another lesson that I got was that I should accept feedback positively and use it to enhance my performance. It is essential to manage time properly and avoid wasting it on one task at a time, as this can negatively impact the program's success.

- Time Management and Work Discipline

It is vital to use the time effectively and not spend it on one activity at a time as this will affect the success of the program. A working environment in a company mandated strict observation of time and deadline. I was usually given two or more tasks at the same time during the busy recruitment periods. These tasks had to be well planned and prioritized to be in control. This experience has made me more time conscious, taught me the values of being on time, consistent, and accountable. These are the qualities that keep one successful in any workplace.

- Confidentiality and Ethical Awareness

The work with the HR related information helped me realize that ethical obligations are connected with the profession. Sensitive information is contained in candidate CVs, interview outcomes and internal documents that should be guarded. During my internship, I highly observed confidentiality practices and made sure that I did not share information with other unauthorized members of staff. This was a lesson on the need to act with ethics in HR practices.

- Association with Supervisor and Team Members

My supervisor gave me valuable tips that were important to me during my learning process. Frequent orders, feedback, and support enabled me to become better at my work and confidence. The HR team provided a supportive environment and enabled me to adjust to the working environment. Having to cooperate with more experienced people helped me to see how HR teams cooperate, solve problems, and serve organizational interests. This exposure taught me inter-personal skills and understanding of team work.

- Personality Development and Self-efficacy

In addition to professional competencies, the internship has helped me grow as an individual. At the beginning, I was insecure and awkward in a business setting. Nevertheless, I became more relaxed to accept responsibility and do tasks on my own as I gained experience and confidence. This development enabled me to have a stronger self-confidence in becoming a Human Resource Manager. My internship experience has enabled me to establish my strengths and weaknesses.

- Restrictions of the Internship Experience

Despite the exposure gained through the internship, it had some weaknesses. My duties as an intern were few as compared to full-time workers. Strategic planning and policy formulation were some of the key HR roles that the senior management did, which were not within my reach. Also, the short term of three months did not allow interaction in long term HR projects. Nevertheless, these restrictions are inherent in internship programs and did not make that much of a difference with the overall learning experience.

1.3.2 Learning Outcomes

The internship experience was an excellent learning experience that has helped me acquire professional and personal competencies. I learned the practical aspect of recruitment and selection process, such as screening, shortlisting and evaluation methods of the CV. My technical skills were enhanced in the areas of Microsoft Excel, data management and documentation. Besides, the internship enabled me to acquire professional communication skills, time management skills, and flexibility to corporate culture. My experience under supervision taught me to be disciplined, responsible and to work in a team. My experience of the actual HR activities enhanced my desire to become part of the Human Resource Management career.

1.3.3 Problems that arose during the Internship.

Although there was a positive learning experience, there were a number of challenges that I encountered during the internship. First, it was hard to adjust to the corporate culture of working and professional demands. Time management and prioritization were needed to handle various activities at the time of high recruitment rates. It was also challenging to learn organizational systems and documentation practices within a small period of time. Yet, I also managed to overcome all these difficulties with the help of a supervisor and the assistance of the HR team and began to enhance my performance.

1.3.4 Recommendation

However, according to my experience, it is possible to recommend several suggestions that can improve the future internship programs. The internship can be made more clear to the interns by offering a structured orientation program at the start of the internship period. More in-depth learning may be achieved by rotating between the various functions of HR, including training and performance management. Continuous improvement could also be facilitated by frequent feedback between interns and supervisors.

Chapter 2 Organization Overview:

2.1 Introduction

This chapter gives a full and detailed background of the Bitopi Group, its development as groundbreaking advertising agency to the diversified, sustainability-oriented conglomerate with the best strength on readymade garments manufacturing (RMG). It will look back into the history of the company, the vision and mission statements, manufacturing processes (with due focus on its world-renowned green plants and technologies), management approach, leadership style, recruitment and selection systems, compensation system, training and development programs, performance appraisal programs and system, marketing practices, financial performance and accounting, operations management and information system, and its total industry and competitor analysis. The chapter is followed by a conclusion overview, general evaluation and recommendations.

The information is summarized using publicly available sources, such as the official websites of the company (bitopibd.com and bitopi-group.com), business directories (Crunchbase, Datanyze, RocketReach), industry reports, and news articles of 2025-2026 as well as the strategic analyses. Bitopi Group, as a privately owned family business, does not share much granular internal information like the specific remuneration amounts, proprietary performance appraisal forms, or audited accounts. In such cases, the chapter is seen as referring to the common practice in the RMG business in Bangladesh and inferences are made based on the sustainability leadership reported by the group, recent investments and awards, as well as what the leaders of the group have said.

Special focus is given to the strategic positioning of Bitopi in an environment that is fast changing RMG. The RMG sector of Bangladesh is the second biggest apparel exporter in the world, after China and it is the biggest contributor to the national exports with a contribution of about 81 million and it has more than 4 million employees. But it suffers serious head winds, such as the LDC graduation in the country (effective November 24, 2026, with duty-free allowances phasing out by 2029, potentially imposing average tariffs

of 8-12% or more in the EU), export volatility (e.g., a small 2.63% increase reaching \$19.36 billion in Y2025-26 with periodic declines), increased production costs (as high as 40% in certain years due to raw material duties Bitopi has a defensible competitive advantage through its elite LEED Platinum certified factories, zero-waste technologies, ethical business approaches, and family-led synergies, which allow it to serve both high-end and sustainability-aware segments and create resilience to these factors. In the chapter, the description of the organization is accompanied by the analysis of how its resources, capabilities, and strategies are aligned with the long-term sustainability and post-LDC competitiveness.

2.2 Company Background

Bitopi Group was established in 1968 in Dhaka by a visionary entrepreneur Reza Ali (who died in February 2023, at 82) as Bitopi Advertising Limited. The agency was then based in what was East Pakistan back then and soon became the pioneer in the creative and media business bringing new advertising campaigns and professional standard way before the independence of Bangladesh in 1971. The philosophy of the founder was reflected in the name of the company, which is a Bengali word, Bitopi, meaning a big, protective tree that would offer shade, support, and benefits to the society in the long run. This group ethos has continued to be a focus of the identity as well as decision making of the group over 50 years.

Bitopi has undertaken a strategic diversification in 1984 into the newer readymade garments (RMG) business with the formation of Misami Garments Ltd. with an initial concentration of woven bottoms. This action took advantage of post-independent industrialization policies of Bangladesh, the availability of large quantities of cheap labor, and a rising world demand of outsourcing clothing. The group expanded its manufacturing base in the subsequent decades, opening up locations in strategic locations: the flagship Shewrapara, Mirpur location in Dhaka (still serving as the headquarters, and a modern design and product development studio), Tarasima Apparels Ltd. in Manikganj (2005), Remi Holdings Ltd. in Adamjee EPZ, Narayanganj (around 2012), Baridhi Garments Ltd. in Comilla EPZ (2015), as well as a large new project in Dhaka Export Processing Zone

Bitopi Group is a diversified conglomerate today, that is fully owned by the Bangladeshi. Its main revenue generator is apparel production that manufactures woven and denim bottoms, jackets, outerwear, and swimsuits to the major global customers like VF Corp, H&M, Zara, Primark, Walmart, and Benetton. It also has a presence in the media and communications (based on its advertising base through a joint venture with the worldwide agency FCB which runs under the name FCB/Bitopi with operations in several countries), event management, aquaculture, and agro-based businesses. This diversification creates synergies in operations - such as advertising skills in-house branding, digital marketing, and supply chain traceability to the RMG clients.

