Main Finding Brief

Securing Green Transition of the Textile and Readymade Garments Sector in Bangladesh

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Centre for Policy Dialogue (CPD)

Sweden
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Publisher

Centre for Policy Dialogue (CPD)

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First Published October 2023
@ Centre for Policy Dialogue (CPD)

This Main Finding Brief is an abridged version of the full report.

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Cover Design
Avra Bhattacharjee

Copyediting
HM Al Imran Khan

Page Layout and Typesetting
Md Shaiful Hassan

ISBN 978-984-98096-2-3

Citation: Khatun, F., Kamal, M., Kabir, F. A., Nawrin, N., and Hoque, M. S. (2023). *Securing Green Transition of the Textile and Readymade Garments Sector in Bangladesh*. Dhaka: Centre for Policy Dialogue (CPD).

Acknowledgements

The Study Team would like to extend sincere appreciation to several individuals and institutions who have extended valuable support towards the successful implementation of the project.

The Research Team would like to acknowledge the support received from several concerned agencies which have helped by sharing relevant documents and data. In this connection, the Team would like to thank Bangladesh Garment Manufacturers and Exporters Association (BGMEA), Bangladesh Knitwear Manufacturers and Exporters Association (BKMEA), and Bangladesh Textile Mills Association (BTMA) for their co-operation. The Team would also like to express its sincere gratitude to authorities of the factories that were visited by the CPD Study Team and surveyors during the survey and field visits. The authors of the study also acknowledge the support of Org-Quest Research Limited for conducting the survey.

The authors have immensely benefitted from the insightful comments and suggestions offered by the participants of the expert group meetings (EGMs). The participants of these EGMs included owners and officials of textile and readymade garment factories, representatives from brands and buyers, and representatives from academia. The valuable inputs received from the EGM participants proved to be extremely helpful in terms of cross checking the findings of the study and sharpening the recommendations.

The Study Team gratefully acknowledges the useful comments offered by the representatives of various stakeholder groups and experts who took part in the national dialogue titled 'Securing Green Transition of the Textile and Readymade Garments Sector in Bangladesh' held on 3 October 2023. In this regard, the authors would like to put on record their deep appreciation of the valuable inputs provided by the Chief Guest of the dialogue, *Dr Shamsul Alam*, Hon'ble State Minister, Ministry of Planning, Government of Bangladesh. The Team thanks the following panellists for their insightful comments and suggestions offered at the dialogue: *H E Ms Alexandra Berg Von Linde*, Ambassador of Sweden to Bangladesh; *H E Mr Charles Whiteley*, Ambassador, Head of Delegation, Delegation of the European Union to Bangladesh; *Mr Thijs Woudstra*, Deputy Head of Mission, Embassy of the Kingdom of the Netherlands in Bangladesh; and *Mr Md Shahidullah Azim*, Vice President, BGMEA.

The authors would like to sincerely acknowledge the generous support received from the Embassy of Sweden in Bangladesh for conducting this study. The authors express their sincere thanks to *Ms Maria Stridsman*, Counsellor/Deputy Head of Mission, and Head of

Development Cooperation, Embassy of Sweden in Bangladesh; *Mr Marcus Johannesson*, former First Secretary, Private Sector Development, and Deputy Head of Development Section, Embassy of Sweden in Bangladesh; *Ms Nayoka Martinez Bäckström*, First Secretary, Environment and Climate Change, and Deputy Head, Development Cooperation Section, Embassy of Sweden in Bangladesh; *Ms Fredrika Norén*, Second Secretary Inclusive Economic Development, Embassy of Sweden in Bangladesh; and *Ms Ingela Juthberg*, Senior Advisor, Swedish International Development Cooperation Agency (SIDA) for their continuous support in the course of conducting this study.

The Team members would like to express special words of thanks to colleagues at the CPD who were involved with various project-related activities and have extended valuable support during the entire period of the study. In this connection, the Team gratefully acknowledges the valuable support received from the Dialogue and Communication Division, and the Administration and Finance Division of CPD in conducting this study. *Mr Avra Bhattacharjee*, Joint Director, Dialogue and Communication Division, CPD, and colleagues at the Division have helped organise various activities of this study in the most efficient manner while upholding the highest standards. Support from *Mr Zulker Naeen*, former Programme Associate, CPD is also particularly appreciated. Besides, copyediting support from *Mr HM Al Imran Khan*, Publication Associate, CPD in giving shape of the final manuscript is also appreciated. The authors remain deeply indebted for their hard work.

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Acronyms

8FYP	Eighth Five-Year Plan
BB	Bangladesh Bank
BBS	Bangladesh Bureau of Statistics
BCI	Better Cotton Initiative
BGMEA	Bangladesh Garments Manufacturers and Exporters Association
BIWTA	Bangladesh Inland Water Transport Authority
BSCI	Business Social Compliance Initiatives
BTMA	Bangladesh Textile Mills Association
DFQF	Duty Free Quota Free
DNCC	Dhaka North City Corporation
DoE	Department of Environment
EBA	Everything but Arms
ECA	Environmental Conservation Act
EGMs	Expert Group Meetings
EPB	Export Promotion Bureau
EPZs	Export Processing Zones
ETP	Effluent Treatment Plant
FGDs	Focus Group Discussions
FY	Fiscal Year
GDP	Gross Domestic Product
GED	General Economic Division
GoB	Government of Bangladesh
GOTS	Global Organic Textile Standard
GSP	Generalised Scheme of Preference
ILO	International Labour Organization
IT	Information Technology
KIIs	Key Informant Interviews
LDC	Least Developed Country
LED	Light Emitting Diode
LEED	Leadership in Energy and Environmental Design

MCPP	Mujib Climate Prosperity Plan
MoC	Ministry of Commerce
MoEFCC	Ministry of Environment Forest and Climate Change
MoF	Ministry of Finance
MoI	Ministry of Industries
MoIB	Ministry of Information and Broadcasting
MoP	Ministry of Planning
MoPEMR	Ministry of Power, Energy and Mineral Resources
NSDA	National Skills Development Authority
OCS	Organic Content Standard
OECD	Organisation for Economic Co-operation and Development
PMO	Prime Minister's Office
RECP	Resource Efficiency and Cleaner Production
RMG	Readymade Garments
SMEs	Small and Medium Enterprises
SMI	Survey of Manufacturing Industries
SREDA	Sustainable and Renewable Energy Development Authority
SRS	Simple Random Sampling
UNIDO	United Nations Industrial Development Organization
USA	United States of America

About the programme

The textile and readymade garments (RMG) sector employ around 4.5 million people and earned about USD 47 billion as foreign exchange (FY2023). The sector contributes more than 80 per cent of Bangladesh's total export earnings. As the economy is getting more integrated with the global market, it is also bringing challenges with it which include the need to adhere to international labour laws and ensuring safety standards in working conditions, particularly in manufacturing. Requirements for being environmentally compliant are also becoming prominent. Environmental compliance requires the sector to abate pollution and achieve resource efficiency.

Following Bangladesh's graduation from the least developed country (LDC) category in 2026, Bangladesh will have to comply with stringent compliance requirement in many areas including the environment not only to access global markets but also to remain competitive. The Government of Bangladesh (GoB) and the textile and RMG sector need to have a clear strategy for accomplishing environmental and sustainability commitments in areas such as clean energy, waste management, robust climate actions vis-à-vis the emerging EU Green Deal, and Circular Economy frameworks.

The textile and RMG industry, being one of the most resource-intensive sectors, has high potential to contribute towards achieving Bangladesh's climate goals. This will also help the sector to achieve environmentally friendly and sustainable production and comply with the growing demand of buyers and brands to be clean and green.

In the above context, the Centre for Policy Dialogue (CPD) undertook a programme titled 'Securing Green Transition of the Textile and Readymade Garments Sector in Bangladesh' in collaboration with the Embassy of Sweden in Bangladesh. The objective of the programme was to contribute towards enhancement of environmentally sustainable and climate-neutral growth in Bangladesh with productive employment opportunities for women and youth. The key undertakings of this programme include knowledge gap analysis, data generation and research, consultation, dialogue, and dissemination activities.

1. Context

The export-oriented textile and readymade garments (RMG) sector is an important driving force of the economy of Bangladesh as it is a source of employment generation and foreign exchange. Within the entire sector, RMG alone earned USD 46.99 billion in fiscal year (FY) 2022-23. This was 84.58 per cent of the total export earnings in that year and 10.35 per cent of the total gross domestic product (GDP) of the country (BGMEA, 2023; EPB, 2023). The two major export destination of the Bangladeshi RMG products are the European Union (EU) countries and the United States of America (USA). In FY2022-23, total RMG export to the EU was USD 23.52 billion, which was 50.07 per cent of the total RMG export of the country. The RMG export to the USA was USD 8.52 billion in FY2022-23 which was 18.12 per cent of the total RMG export. As a least developed country (LDC), Bangladesh has been enjoying duty free quota free (DFQF) market access under the Generalised Scheme of Preference (GSP) under the EU's Everything but Arms (EBA) initiative.

Approximately, over 5,500 factories in the textile and RMG sectors employ 4.5 million people (MiB, 2023; BTMA, 2022). The sector plays a critical role in women's economic empowerment since the share of women workers is 57.2 per cent of the total employment in the RMG industry (MiB, 2023). As an export-oriented industry, the textile and RMG sector must comply with international labour laws, safety standards in working conditions and environmental compliance to remain competitive and meet the evolving standards of global brands.

Following Bangladesh's graduation from the LDC category to a developing country in 2026, the country will lose preferential access to the EU and other developed and developing country markets for its RMG exports. As a developing country, Bangladesh can avail market access through the GSP scheme upon fulfilling several compliance-related criteria. Bangladesh must work towards ratification of all the 27 core labour conventions of the International Labour Organization (ILO) and their stringent enforcement. As a part of this effort, the Government of Bangladesh (GoB) and the textile and RMG sector need to have a clear strategy for accomplishing environmental and sustainability commitments in areas such as clean energy, carbon neutrality, waste management, robust climate actions vis-à-vis the emerging EU Green Deal, and circular economy frameworks. Following the Paris Climate Agreement in 2015 and net-zero commitments of countries by the middle of the century at COP26, there is higher and more stringent demand for environment and climate-friendly production in all sectors and businesses. However, given the enormity of the tasks involved in achieving climate goals, collaborative efforts are needed, that involves all stakeholders such as the entrepreneurs, buyers, and the government.

In the above context, the present study has examined the state of green transition initiatives in the textile and RMG sector of Bangladesh based on evidence collected from primary sources. The objectives of the study are to: (i) build a nationwide factory-level evidence on the state of green practices in the textile and RMG sector; (ii) collect evidence on the type of barriers to and drivers of green transformation in the textile and RMG factories and investigate if these are symmetric across all sizes of factories; (iii) explore factories' knowledge, interest, and capacity in adopting green transition initiatives; (iv) understand workers' awareness and perception on benefits of green practices; and (v) make a set of recommendations to overcome the challenges in making a green transformation of the textile and RMG sector of the country.

2. Data Sources and Methodology

The study used a mixed approach involving both quantitative and qualitative tools and techniques. As part of the methodology, the study employed four methods.

First, a primary survey was conducted among owners, managers, workers, and supervisors

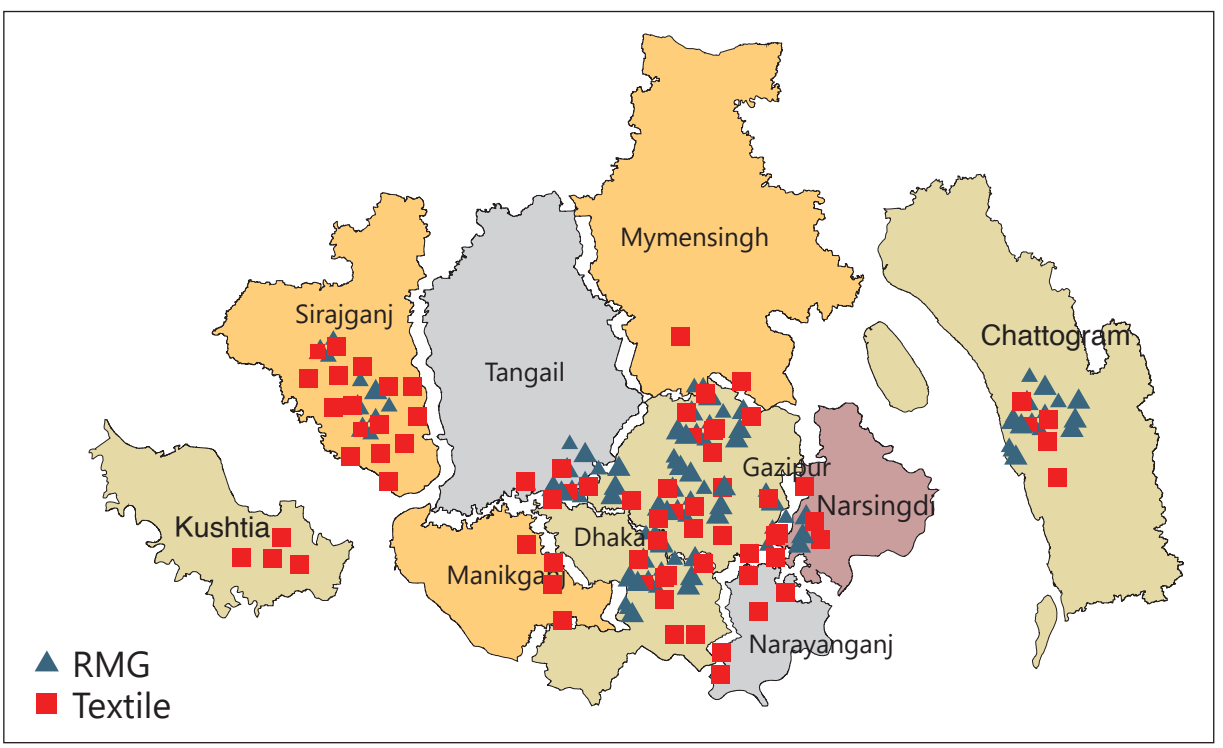
of 403 factories in the textile and RMG sector between June and November 2022. Additionally, a total of 4,541 workers and supervisors were interviewed from the aforementioned factories. Samples were selected following the Simple Random Sampling (SRS) method. Of the surveyed factories, 182 were RMG factories while 221 were textile factories. The samples were selected from a total of 5,532 textile and RMG factories. The selected factories are situated in nine districts of Bangladesh (Figure 2.1). The survey followed the classification from the Survey of Manufacturing Industries (SMI) 2019 by Bangladesh Bureau of Statistics (BBS) which categorises factories as follows: micro factories have 10-24 employees, small and medium factories have 25-249 employees and large factories have 250 or more employees (BBS, 2020).