Although site-based workforce estimates in some directories estimate the number of people at between 1,001-5,000 group-wide, the actual number of persons directorships employed in the RMG division exceeds 14, 000 and the totals in the millions of persons when all the operations and indirect positions are included. It has facilities in strategic industrial centers that enjoy the Export Processing Zone (EPZ) incentives including tax-free importation of machinery and raw materials. One of the noteworthy achievements is the US 9.58 million in a new DEPZ plant (announced towards the end of 2022 and into full operation), which is to manufacture around 2.93 million units of woven and knit garments and generate 1,551 direct jobs to residents of Bangladesh.

The international community has appreciated Bitopi on account of its sustainability efforts. Its factories have been awarded several LEED Platinum awards by the U.S. Green Building Council with Remi Holdings being ranked one of the highest scoring LEED Platinum garment factories worldwide at different times and Tarasima Apparels being the highest scoring at different times in existing structures in Bangladesh and South Asia. In 2025, 38 new LEED certifications (22 Platinum) were registered in Bangladesh, bringing the national total of approximately 268-270 LEED-certified garment factories, with the units of Bitopi being repeatedly singled out as some of the high achievers. Facility features are features throughout the facilities such as zero-waste production, waste-to-energy boilers (using fabric, thread and carton waste to create energy), biogas plants of organic waste, advanced water recycling, lean production of high fabric usage (usually higher than industry average), and worker well-being facilities. These efforts minimize

environmental effects, decrease the long-term expenses, and become attractive to ESG-friendly consumers in an environment of tougher international rules.

This has been facilitated by the leadership of the group. Following the death of Reza Ali, the second-generation leaders (such as Miran Ali, Managing Director and former BGMEA Vice President), Mishal Ali (Deputy Managing Director, Apparels) and Sarah Ali (media sector) have followed the tradition but professionalized the operations. One such figure is Miran Ali, who has been speaking at international conferences, talking about China+1 prospects, sustainability and industry resiliency. The group is successful as evidenced by awards like the IPDC Bangladesh Supply Chain Sustainability Awards (both Remi and Tarasima), Green Factory Award 2025 (Tarasima) and HSBC Export Excellence (Mishal Ali).

In spite of such strong points, Bitopi is in a very competitive and margins sensitive industry. Directary estimates in the core entities are on a range of about US 17.5 million and consolidated group turnover has historically been reported as higher (up to over US 100 million in certain evaluations). Premium sustainable orders help the performance but the price volatility of raw materials and dealing with a labor market that is under strain (including 2025 wage-related unrest) and the imminent LDC graduation risk the absorption of tariffs in the billions of dollars for the industry as a whole. Bitopi is addressing them by means of green differentiation, efficiency gain, and strategic capacity building, making it a responsible and future ready supplier in the world apparel value chain.

2.3 Overview of the company

2.3.1 Bitopi Group vision

The vision of Bitopi Group is to cultivate and develop all of the businesses they involve in an organic and sustainable fashion likened to the large "Bitopi" tree that gives shade, support and food to the surrounding. Its purpose is to enhance the standards of operations in the various industries, develop centers of excellence, contribute back to society through creation of meaningful opportunities to human beings and raise the level of Bangladesh as a destination of excellence and quality in terms of manufacturing, creativity and responsible businesses.

The vision is heavily embedded in the philosophy of the founder of the group Reza Ali and has led to the diversification and investments of the group in a span of more than 55 years. It focuses not on short-term gains but long-term value creation, through significant investments in green technologies, employee welfare (through inclusive hiring policies towards persons with disabilities and fair-priced shops) and community programs as well as ethical governance. The RMG division vision is the quest to attain the best LEED certifications and zero waste operations, which means growth will have positive impacts on stakeholders, the environment, and the country.

In the context of the 2026 pressures (such as LDC graduation, new tariffs may be imposed, risking billions of exports), the vision proposes premium positioning in sustainable and ethical markets, the implementation of circular economy principles, and technology use (e.g. digital traceability). It equally encourages an enabling leadership culture that will help build talent and align human capital with business objectives. The symbolic shade-giving tree is an image of strength, participation in society, and natural growth that enables Bitopi to be distinguished among the purely volume-based competitors and establish long-lasting buyer relationships.

2.3.2 Mission of Bitopi Group

The mission of Bitopi Group is to introduce high standards of work environment in all its business endeavors and to commit itself to positioning Bangladesh in the global map as a destination of high standards and quality. It is dedicated to innovation, sustainability, ethical behavior, superior operation and provision of high value products and service that exceeds global expectations and helps in development of the nation.

This mission is realized by stringent adherence to the international labor, environmental and quality standards; embracing lean and green manufacturing concepts and the use of its advertising culture to communicate transparently with clients and traceability of its supply value chain. Practically, it implies manufacturing high-quality apparel in LEED Platinum buildings that have biogas energy, water recycling, and zero-waste. The mission also fosters diversification unit synergies such as branding through media, networking

through events, and larger economic gains through agro/aquaculture, which helps it absorb shocks in its specific sector.

The mission demands flexibility in a post-LDC setting (the possibility of increasing tariffs after 2029, EMM changes and ESG demands): it will speed up the development of man-made fibers, invest in digital solutions, and focus on higher-value brand requests, such as outerwear and sustainable collections. High standards of globally acceptable products allow Bitopi to retain high-end consumers in addition to making Bangladesh one of the leaders in the responsible production work, with more than 268 LEED-certified plants in the country by the end of 2025. Ethical family values are also reinforced in the mission alongside the adoption of professionalism, which guarantees sustainable growth, and the growth is friendly to employees, communities, and economy.

2.4 Manufacturing Unit

Bitopi Group manufacturing activities are the foundation of the company business with high-quality production facilities coupled with environmental stewardship through its high level of sustainability based RMG. It has four major apparel divisions and a significant DEPZ development, with the total capacity of multiple million pieces per month and specializes in woven and denim bottom, jackets, outerwear, and swimsuits. These plants are in strategic locations within the industrial zones to enjoy infrastructure, labor force, and the EPZ incentives.

The RMG group was based in Misami Garments Ltd. founded in Shewrapara, Mirpur, Dhaka in 1984, which is its headquarters. It is located on about 80,000 square feet and concentrates on bottoms that are woven as well as a modern state of the art design development studio with the ability to draw the current CAD systems. This allows quick prototyping, customization (such as complicated products such as seam-sealed jackets) and prompt reaction to customer orders. The plant combines the concept of lean manufacturing and is also a focal point in terms of coordination and quality control among groups as well as innovation.