Second, the study conducted key informant interviews (KIIs) to elicit information and insights of stakeholders of the sector. Semi-structured KIIs were conducted with 120 factory owners and top managers. Six additional KIIs were conducted with industry insiders (owners, managers, sustainable officers, and green certification consultant, etc.) to obtain an in-depth understanding of barriers and challenges pertaining to green transition. Another four KIIs were conducted with brands and buyers to understand their motivations and initiatives.

Third, seven focus group discussions (FGDs) were organised in factories of Dhaka and Chattogram districts. Participants of the FGDs included factory owners, senior managers, sustainability managers, environmental officers, factory workers and supervisors, and industry experts.

Fourth, two additional expert group meetings (EGMs) were organised to validate the study findings and receive feedback. The participants of these EGMs included owners and officials of textile and RMG factories, and representatives from brands and buyers.

Figure 2.1: Survey Coverage



Source: Authors' illustration.

3. Analytical Framework of the Study

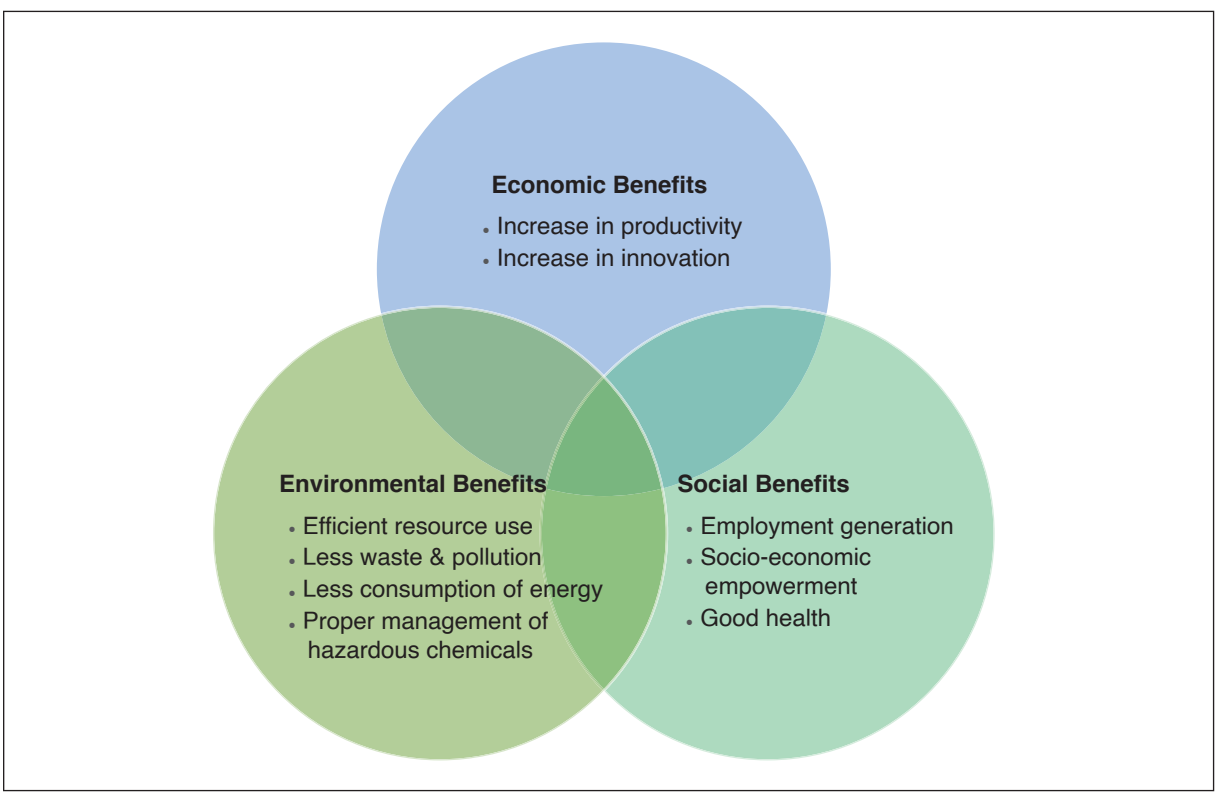
Defining green industry

In the parlance of green industrialisation, two concepts are used—greening of industries and green industries. Greening of industries imply the commitment of industries to reduce environmental impacts of their production processes and products. This is done through resource efficiency, environmentally sound management of chemicals, waste management, replacing fossil fuels by renewable energy and eco-design of products. Green industries are those which are basically industries in the environmental goods and services sector. These industries manufacture clean technologies to achieve environmental objectives (UNIDO, 2010).

The current study is about greening the industry. To elaborate, by greening the industry, it is meant that industrial production and development that does not come at the expense of the health of natural systems or lead to adverse human health outcomes. It includes commitment to and action on reducing the environmental impacts of industrial processes and products by improving production efficiency, enhancing environmental performance, and minimising health risks (UNIDO, 2011). Green industrialisation is essential for achieving a green growth which follows a path of economic growth by using natural resources in a sustainable manner.

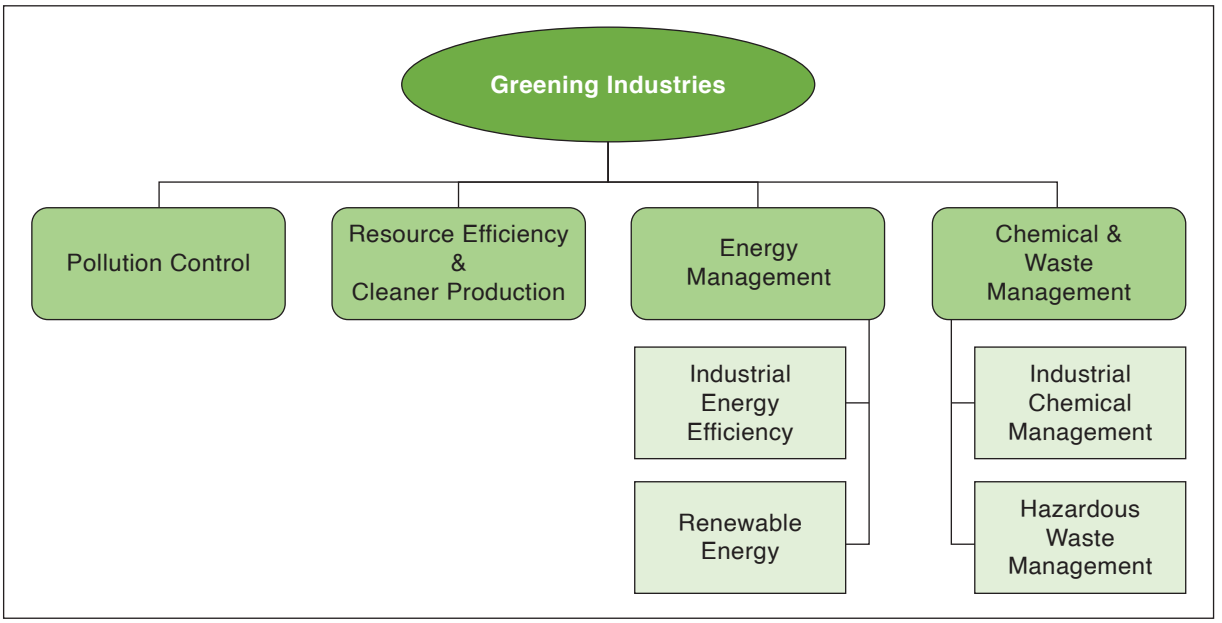
It implies fostering economic growth and development, while ensuring that natural assets continue to provide the resources and environmental services on which well-being relies (OECD, 2011). So, the perspective of this study is to look at greening as a holistic view where greening of industries will have benefits on three streams–economic, social, and environmental. This aspects are illustrated in the Figure 3.1 given below.

Figure 3.1: Holistic View of Greening Industries



Source: Author's illustration.

Figure 3.2: Pathways of Greening of Industries



Source: Adapted from UNIDO (2011) and Luken and Clarence-Smith (2019).

Greening of industries requires appropriate policies in four broad areas: (i) pollution control; (ii) resource efficiency and cleaner production (RECP) that considers production efficiency, environmental management, and human development; (iii) energy management; and (iv) chemical waste management. Figure 3.2 shows the components of greening industries. In order to implement these, various government policies are required.

Following the above framework, this study puts forward key findings on initiatives taken by the factories, what more is needed, what challenges do they face and how those can be overcome.

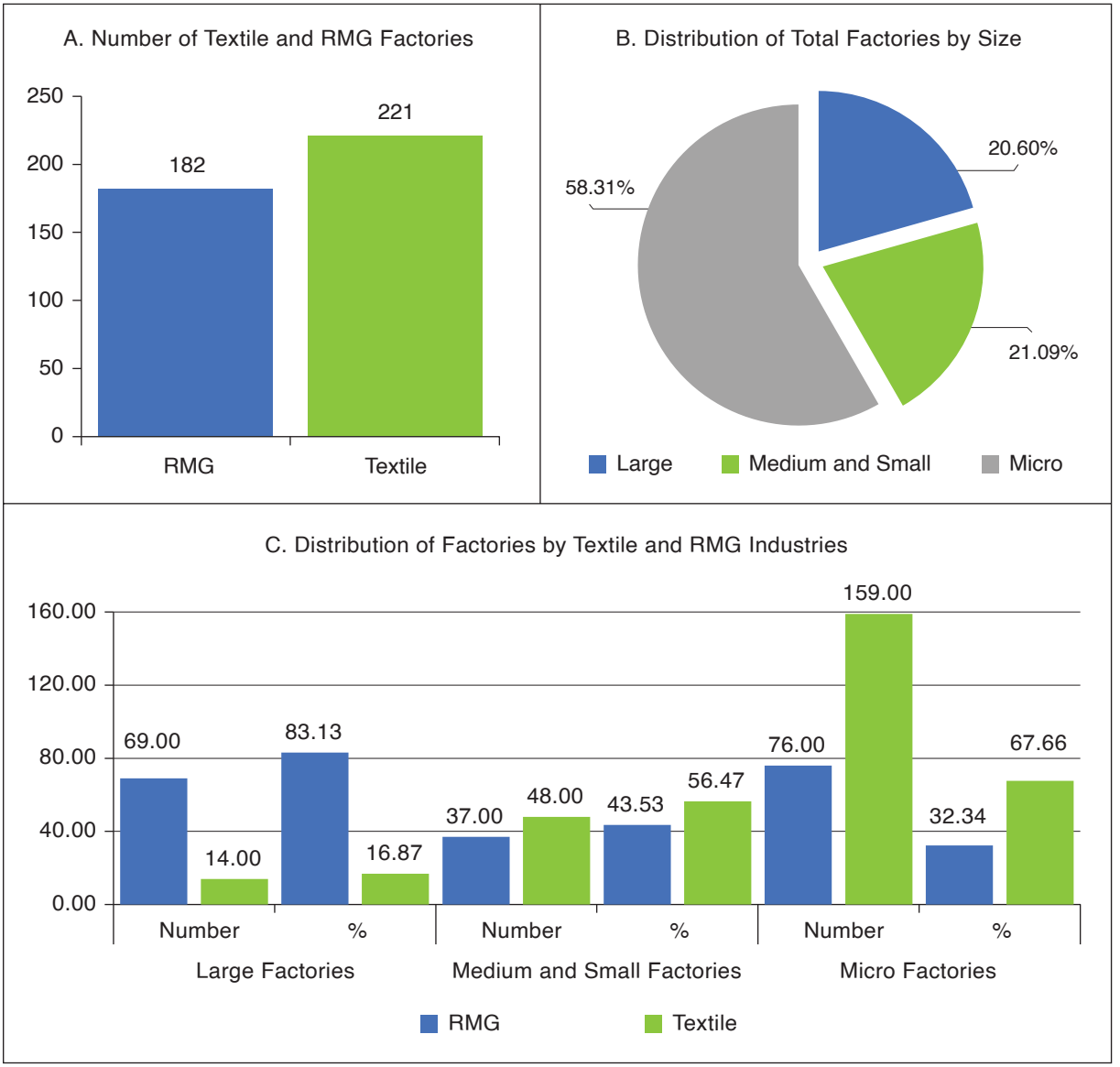
4. General Information of Factories: Size, Location, Green Certificates

Among the surveyed factories, 20.60 per cent are large, 21.09 per cent are small and medium, and 58.31 per cent are micro in size as per the aforementioned BBS categorisation. The minimum number of workers in large factories is 250 and the maximum is 16,225. For small and medium factories, and micro factories, the minimum number of workers is 25 and 10, respectively. For the same categories of factories, the maximum number of workers is 245 and 24, respectively.

When categorised tier-wise, 7.69 per cent of the RMG factories fall under tier 1[1]. These are large factories located in the Export Processing Zones (EPZs) and have direct contact with the foreign buyers. The share of tier 2 RMG factories is 30.22 per cent. Located outside the EPZs, these factories are large and medium in size, and have direct relations with the foreign buyers. A large share (62.09 per cent) of RMG factories falls under tier 3 which are located outside the EPZs and of various sizes including medium to small and micro, and they do not have any direct link with foreign buyers. Tier-wise distribution of survey factories is presented in Annex Figure A4.1. Figure 4.1 presents the distribution of factories by industry, and size.