Tarasima Apparels Ltd. (formed in 2005 in Manikganj) is specialized in non-denim and denim bottoms, and has high level of wet and dry processing. The factory is expansive in

terms of its floor space and has a monthly capacity of about 1.2 million pieces. It is LEED Platinum in the Existing Buildings category and has been known as one of the highest-rated green factories in existing buildings in Bangladesh (and South Asia). The major sustainable aspects are the zero waste initiatives, waste-to-energy boilers which transform fabric, thread and carton waste into usable energy, biogas plants which use organic refuse, advanced water recycling plant, and lean manufacturing which make use of the highest rates of fabric utilization. Tarasima was named the Green Factory Award winner in 2025 and is once again regarded as a leader in production of environmentally friendly denim. The structure of the facility is based on the comfort of the workers, energy savings, and the adherence to the international standards of buyers.

The flagship operation is Remi Holdings Ltd. (created approximately in 2012 in Adamjee EPZ, Narayanganj), covering the area of approximately 500,000 square feet and focused on bottoms. It was rated as one of the highest in the world in LEED Platinum (reports in 97/110 range in its category) and is globally known to be a model in manufacturing green garments. Remi is focused on zero-waste manufacturing, the latest energy-saving technologies, high-level water conservation, and a full set of facilities of employee wellbeing. It has won prizes like the IPDC Bangladesh Supply Chain Sustainability Award and has often been brought up as a source of national pride, indicating what Bangladesh is capable of doing to make high-quality manufacturing responsibly on the global platform. The pre-designed green infrastructure in the factory promotes the cost-saving and environmental performance in the long term.

Baridhi Garments Ltd. (2015 in Comilla EPZ) is a jackets, outerwear, and swimsuits producer. It is also LEED Platinum and is purpose-built green in terms of maximum energy management, water efficiency and waste reduction. The facility covers diversified product lines and high compliance and quality standards.

The US\$9.58 million DEPZ project (announced in 2022 and currently in the process of development to full-scale operations) that will produce 2.93 million pieces of woven and knit garments (including jackets and bottoms) annually and create 1,551 working places is aimed at the overall capacity improvement. This investment enhances knit capacity, and aids in further vertical integration and is in line with the export expansion strategies.

In each of the units, Bitopi uses lean manufacturing, cutting and spreading automation (auto spreaders and cutters), and sustainable technologies, including incineration boilers and developments in solar power. The practices have high fabric utilization, low emissions and ground water consumption, and adherence to post Rana Plaza buyer audits. The overall RMG output of the group is mid-tier against larger conglomerates (it is estimated that the company has a base of about 3.5 million pieces a month across its facilities), but the group has a rare and invaluable, and hard-to-replicate competitive edge in its elite green credentials, which is part of the record 2025 LEED performance of Bangladesh (38 new certifications all over). Some of the challenges are dependency on imported materials (woven fabric sourcing in the country is around 40 percent), exposure to changes in global prices, but the location in the EPZ and sustainable efficiencies can counter this. On the whole, the manufacturing facility of Bitopi is the best example of how environmental responsibility could be used to achieve operational excellence, cost competitiveness, and high quality access to the premium market in the harsh global industry.

2.5 Management Practices

Bitopi Group Management has adopted management practices that incorporate family stewardship and professional skills and has had a heavy focus on sustainability, regulatory compliance, operational efficiency, employee welfare, and continuous improvement, which are important success factors in the export-driven RMG industry in Bangladesh. These practices underpin the strategy of differentiation that the group has and enables it to overcome the volatility in the industry.

2.5.1 Leadership Style

Bitopi Group is an example of a family-based leadership approach with the professional added values. The founder and long-time Chairman, Reza Ali inculcated a visionary, ethically fostering approach based on the philosophy of shade-giving tree, sustainable and creating value to society. Second-generation leaders have continued this tradition after his death in 2023: Miran Ali is the current Managing Director, who has previously worked as a Vice President and Managing Director of BGMEA, with strategic advocacy

in the industry, policy influence, and global views (including attending China+1 strategic forums and sustainability). Mishal Ali is the deputy managing director and majorly deals with apparels and pursues manufacturing excellence and sustainability programs and has been awarded the HSBC Export excellence award. Sarah Ali heads areas of media and communications division, which makes sure that synergies of diversification exist.

The general leadership approach is a combination of transformational leadership, including the encouragement of major LEED investment and green innovation, democratic and coaching leadership. Leaders promote involvement of employees in decision making, generation of ideas within the company because of flat organizational, and growth of employees through mentoring and training programs. It fosters agility with lean systems, inclusivity with frequent cultural gatherings (staff picnics, Pitha Utshob festivals, charity drives) and harsh ethical practices through zero tolerance to child labor, fair labor practices, and transparency. It is a results-focused but caring approach that has allowed the group to enjoy a high level of buyer relations, high compliance among its employees and resilience in terms of labor disturbances (e.g., 2025 wage protests) and economic shocks.

Miran Ali championing sustainable practices in BGMEA and at international forums, Mishal Ali championing award winning supply chain work and the joint investments in the DEPZ expansion to provide employment and capacity are examples of leadership in practice. Although family-based decision making offers a continuation and value system, it also puts in place some form of succession risk, recent senior hires in HR, production, among others is an indication that there is an attempt to professionalize and expand the talent pool. This leadership is effective in the scenario of LDC graduation and ESG changes, which helps to position resources and strategic differentiation with sustainable apparel to grow innovation and competitiveness in the long term.

2.5.2 Recruitment and Selection Process

Bitopi Group has a professional concentrated recruitment and selection that is tasked with ensuring that the company hires talents, which are in line with its sustainability strategy, compliance strategy, and operational strategy. The vacancies are announced

by using a variety of sources, such as company career portal, LinkedIn, BDjobs.com, referral by employees, and networks. Examples of openings have included senior roles such as Deputy General Manager - HR, Assistant General Manager - Production, Washing General Manager (with denim knowledge) and management trainee programs (MTOs) which tend to focus on sustainability and lean production. These advertisements indicate continued growth, skills renewal in a labor-challenged industry, and specialized skills in green operations.

At the initial stage, the process involves a thorough screening of CVs based on elaborated job descriptions of the technical competencies, experience in the field of RMG or other fields involved in it, awareness of ESG, and alignment with the values of the shade-giving tree of the group. The shortlisted applicants undergo a series of processes: technical tests or practical tests (especially the production, quality, or design jobs), behavioural interviews with the focus on the problem-solving and ethical decision-making skills, and panel interviews with the department heads, HR representatives, and even the top management. In managerial or specialized jobs, further assessments can be case studies or simulations on lean processes or sustainability problems.

The ultimate choices are based on the long-term potential, diversity (including hiring inclusively on persons with disabilities), and compatibility with buyer compliance requirements. Successful candidates are then offered positions formally and extended induction and orientation programs are done. These programs also familiarize new entrants to the history, vision and mission of the group, sustainability promises, safety measures, Bangladesh Labour Law necessities, and departmental special working processes. Onboarding can assist in speeding up the process of integration and supporting ethical and operational standards during the initial days.