[1]Tier classification was followed by Khan & Wichterich (2015). Please see for details: https://global-labour-university.org/wp-content/uploads/fileadmin/GLU_Working_Papers/GLU_WP_No.38.pdf.

Figure 4.1: Distribution of Factories by Industry and Size

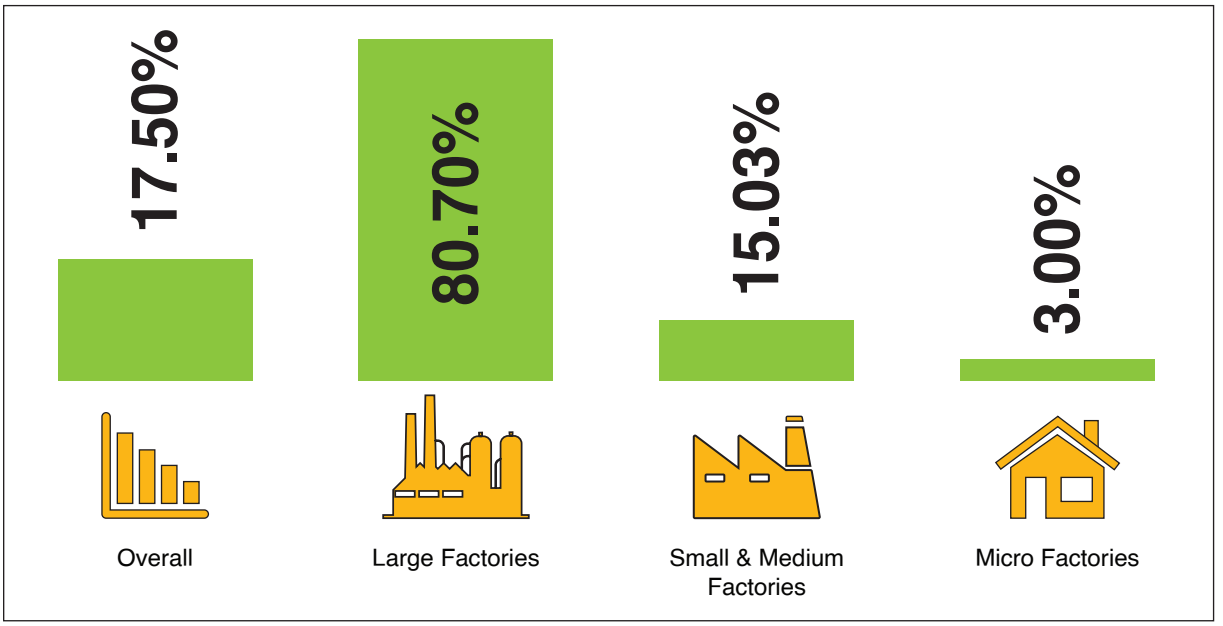


Source: Calculated from the CPD Green Transition Study survey data.

Practices of greening factories and motivation

The current study analysed some features of the green certified factories. Among the 83 large factories that were surveyed, 31.33 per cent are green certified and 15.66 per cent of the factories have applied for green certification, while 53.01 per cent of the large factories in the sample do not have green certification. However, among the non-green certified factories, many follow sustainable practices to comply with environmental requirements and certification by the international buyers. These environmental certifications include BCI, BSCI, GOTS, Higg Index, Sedex, and OEKO-TEX, etc. Among the surveyed factories that achieved these environmental certifications, the highest percentage (18.42 per cent) of factories achieved Sedex. The second highest percentage of certification category is OEKO-TEX with 17.11 per cent and OCS with equal percentage (Annex Table A4.1).

Figure 4.2: Factories' Knowledge about Green Certification



Source: Calculated from the CPD Green Transition Study survey data.

In terms of awareness and knowledge, large factories are more aware of green certification than the others. Micro-sized factories are much less aware (Figure 4.2). During the FGDs and KIIs with factory owners and managers, it was revealed that factors such as access to information, resources for certification, and overall capacity to adopt environmentally compliant practices are key reasons for such variations in knowledge about green certificates.

Overall, self-motivation, market-driven factors, such as buyer requirements, and a desire for becoming competitive are the major reasons for factories to obtain green certification (Table 4.1). This implies that there exists a willingness among

Table 4.1: Motivations for Obtaining Green Certificate

Reasons	Factories with Green certificate		Factories that do not have Green certificate but want to obtain in the future	
	Frequency	% of Cases	Frequency	% of Cases
Self-motivation	21	80.77	27	61.36
Buyers' Requirement	19	73.08	16	36.36
Sustainability Practice	18	69.23	17	38.64
To Become More Competitive	18	69.23	17	38.64
Marketing Strategy	17	65.38	23	52.27
Buyers' Influence	10	38.46	17	38.64
Government Environmental Regulations	7	26.92	10	22.73
Following Other Factory Examples	1	3.85	2	4.55
Others	-	-	4	9.09

Source: Calculated from the CPD Green Transition Study survey data.

Note: Since multiple responses were accepted, the sum of the shares could be greater than 100.

factories to voluntarily embrace sustainable practices and align with market demands for environmentally friendly processes. In case of the non-green certified factories, the reasons to obtain green certificate include their commitment to sustainability, demand from buyers, and a recognition of the marketing benefits associated with the green certification. It is notable that the government regulations on environmental standards appear to have a relatively weaker influence on the decisions of both green certified and non-green certified factories.

5. Green Measures Undertaken by Factories

Where are the factories investing and how much?

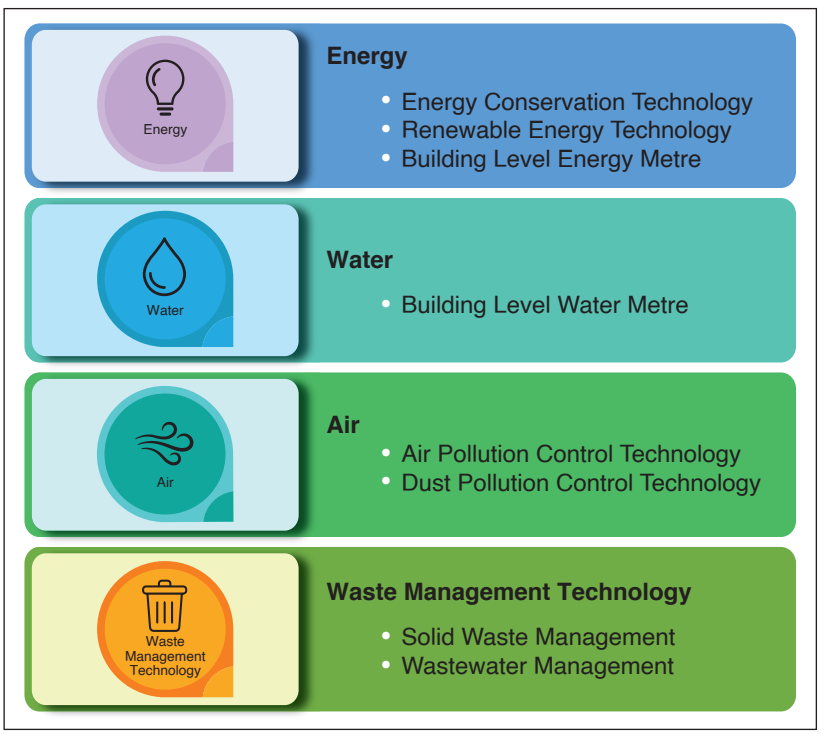
Factories are investing for greening in areas such as energy, water, air, and waste management by way of technology upgradation. Their investments are for energy conservation technologies, renewable energy-related technologies, building level energy meter, building level[2] water meter, technologies for air pollution control, dust control, solid waste management, and wastewater management (Figure 5.1).

The survey data analysis indicates that small and medium and micro-sized factories have a greater reliance on grid electricity compared to the large factories. Small and medium-sized factories depend on the grid for about 86.59 per cent of their electricity consumption, while micro factories rely on it for approximately 93.35 per cent of their power consumption. This information is presented in Figure 5.2.

Similarly, Tier 3 RMG factories have the highest dependency on grid electricity (76.94 per cent). This is followed by Tier 2 factories which use 57.05 per cent other their electricity from the grid, and Tier 1 factories that use 40.83 per cent of their requirement from grid electricity (Figure 5.3).

Factories have invested for adoption of technologies for conservation of energy and water, air pollution control, and waste management. Irrespective of their sizes or greening status, factories have made some investment towards greening. The share of factories which made investment towards greening during the last five

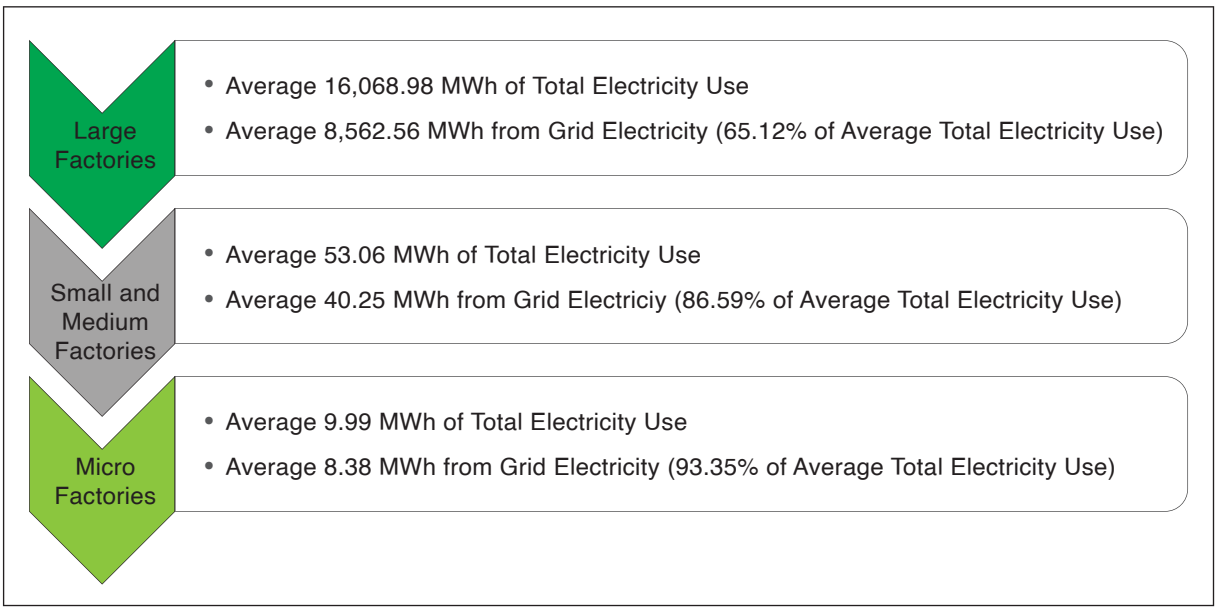
Figure 5.1: Green Investment of Factories in Various Greening Practices



Source: Authors' illustration based on the CPD Green Transition Survey analysis.

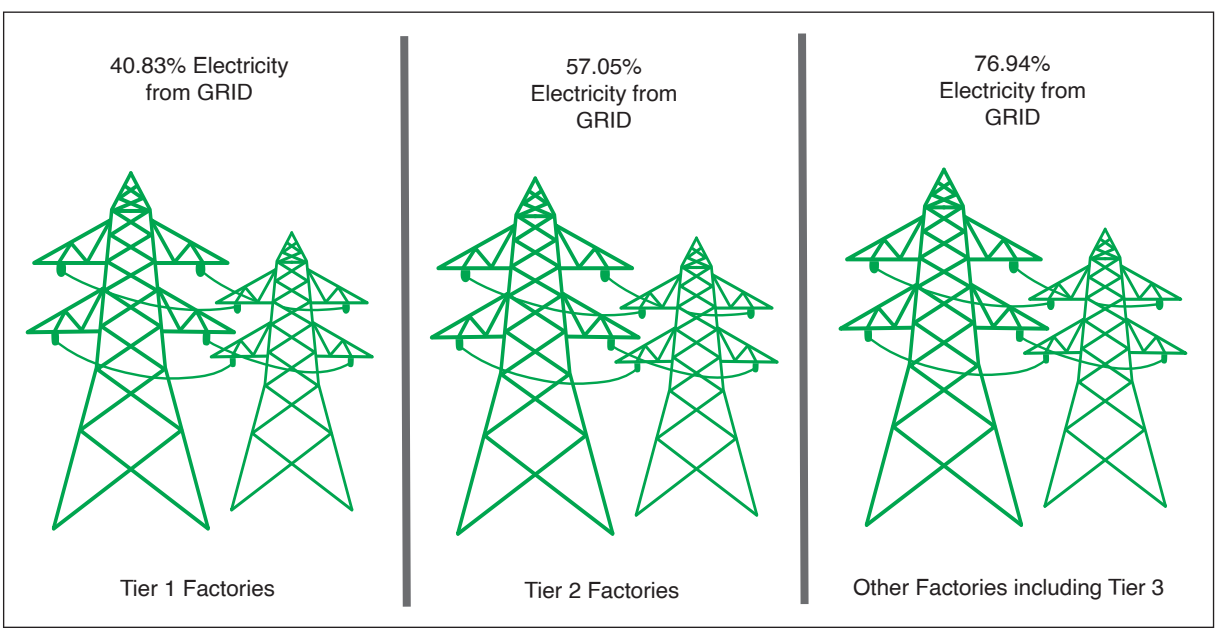
[2]This is a system to support resource management and identify opportunities for additional resource savings by tracking building-level resource use. For more details, please see: https://www.usgbc.org/credits/core-and-shell/v4-draft/eap3

Figure 5.2: Average Use of Electricity in a Month by Factories



Source: Calculated from the CPD Green Transition Study survey data.