The strategy of Bitopi solves several common problems in the RMG sector that include high turnover rates and lack of skills by focusing on retention at the hiring point-based on compensation packages, welfare, and enhanced career growth. Although the specifics of the internal processes (e.g., the use of portfolio analysis documents or multi-level approval processes) are not publicly revealed, the process can be deemed highly professionalized when it comes to the Group HR leadership, such as the Sr. Manager -

Organization Development and Training. This is a compliance-based recruitment that will help in scaling sustainable operations and developing a robust workforce that will be in position to handle the post-LDC recruitment requirements in terms of increased productivity and value addition.

2.5.3 The Compensation System

Bitopi Group does not publicly release its specific salary structures and exact amounts, as it is customary to do with privately held Bangladeshi conglomerates. Nonetheless, the remuneration package is geared towards meeting all requirements as stipulated by the Bangladesh Labour Act and international codes of conducts in buying goods, though some features that facilitate retention and motivation in the competitive labor market are also included.

An average permanent employee package consists of a basic salary based on grade, experience, qualification and role importance (e.g. better in technical- or sustainability-oriented jobs). Allowances are usually house rent (usually about half of basic pay), medical (25%), transportation or conveyance (25%), and other special allowances depending on the job or the place of work (e.g., factory and corporate). The monthly payments are done in arrears monthly, which should preferably be in the form of bank transfers, with an exception of new hires or short term non-management personnel.

Other perks that the confirmed permanent employees will enjoy include:

Festival Bonuses: There are two yearly bonuses (Eid-ul-Fitr and Eid-ul-Azha), paid in the amount of one-month basic salary. The pro-rated or 50 percent applies to employees who have less service (e.g. at least six months to be eligible).

Provident Fund: The employee and the employer make 10 percent contribution of basic pay and the fund is administered by a trust deed under a board of trustees.

Gratuity: It is payable on resignation, at retirement after a minimum of five years of service based on the final basic salary and years of service.

Life and Medical: Life insurance (usually 24 times basic pay or minimum limit) with medical coverage of corporate employees and their dependents, which is provided by the HR. It is usually after confirmation that the probationary employees become eligible.

Overtime: Paid at statutory rates to non-management employees on hours worked outside of regular shifts, subject to the approval of the supervisor and being monitored on a daily basis.

Salary increments based on performance are taken into account through annual salary reviews taking into account government-reported inflation, cost-of-living increase (usually 3-4% or higher, at the discretion of the Managing Director) and performance-based increment. Extra allowances can be given on outstanding contributions, especially in the area of sustainability or efficiency enhancement. The provisions of welfare, including subsidized fair-price shops, canteen amenities, and inclusive programs that Bitopi offers as a part of a total reward offering also improve compliance and retention in the context of industry wage protests and increased living costs in 2025. Senior and technical positions (i.e. DGM level HR or production role) are fairly remunerated based on market competitiveness to appeal to experienced professionals who can propel green initiatives and operational brilliance. All in all, the system acts as a balance between the law, professional ethics, and strategic talent demands in order to have a motivated workforce in a demanding sector.

2.5.4 The Training and Development Initiatives

Bitopi Group has a strong aspiration towards training and development where it considers human capital vital to its sustainability and operational excellence objectives. Training and Development Group HR (enhanced by such positions as Sr. Manager - Organization Development and Training) develops, facilitates, and assesses training programs of employees of all levels, including factory employees and management.

All new members go through a well-organized orientation training process that includes the history and values of the group, its vision and mission, organizational culture, safety and health policies, ethical practices (such as zero child labour and adherence), Bangladesh Labour Law as well as department-related processes. This basic training

ensures faster integration and the alignment of the employees to the shade-giving tree philosophy.

Continuing efforts can be divided into the following categories:

Technical Training: Practical courses in lean manufacturing, methods of washing and processing denims, planning and control of production, ERP system, quality management systems (QMS), operating and maintaining equipment, and such more specialized courses as sustainable dyeing or waste minimization technologies. They are commonly provided by the internal resource persons or external experts with the line managers taking care of the ultimate participation.

Soft Skills and Leadership Development: Time management, effective communication, teamwork, leadership, conflict management and stress management sessions, the main focus of the sessions would be on white-collar and managerial staff to improve decision-making and cooperation.

Sustainability and Compliance Training: Important courses on ESG needs, supply chain traceability, principles of the circular economy, carbon reduction, water and energy conservation, and buyer-specific requirements. These initiatives are a direct answer to the sustainability of LEEDs and assist employees in supporting zero-waste and green objectives.

Awareness and Motivational Training to Workers: The programs that are offered to non-management worker (such as office assistants, drivers, and cleaners) are based on the themes of safety, motivation, efficiency, and personal growth.

Sales, Marketing, and Specialized Training: These are based on the advertising tradition, and they include customer relationship management, sustainable branding, rapport building, and digital tools.

The training techniques are diverse to provide as many engagements and retention as possible; lectures to train a large group, role plays and simulations to learn in practice, ice-breaking to break the silence, focus group discussions (particularly, the management level in terms of soft skills), and using films, videos, and case studies. Logistics are well-

invested consisting of committees training rooms or venues, projectors, sound, cameras to capture recording sessions, laptops, stationery, as well as predetermined refreshments. Training Needs Analysis (TNA) is done on a yearly basis (or as per the necessity of the HR and line managers) by taking market visits, sales meeting feedback into consideration, and performance gaps to develop an annual training calendar.

New HR and production positions in the last six months have increased the capacity to deliver, whereas collaborative efforts with industry organizations (e.g., BGMEA) and external trainers offer advanced material. These programs do not only eliminate skills gaps and enhance productivity, but they also facilitate talent retention, succession planning and adjusting to the post-LDC demands including increased efficiency, knowledge of MMF and digital skills. The process of investing in the development of employees helps Bitopi match its people with strategic goals and create a culture of improvement and sustainability leadership.

2.5.5 Performance Appraisal System

Although there is no publicly accessible particular appraisal forms and detailed rating scales, the performance appraisal system of Bitopi Group is known to be based on the accepted standards of the RMG industry with a high focus on sustainability, compliance, and lean principles. The appraisals are usually done on an annual basis (including some mid-year appraisals) by the supervisors directly reporting the employee in consultation with the department heads and the HR.

A balanced scorecard approach is likely to be employed throughout the process, with the quantitative KPIs being measured in productivity targets, quality rates, waste reduction metrics, on-time delivery performance, and cost efficiencies, and the qualitative ones including teamwork, green practices innovation, and compliance to ethical and safety standards, as well as ESG goal contribution. In managing positions, the 360-degree feedback components can be added in order to have a comprehensive picture. The performances are discussed on individual meetings with clear feedback on the strengths, weaknesses and development plans.

The outcomes of appraisals determine whether salary increments, eligibility of the festival bonuses, promotions, training recommendations, and special merit rewards will occur or not. Sustainability efforts (e.g. donation to LEED maintenance, zero-waste goals, or traceability gains) are especially identified to expand the strategic priorities of the group. Managing Director still maintains check and balances over testing and grading done by seniors to make sure that the work is in tandem with the overall business goals.

A clear, unbiased, fair and objective appraisal system would help to gain trust, concerns of the employees, and retention in an industry that is susceptible to labour problems and high turnover. It also gives information of TNA and succession planning. The system enhances the differentiation of Bitopi as an ethical, green manufacturer because, as a company, performance is tied to sustainability and compliance metrics.