Figure 5.3: Source of Electricity Use by RMG Factories in Tier Groups

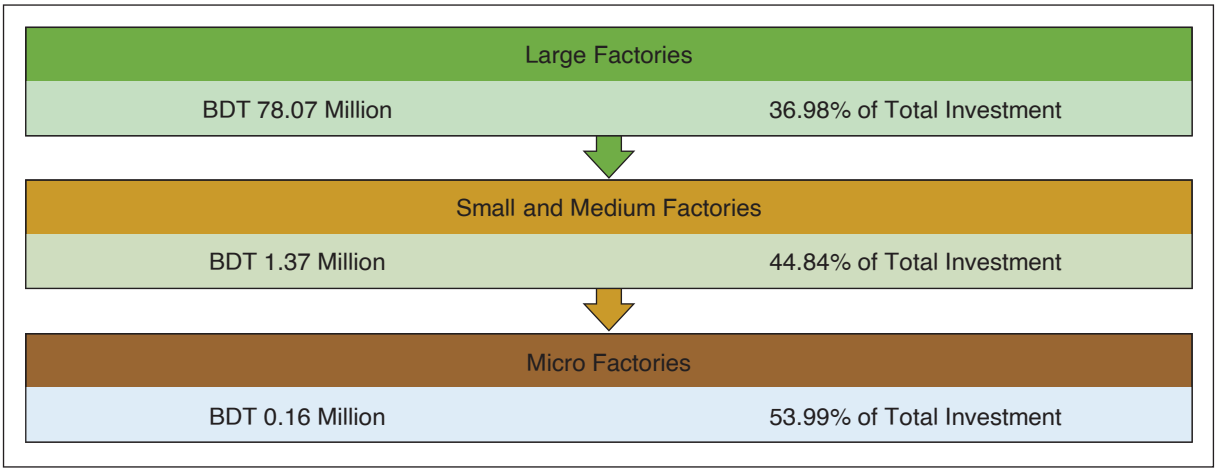


Source: Calculated from the CPD Green Transition Study survey data.

years was more than 91.57 per cent in the case of large factories, 20 per cent in the case of small and medium factories, and 13.19 per cent for micro factories (Annex Table A5.1).

For large factories, average green investment during last five years was BDT 78.07 million, which is 36.98 per cent of their total investment. For small and medium factories, and micro factories,

Figure 5.4: Factory Groupwise Average Green Investment in Last Five Years



Source: Calculated from the CPD Green Transition Study survey data.

average green investment during the last five years was BDT 1.37 million and BDT 0.16 million, respectively (Figure 5.4). Although the volume of green investment by small and medium, and micro factories is lower compared to large factories, the share of green investment in their total investment is higher than that of the large factories.

Through the KIIs, it was revealed that most green building certified factories use, among others, solar panels, metering system to monitor and efficiently use electricity, LED lightbulbs, servo motors, exhaust fans, rainwater harvesting, water recycling technologies, and effluent treatment plants (ETPs). Curiously, despite not being certified, most non-green certified factories deploy various environment-friendly technology as well. However, the variety and extent of technology use depend on factors including industry type and factory size. While massive undertakings such as rainwater harvesting, water recycling system, and ETPs can be mostly found in large factories, solar panels, LED bulbs, exhaust fans, etc. can be found in both larger and smaller factories.

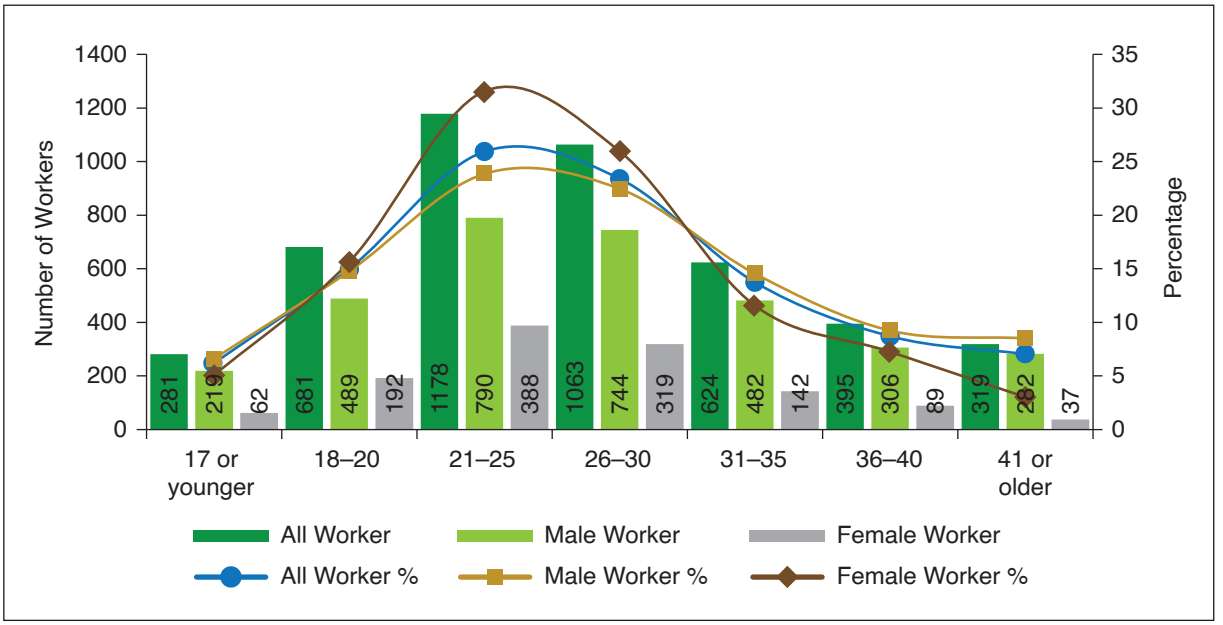
During the KIIs, the factory owners and managers mentioned safe and healthy working environment for employees, lower energy bills and cost savings, reduced environmental impact, increased brand value and reputation, and increased customer interest as potential benefits of adopting green technologies. It was also mentioned that better ventilation and temperature management positively impacts workers' productivity. At the same time, higher initial investment costs, ongoing maintenance and management costs, reduced profit margins, and challenges in adapting to new technologies and processes were perceived to be major barriers associated with adopting green technologies. Inadequate knowledge regarding type and availability of green technologies was also mentioned as a considerable challenge. During the KIIs, it was also mentioned that there is a shortage of skilled human resource to maintain the technology.

6. Social Aspects of Greening Factories

A total of 4,541 workers were interviewed from the surveyed factories. The gender distribution of workers varies significantly between the RMG and the textile industry. It also varies according to factory sizes. In the large RMG factories, 58.88 per cent of the respondents were female and 41.12 per cent were male respondents (Annex Table A6.1).

The textile industry reveals a different pattern in terms of gender representation. In the large textile factories, the share of female respondents is 27.08 per cent and the share of male respondents

Figure 6.1: Age Group Distribution of the Workers



Source: Calculated from the CPD Green Transition Study survey data.

is 72.92 per cent. Factors such as the nature of work, factory size, location, and industry-specific dynamics may contribute to these differences in gender representation among the workers.