2.6 Marketing Practices

The present marketing practices at Bitopi Group are effectively based on the underlying marketing expertise in advertising to develop integrated, professional, and value-based campaigns focusing on quality, sustainability, and traceability. The media and communications section (under an agency named FCB/Bitopi) is in charge of branding in-house, digital content, client communication, and promotion, giving it a competitive edge over competitors that are more purely manufacturing-based.

Some of the main methods are specific B2B marketing with a focus on the extent of the group of elite LEED Platinum certifications (e.g., Remi Holdings as the global standard and Tarasima as the 2025 Green Factory Award), zero-waste, and ethical labor. The company attends large global trade shows, has an active professional website and LinkedIn, and creates case studies and storytelling messages based on the philosophy of the shade-giving tree to attract ESG buyers. Digital tools and client portals allow real-time visibility of supply chain, which increases trust and transparency.

Marketing is also used to promote the diversification synergies- positioning the group as a complete entity in terms of apparel, media, events, aquaculture, and agro to establish a powerful corporate name. These practices serve to keep Bitopi in the premium positioning spot in an increasingly regulation-focused, but price-sensitive, market, create

long-term relationships with brands that want responsible suppliers and distinguish itself between volume-driven market competitors. With LDC graduation and the world turning to ethical sourcing, marketing activities are based on the communication of resilience, innovation, and in line with buyer sustainability roadmaps.

2.7 Financial Performance and Accounting Practices

This part discusses financial performance and accounting practices, which are relevant to the financial performance of the company.

2.7.1 Financial Performance

Bitopi is a private group, and does not (as such) publish detailed audited financial statements. The business directories show that in recent times, core entity revenue is approximated at about US\$17.5 million, and the consolidated group turnover has been rated higher (more than US\$100 million in certain past reports), based on the main driver of RMG exports. Capacity expansions (e.g., the DEPZ project), operational efficiencies achieved with the help of green technologies (lower costs of energy, water, and waste), and the possibility of attracting top orders due to the sustainability-oriented purchasers are beneficial to performance.

Nevertheless, the group is exposed to wider RMG sector forces: fluctuation in the prices of raw materials (which worsened due to customs duties on MMF inputs), changes in exports (industry-wide 2.63% change to \$19.36 billion in Y2025-26 with certain monthly drops up to 14%), and the effects of LDC graduation that are expected. The tariffs that might be absorbed in major markets such as the EU to offset the loss of some of its duty-free preferences may be estimated as 8-12% or more in the post-2029 period, which may significantly lower the revenues of the sector. Disciplined cost management, lean practice, and export earnings contribute to liquidity and profitability, and a sustainability initiative drives long-term margin protection by ensuring efficiency and brand premium. All in all, financial health has been described as stable in case of a mid-sized player, and the opportunities of growth are associated with the effective implementation of green and diversification strategies.

2.7.2 Accounting Practices

Bitopi complies with Bangladesh Financial Reporting Standards (BFRS), tax and other regulatory provisions, such as EPZ-specific regulations that help to treat an import or export as duty-free. Accounting standards focus on proper allocation of costs (especially on sustainability assets like green equipment and waste-to-energy systems), proper valuation of inventory based on lean manufacturing (reduced holding cost) and extensive staff benefits (provident fund, gratuity) and environmental liability.

The system assists in elaborate compliance reporting among international purchasers, such as traceability and ESG performance, which increases the credibility of the audit. The depreciation policies are long lasting nature of green infrastructure investments, and the revenue recognition is in accordance with the export shipment. These are transparency practices, which will help to gain access to funding, and which are compatible with the ethical and sustainable ethos of the group.

2.8 Operations Management and Information System Practices

The operations management of Bitopi is based on lean manufacturing, automation, and extensive implementation of sustainability policies throughout its facilities. Just-in-time inventory, high fabric utilization, and minimization of waste are all methods of production flow optimization, with the cutting (auto spreaders and cutters) and processing lines being optimized by automation to enhance efficiency and precision. The coordination of supply chains in Dhaka, Manikganj, Narayanganj, and Comilla can provide traceability of the raw materials to finished garments and lead times are reliable (on average 45-60 days).

The enabling factor is the role played by information systems. A specific Head of ERP and IT manages an ERP platform that facilitates end-to-end production planning, real time inventory control, quality management (QMS), compliance documentation, and performance monitoring. These systems enable data-based decision-making, waste monitoring, energy control (including biogas production), and buyer demanded reports on the ESG measures. The use of digital tools contributes to agility and errors reduction and the facilitation of zero-waste and resource-efficiency ambitions of the group. The

practices offer operational resilience and cost benefit in a competitive environment where lead times and regulations are tightening.

2.9 Industry and Competitive Analysis

Bitopi Group operates mainly within the RMG sector in Bangladesh which is a front runner of the national economy and second-largest apparel exporter in the world after China. The industry has around 81 percent of exports and more than 4 million workers, but it is going through radical changes: LDC graduation (starting November 2026, preferences expire by 2029), export volatility, increased input costs, the MMF transition, nearshoring, and the growing demands of ESG.

2.9.1 Porter's Five Forces Analysis

Threat of New Entrants: Medium. There are major impediments in the form of heavy capital expenditure to comply with the factories, strict buyer audit (after Rana Plaza), and required certifications such as LEED Platinum. Low labor costs and incentives of EPZ make it easy to enter with fewer conditions, but it is not easy to scale, be green, and trusted by buyers. Small competitors are discouraged by the facilities and reputation built by Bitopi.

Supplier Power: Moderate and high. The buyers of fabrics, yarns, and accessories (which are frequently imported to China or India) have power because of the fluctuations in prices as well as the recent increment in the customs duty on the MMF inputs. The degree of local sourcing has not been very high (~40 percent on the woven fabrics), which exposes exporters to currency and supply shocks. Bitopi addresses this in the form of EPZ importation that is duty-free, partial vertical integration, and long-term sourcing alliances.

Buyers Power: High. Big brands (VF Corp, H&M, etc.) are centralized and they require competitive pricing, lead times shorter (45-60 days), complete traceability and excellent ESD performance. Events in the US/EU, where economic slowdowns increase supply chain visibility, nearshoring trends and order cuts (e.g. 30% reduction in some periods reported) further give buyers power, that is likely to squeeze supplier margins to the 5-7% range. The LEED factories and ethical track record of Bitopi make it win and keep premium accounts.

Threat of Substitutes: Moderate. There are no direct substitutes but indirect threats because of the transition to MMF globally (Bangladesh is ranked the lowest at about 20% share), the growth of second-hand and resale markets in the West, digital fashion and nearshoring to producers closer to its location (Vietnam, Turkey, Mexico) because of the reduction in shipping time and tariffs.

Competition among the current competitors: High. There are more than 4,000 RMG factories in Bangladesh, and there are high prices, quality, delivery, and compliance competition. Volume is controlled by larger conglomerates (Beximco, DBL Group, Ha-Meem), whereas sustainability has become one of the major distinguishing factors. The zero-waste practices and the leading LEED rating of Bitopi create a significant advantage among the general stakeholders in exports or low growth rates (e.g., -0.89% in certain periods) as well as geopolitical doubts.

Together these forces combine to produce a profit-limited volume-sensitive environment. Green and ethical branding provides Bitopi with a way to survive in more lucrative yet compliance-based segments as the industry enters the post-LDC phase.

2.9.2 SWOT Analysis

Strengths: Elite LEED Platinum manufacturing infrastructure (Remi Holdings as a former world-leading scorer and Tarasima Green Factory Award-winner 2025), good ethical reputation and compliance record (including IPDC and HSBC awards), family-led diversification with advertising synergies to good marketing and traceability, a professional workforce of over 14,000 in RMG, in-house design and product development, and These features are valuable, rare, imitable, hard to copy and structured (VRIN) resources that contribute to sustainable advantage.

Weaknesses: Mid-sized operations compared with industry leaders (combined capacity estimates of around 3.5 million pieces per month), vulnerability to imported raw material cost increases and supply chain fluctuations, overdependence on family leadership to make strategic decisions (with relating succession factor), and persistent talent retention and skill development challenges due to industry-wide labor market pressures.

Opportunities: Rising demand of traceable and sustainable clothing globally, diversification into MMF and circular economy, entering the emerging markets (Africa, Russia, and others), using developed digital solutions (traceability with blockchain) and increasing efficiency to compensate the probable post-LDC tariffs.

Threats: very strong competition and buyer bargaining power, risks of loss of tariffs on LDC graduation (may eat up huge duties after 2029), periodical decrease and demand of exports, political and labor instability, regional competition with Vietnam (CPTPP benefits) and India, and the increase of raw material duties and energy prices.

The main strengths that help Bitopi transform most of the threats into opportunities are its sustainability and ethics, which allow it to innovate, form partnerships, and position itself as a premium.

2.10 Conclusion and summary

Bitopi Group has managed to transform into a sustainability-based RMG and diversified conglomerate that started in the 1968 as an advertising pioneer. The solid base of its strong presence in the global environment is based on its world-class LEED Platinum factories, ethical family leadership, operational synergies, and dedication to excellence. Despite the fact that the group operates in mid-scale and is vulnerable to the common RMG issues, the group resources in terms of VRIN in green manufacturing and compliance provide a clear competitive edge within an ESG-centred market. Bitopi will be in a good position to continue growing resiliently after graduating LDC.

2.11 Recommendations

To consolidate its position, Bitopi Group is to:

Move to urgently invest in both new and depleting facilities in the production of MMFs and technological components of circular economies with the intention of realizing significant revenue (e.g., 20 percent of MMF by 2027) through partnerships with BGMEA and technology suppliers to offset input taxes and world trends.

Use its advertising legacy to create superior digital traceability systems (e.g., blockchain-based buyer portals) that increase transparency, minimize the need to rely on intermediaries, and create strong relations with EU and other high-value clients.

Strengthen talent management through regular compensation benchmarking, the introduction of living-wage factors where possible, the expansion of Lean/ERP/sustainability education, and the codification of succession planning, which incorporates family leadership with external professional talent.

Encourage more cross-functional teamwork through the creation of integrated ESG teams with key performance indicators and incentives, and Knowledge sharing and innovation through cultural initiatives (like Pitha Utshob and staff events).

Continue to seek more LEED and other similar certifications, seek further diversification into high-priced products, and seek other emerging export markets to balance out tariff risks and capitalize on the world going green in sourcing with ethical and sustainability in mind.

These suggestions, when applied in a systematic way, will make Bitopi stronger on its differentiation strategy, enhance its operational resilience, and contribute to sustainable long-term development in a post-LDC environment.

Chapter: 3 Project Part

3.1 Introduction

Industry 5.0 has transformed the manufacturing in the developing economies such as Bangladesh whereby the RMG sector contributes more than 80 percent of the total export earnings. By focusing on human-machine cooperation through AI, IoT, and big data analytics, Industry 5.0 helps RMG companies address environmental challenges such as waste, water pollution, and carbon emissions (Al Amin & Baldacci, 2024). The introduction of a digital transformation is now an urgent priority due to the introduction of carbon taxes and net-zero goals by 2050 through the introduction of international regulations (Syed et al., 2026). Although there are advantages, the high implementation cost, skills gap, and cultural resistance continue to impede comprehensive adoption. This paper explores the relationship between the adoption of Industry 5.0, the top management commitment, and the training in a GSCM framework and the environmental performance in Bangladeshi RMG.

3.1.1 Theoretical Background: Triple Bottom Line Theory.

This paper is based on the concept of Triple Bottom Line (TBL), which was first introduced by Elkington (1997), and according to which, the performance of the organization must be measured in terms of three dimensions whose importance is equal: economic, social, and environmental, or Profit, People, and Planet. The TBL model is especially applicable to the Bangladeshi RMG sector, which has to operate on a dual level: to provide both economic gains to the shareholders and to protect the rights and wellbeing of millions of workers and to minimize its massive ecological footprint.

The Industry 5.0 technologies and Green Supply Chain Management (GSCM) practices are not just operational tools as they are strategic enablers of all three dimensions. On

the economic front, technologies like AI and IoT save wastage and energy expenses, enhancing profitability (Al Amin & Baldacci, 2024). At the social level, the human-centric Industry 5.0 designs focus on workforce development, safe work environment, and inclusive upskilling. Directly, GSCM practices, such as green sourcing, eco-efficient production, and circular economy practices, directly reduce emissions, water pollution, and textile waste.

The other two independent variables in this study which are top management commitment and training also directly chart on the TBL framework. The commitment of leaders to the social and economic dimensions institutionalizes the sustainability into a corporate value, and the building of the human capital operationalising green practices on the factory floor. Industry 5.0 adoption, management commitment, and training are combined to form an integrated system that is TBL-aligned. This theoretical basis offers the analytical prism according to which the results of this study can be explained.

3.1.2 Research Objectives

The main aim of this research is to empirically examine the relationship between the synergy of Industry 5.0 technology adoption, commitment of top management and workforce training and environmental performance in Bangladeshi RMG industries within a Green Supply Chain Management (GSCM) framework, which is interpreted through the Triple Bottom Line (TBL) theory.

In order to fulfill the Primary Objectives, the specific objectives are as follows:

- To investigate the degree to which the technology adoption of Industry 5.0 including AI, IoT, BMS, and online ETP monitoring contributes to the realization of measurable improvements in environmental performance (Planet pillar) in Bangladeshi RMG supply chains.
- To evaluate the influence of top management commitment on GSCM practices and environmental performance, and how the latter scales top management commitment.

- To assess the importance of workforce training in reducing the gap between the Industry 5.0 technological capacity and the operational environmental performance with reference to the TBL People pillar.

3.1.3 Research Significance

The study is both theoretically and practically relevant, and has implications to various stakeholders throughout the Bangladeshi RMG industry.

Theoretically, the study contributes to the literature on Triple Bottom Line by providing the theoretical framework as a unifying theoretical focus. Although current literature will tend to analyze technological adoption or managerial practices separately, this study will provide integrated empirical data that all three variables, which include technology, leadership, and training, will have to work synergistically to reflect meaningful gains in terms of environmental performance.

In practice, the results can be practically applied to provide the actionable information to three important parties. To the managers of RMG factory, the study identifies and shows the operational value of management commitment and structured training to provide RMG factory managers with the fastest environmental returns of the investments that Industry 5.0 provides (e.g. BMS, on-line ETP monitoring, solar integration). To the policymakers of BGMEA, the evidence is that the industry-wide sustainability requirements, training subsidies, and green-factory certification pathways that will be aligned with SDG 12 and SDG 13. The study will give international buyers and investors confidence that the Bangladeshi RMG sector has the structural capacity to perform to the international benchmarks of sustainability when the three variables are aligned properly.

Lastly, the research has social implications. By proving that the environmental results of sustainable development of RMG do not have to be at the cost of the welfare of the workers, but in fact, it could be based on it, the research reinforces the social pillar of the TBL, that is, showing that sustainable development of RMG will not have to negatively affect the welfare of the workers, but, on the contrary, could be built on the basis of it.

3.1.4 Problem Statement

The compounding sustainability crisis is a situation in the Bangladeshi RMG industry. It generates more than 80 percent of the total export revenues of the country and employs about 4 million workers, but it is one of the most environmentally harmful sectors in the world - it causes great water pollution, greenhouse effects and textile waste (Hosain, 2025). The sustainability requirements are getting tight with the net-zero emission targets set to be achieved by 2050 and the imposition of carbon taxes already being experienced (Syed et al., 2026). The inability to fulfill these criteria can be a risk of being excluded by the market in Bangladesh, especially Bangladeshi factories.

Although there is an increasing investment in Industry 5.0 technologies and GSCM practices, the environmental performance in the industry is still uneven. The gap in the existing literature is critical: despite most studies investigating the efficiency benefits of Industry 5.0 or GSCM, there is no empirical research on the role of the synergy between them, combined with the commitment of the top management and training of the workforce, in the process of environmental performance as a TBL outcome. Moreover, in most instances, research does not concentrate on the context of Bangladeshi RMG where there are unique structural issues, i.e., high implementation costs, lack of skilled labour, and cultural obstacles to change in influencing technology adoption (Hosain, 2024).

The problem which this study is going to address is as follows: The Bangladeshi RMG industry lacks empirical evidence on how the combined effect of adoption of Industry 5.0 technology, top management commitment, and training can drive environmental performance in a GSCM framework aligned to Triple Bottom Line principles. Lacking this knowledge, RMG managers and policymakers will fail to develop appropriate strategies to achieve sustainability goals without losing economic competitiveness and social responsibility.

3.2 Research Methodology

3.2.1 Research Questions

- How Industry 5.0 adoption affects the environmental performance of RMG supply chain?
- How does the commitment of top management affect environmental performance by GSCM practices?
- How does training play a role in environmental performance in Industry 5.0-GSCM integration?

3.2.2 Research Design

This paper has a qualitative design of exploratory research with semi-structured interviews at a time. This can be used to explore in depth how the adoption of Industry 5.0, management commitment and training interact to shape environmental performance - and how this can be related to TBL outcomes in the RMG context.

3.2.3 Sources of Data

Semi-structured interviews were conducted with the professionals in the RMG industry with experience in Industry 5.0 and GSCM.

3.2.4 Population and Sampling

The target population will be industry people working in Bangladeshi RMG and well-informed about Industry 5.0, GSCM, and sustainability. Non-probability sampling was conducted in a purposive manner where 7 experts with at least 7 years of relevant experience in this field were selected as it is enough to saturate the data in a qualitative study of this scale.

3.3 Analysis & Finding

3.3.1 Data Screening

The 7 semi-structured interviews were audio-recorded with the consent of the participants and transcribed verbatim. All the data were complete, and no interviews were left out in the screening. The corrections made on the grammar were minor and were made in order to make it easy to read and at the same time, the meaning remains unchanged. The profiles of the respondents and the entire interview guide can be found in Appendix A and Appendix B respectively.

3.3.2 Thematic Analysis Approach

The six-phase method of thematic analysis developed by Braun and Clarke (2006) was used to analyse the data: familiarisation with data, developing initial codes, searching themes, reviewing themes, defining and naming themes, producing the final report. Inductively coded interview responses were then deductively organised against the three variables: Industry 5.0 technology adoption, top management commitment and training and interpreted through the Triple Bottom Line (TBL) framework. The data resulted in three overarching themes, each of which has been mapped to one variable and the corresponding TBL pillars: Theme 1 Technology as a Planet-Pillar Enabler; Theme 2 Leadership Commitment as the TBL Anchor; and Theme 3 Training as the People-Pillar Bridge. The fourth cross-cutting theme of GSCM -Industry 5.0 synergy was identified throughout all three sections.

3.3.3 Theme 1: Technology as a Planet-Pillar Enabler

In all seven interviews, there was a prevalent theme: Industry 5.0 technologies serve as the main operational mechanism under which RMG companies can gain tangible benefits to the environment - the direct operationalization of the Planet pillar of the TBL. The tools that were consistently identified by the respondents as concrete drivers of decreased resource use, decreased emissions, and enhanced waste management are Building Management System (BMS), online Effluent Treatment Plant (ETP) monitoring, O3 machines, Eco-flow systems, and solar integration. Aslam Yousuf explained how the

BMS allows real-time monitoring of fuel, water, and electricity across the factory floor that his facility is targeting a water-recycling rate of 60-80% through online ETP monitoring. Both Sayeed Ur Rahman and Mosiuddin Bin Mesbah eloquently explained how AI and IoT can enable predictive analytics to preempt waste, optimize energy loads, and reduce the use of chemicals - translating into measurable Planet-pillar performance improvements. TBL-wise, these benefits also benefit the Profit pillar: less utility use means less operational cost and an improved economic argument regarding the merits of green investment. Nonetheless, another sub-theme, which was also very powerful, is barriers to adoption. Capital investment, vulnerability to cyber-crime, substandard infrastructure and lack of skills in the workforce were identified as hurdles in the multiple respondents. "Social resistance is a consequence of fear of job displacement due to automation, specifically," Hasan Mahmud, Thus, is a tension that will need careful management between the Planet and People pillars. There was a universal consensus among experts to adopt gradual adoption strategies that are ROI-focused to balance short term economic feasibility and long term sustainability and continuity of the workforce.

3.3.4 Theme 2: Leadership Commitment as the TBL Anchor (Top Management Commitment)

The second overall theme to be identified is that the top management commitment, serves as the structural anchor of TBL performance - the variable without which no effective maintenance of either technology or training can be achieved. The most recurrent and emphatic theme throughout all seven interviews was this, as respondents across various organisations and different levels of the organisation all converged around the same conclusion: environmental performance cannot be institutionalised without leadership which allocates resources, enforces green policy, and instills sustainability as a core organisational value. Mahbubur Rahman "Bitopi's commitment to the organisation is highly values based, with roots in the inherited values thus, translating to active investment in sustainable technologies". Hasan Mahmud has pointed to a critical market-based incentive, which is the shift of green compliance by European buyers not as a differentiating feature but as a non-negotiable procurement condition to create a Profit-pillar rationale to strengthen Planet-pillar commitment. This was echoed by Rafiqul Islam who pointed out

that management buy-in is a strong indicator of the rate and extent of GSCM development and technology adoption. One of the most eye-opening sub-themes was about the outcomes of the lack of commitment. Both Mizanur Rahman and Sayeed Ur Rahman gave a very clear testimony that lack of management support is a direct cause of GSCM initiatives stalling, leaving employees demotivated, and creating gaps in implementation that only technology can bridge - undermining all three TBL pillars simultaneously.

3.3.5 Theme 3: Training as the People-Pillar Bridge

The third theme places workforce training as the People-pillar bridge that transforms the technological capacity of Industry 5.0 on the one end and the intent to transform the top management intent into a quantifiable environmental performance at the factory floor. The respondents with no training always argued even the most advanced green technologies are not effectively applied and management policies are not practical but idealistic. Structured, subject-specific programmes, including environmental policy awareness, operational control of green systems, internal auditing, and practical Industry 5.0 training were outlined by Mahbubur Rahman and will be delivered using third-party Training Needs Assessments (TNAs) to guarantee accuracy and relevance. Mazanur Rahman highlighted “Training should be provided at all levels of the organisation since the mindset resistance on the operational level is usually the most significant obstacle to the environmental improvement that can be sustained”. This attitudinal aspect echoes the green Human Resource Management (GHRM) literature (Yu et al., 2020) and the People pillar of the TBL. The direct performance mechanism was best articulated by Sayeed Ur Rahman: trained workers apply BMS controls, ETP processes and O3 equipment correctly and consistently, resulting in quantifiable reductions in waste and non-compliance events. A sub-theme on training issues also appeared: budget issues, lack of skilled trainers and an initial resistance to change by the workforce was noted across organisations, with respondents suggesting mitigation measures such as continued training cycles, simplified delivery systems, management sponsorship and external evaluations. The cross-cutting implication is also evident: training is not a peripheral HR activity but a strategic TBL investment that triggers a full sustainability potential of Industry 5.0 and GSCM in the Bangladeshi RMG industry.

3.3.6 Cross-Cutting Theme: GSCM in Industry 5.0 Synergy and TBL Integration

In addition to the three variable-related themes, there was a cross-cutting theme of systemic synergy throughout all parts of the interview: the three variables do not act in isolation but are interconnected to create a self-enforcing TBL-aligned system. Respondents - more so Sayeed Ur Rahman and Aslam Yousuf - explained how technology tools, management direction, and trained workforces each enhance the effectiveness of the others. The lack of one aspect makes the system weak; when all three are in harmony, TBL results are compounded in all pillars. This synergistic dynamic justifies the ISM hierarchy suggested by Al Amin et al. (2025) with real-life qualitative evidence, and its TBL implementation is already in sight: 80% water-recycling targets (Planet), traceable waste programmes (Planet and Profit), improved worker competency and safety (People), and green-factory market access (Profit). Regulatory and buyer pressures further entrap this alignment, making TBL-integrated GSCM-Industry 5.0 synergy not merely desirable but competitive to keep Bangladeshi RMG afloat in the global economy.

3.3.7 GSCM–Industry 5.0 Synergy and the Triple Bottom Line

The three variables work as a combined TBL system. Technology offers the Planet-pillar technology tools; leadership offers the Profit- and People-pillar leadership direction and resources; training provides the People-pillar human capacity to utilize both. Collectively they deliver 80% recycling water targets, traceable waste programmes, and cut-back on chemical usage - advancing SDG 12 and 13 (Planet), improving worker competency and safety (People), and maintaining economic competitiveness through access to green-market opportunities (Profit).

3.4 Implications

- **Theoretical:** This research confirms the active presence of nine synergistic factors in Al Amin et al. (2025) with practical field data and contributes to the TBL theory

by offering a practical field-based model of the interplay of all three pillars in the context of a developing-country RMG.

- **Practical:** The RMG managers and BGMEA policymakers ought to (1) prioritize high-ROI Industry 5.0 investments that strengthen the Planet pillar, (2) institutionalize management commitment as the structural TBL anchor that permits all other sustainability benefits, and (3) run continuous, level-specific training as the People-pillar foundation that empowers all other sustainability benefits.

3.5 Limitations and Future Research.

The qualitative design of the study (it does not permit statistical generalization) and a small purposive sample (7 experts, most of them being Bitopi Group members) limit it. Further studies are needed to include more samples based on factory sizes and regions, incorporate mixed-methods designs (combining interviews with quantitative TBL measures) to test the proposed TBL-aligned relationships. Causal claims would be further reinforced with longitudinal designs that would track pre- and post-adoption TBL performance.

3.6 Conclusion

This paper shows that adoption of Industry 5.0, commitment of top management and training are mutually reinforcing TBL-based drivers of environmental performance within Bangladeshi RMG. Based on the Triple Bottom Line framework by Elkington (1997), the findings indicate that sustainable development in RMG is not a trade-off between Profit, People, and Planet - it is possible when the three are combined using technology, leadership, and investment in human capital. With mounting pressure on net-zero operations and social compliance, the TBL-integrated approach herein presented can be seen as a clear, practice-tested roadmap to sustainable transformation of the Bangladeshi RMG sector.

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Appendix A: Interview Questions

Section A: Industry 5.0 technology adoption

1. How has the adaption of Industry 5.0 technologies impacted environmental performance in your RMG operations?
2. What challenges or barriers have you encountered in adapting these technologies for GSCM synergy?
3. In your view, how does Industry 5.0 technology adoption contribute to overall sustainable development in RMG supply chain?

Section B: Top management commitment

1. How does top management commitment influence the implementation of GSCM practices in your organization?
2. To what extent has management commitment driven improvements in environmental performance, such as reducing pollution or promoting eco friendly sourcing?
3. What happens when top management commitment is lacking in Industry 5.0 and GSCM scenery?

Section C: Training

1. What types of training programs have been implemented in your RMG firm and how do they affect workforce capabilities?
2. In your experience, how does training enhance environmental performance through GSCM and Industry integration?
3. What challenges exist in providing effective training, how can they be addressed to support sustainable development?
4. Is there anything you would like to add about Industry 5.0 and GSCM synergy in Bangladesh RMG?

Appendix B: Respondent Profile

Table 1: Respondent Profile

Respondent	Position	Company	Primary Expertise Area
Mahbubur Rahman	DGM (EMS)	Bitopi Group	Environmental compliance & sustainability
MD. Aslam Yousuf	Asst. Manager (EMS)	Bitopi Group	Utility monitoring & water recycling
MD. Mizanur Rahman	Sr. Manager (OD & Training)	Bitopi Group	Workforce development & GSCM training
LT.COL Hasan Mahmud (Retd)	Executive Director	Bitopi Group	Strategic leadership
Sayeed Ur Rahman	Manager (HR, Admin & Compliance)	Anowara Knit Composition Ltd.	HR & sustainability integration
Mosiuddin Bin Mesbah	Executive Director	BEPZA CEPZ	Strategic leadership
Md. Rafiqul Islam	Divisional Manager (Marketing & Merchandising)	Interstoff	Buyer-driven GSCM & supplier requirements

Appendix C: Similarity Report



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