It is evident from the survey that the age group of 21-30 years comprises a significant portion of the surveyed workers, with the majority in the 21-25 years range. The concentration of female workers is mostly in the 21-25 and 26-30 age groups while that of male workers follows a similar pattern. Figure 6.1 presents the distribution of workers by age and gender. This information can be valuable for understanding the demographics of the workforce in the studied industries.

Productivity and sickness of workers

Workers in large factories have a higher likelihood of meeting their daily production targets. A larger percentage of workers reported that they 'often' or 'always' meet their production targets. This could be because of a combination of factors such as modern technology, skilled workers and better working environment including environmentally friendly environment (Table 6.1).

Workers in large factories also tend to have lower absence rate due to sickness, while workers in small and medium-sized, and micro factories have higher absence rates due to illness (Table 6.2). While the sickness cannot be attributed solely to the workplace environment, it may have some connections.

Among the surveyed workers, 99.57 per cent of those working in large factories believe green practices bring benefits for them. Around 90.55 per cent of the workers in small and medium-sized factories and 90.01 per cent of workers in micro factories share the same belief. The workers reported reduced health hazard, reduced medical cost, and improved productivity as the top three benefits associated with green practices within the factories. More than 80 per cent of the owners and managers opined that production efficiency of the workers will increase due to green transition of their factories. It was mentioned during the KIIs that green factories prioritise the health and safety of their employees by implementing measures such as improved air quality, reduced noise pollution, and sustainable practices. This leads to a more pleasant and productive work environment and reduced absenteeism and turnover rates.

Table 6.1: How Often Do the Workers Meet Their Daily Production Target

Response	Large Factories	Small and Medium Factories	Micro Factories	Total
Never (N)	0	1	1	2
(%)	(0.00)	(0.86)	(0.44)	(0.33)
Rarely (N)	2	1	6	9
(%)	(0.78)	(0.86)	(2.64)	(1.50)
Sometimes (N)	83	23	131	237
(%)	(32.42)	(19.83)	(57.71)	(39.57)
Often	78	29	32	139
N (%)	(30.47)	(25.00)	(14.10)	(23.21)
Always (N)	93	62	57	212
(%)	(36.33)	(53.45)	(25.11)	(35.39)
Total (N)	256	116	227	599

Source: Calculated from the CPD Green Transition Study survey data.

Table 6.2: Workers' Absence in The Last Month Due to Sickness

	Yes N/ (%)	No N/(%)	Total N/(%)
Large Factories	210	212	422
	(49.76)	(50.24)	(35.88)
Small and Medium Factories	190	119	309
	(61.49)	(38.51)	(26.28)
Micro Factories	237	208	445
	(53.26)	(46.74)	(37.84)
Total	637	539	1176
	(54.17)	(45.84)	(100.00)

Source: Calculated from the CPD Green Transition Study survey data.

7. Barriers for Greening Factories

The present study identifies four major types of barriers that factories in the textile and RMG sectors face while embarking on their journey towards green transition. These are: (i) policy and regulatory barriers, (ii) institutional barriers, (iii) factory level barriers, and (iv) market-related barriers. These barriers are briefly discussed below.

Policy and regulatory barriers

- **Lack of harmonisation in policies and regulations:** The Government of Bangladesh has mentioned considerable initiatives in its national development policy and plan, and enacted several laws and regulations related to climate change mitigation and adaptation, and pollution control (GED, 2018; MoEFCC, 2021; MoEFCC, 2022). However, specific policy options and strategic direction for managing climate and environmental challenges that account for both the green transition of industrial sector in Bangladesh and economic growth in a harmonised way is missing (GED, 2020).

  For instance, the recently published Mujib Climate Prosperity Plan (MCPP) recognises the Leadership in Energy and Environmental Design (LEED) certification as a green

accreditation for export-oriented industries like jute, leather, textiles, and information technology (IT) services. Within the framework of the green export programme, the plan has set a goal of achieving 100 per cent LEED certification for strategically significant export industries by 2030. However, this target does not align with other government plans, such as the Perspective Plan of Bangladesh (2021-2040) and the National Adaptation Plan (2023-2050). Furthermore, it is important to note that LEED certification alone does not encompass all the aspects for making industries more environmentally friendly, as it may not be suitable or necessary for certain sectors, such as textiles. Therefore, there is a need for greater harmonisation and consistency among policies.

Also, there is an obvious absence of regulatory mechanisms within environmental and industrial policies to address critical concerns related to surface and groundwater management, as well as the safe disposal of hazardous and toxic waste, and proper land management. To illustrate, there is currently no established pricing policy for the industrial utilisation of groundwater. The consequent unrestricted use of groundwater is leading to a significant decrease in surface water levels in numerous densely industrialised areas, including Dhaka, Gazipur, and Mymensingh. The need for coordination and the implementation of regulatory tools to effectively confront these environmental and industrial challenges cannot be overstated.

- **Absence of specific environmental goals in policies and regulatory frameworks:** Bangladesh's textile and RMG industry needs more specific and defined goals in policies and regulatory frameworks to adopt sustainable practices. The existing environmental monitoring and regulatory framework needs to clearly define goals for factories to follow sustainable practices. The absence of specific environmental goals has led to insufficient implementation of regulations, for instance, the inadequate implementation of environment protection surcharge. In the Eighth Five-Year Plan (8FYP), a goal was set to implement the polluter pays principle in 40 per cent of cases by 2025 and 100 per cent of cases by 2050. Nevertheless, there is no specific mention of the methods or mechanisms through which this goal will be attained.

  Additionally, more policy support and incentives for encouraging investment in large-scale renewable energy generation must be provided. These factors pose significant obstacles to a smooth transition from traditional to renewable energy, impeding progress in the green transition of the textile and RMG sectors. Improving sustainable practices can be enhanced by the presence of green practice regulations tailored to small, medium, and micro-sized factories.

- **Regulatory and policy uncertainty for energy security:** Regulatory and policy uncertainty for energy security presents a significant challenge for factories when it comes to planning and making long-term investments for green energy sources. This uncertainty is especially pertinent when it involves regulations that prioritise traditional fossil fuel dominant energy mix, as it can discourage factories from venturing into green energy.

  In the context of Bangladesh, the historical reliance on fossil fuels has been a defining characteristic of its energy sector. Fossil fuels, including coal, natural gas, and oil, have traditionally played a central role in meeting the country's energy demands. Regulations and policies designed to support and incentivise these industries may take the form of subsidies that lower the cost of fossil fuel, tax benefits that reduce the financial burden on these industries, or environmental standards that may not be as stringent as those promoting greener alternatives.

  In a policy and regulatory environment that favours fossil fuels, factories operating within this framework might have limited motivation

to invest in cleaner and more sustainable technologies. The immediate financial advantages offered by the current system can overshadow the potential benefits of transitioning to green energy solutions. This hesitancy to shift towards greener technologies persists even when these alternatives have the potential to be more cost-effective and environmentally responsible in the long term.

The energy mix argument underscores that as long as policies and regulations heavily favour fossil fuels, the transition to green energy solutions may face resistance, as the financial incentives in place can make fossil fuels appear more economically viable in the short term. To facilitate this transition, it's essential for governments and regulatory bodies to rebalance incentives and prioritise environmentally sustainable energy sources.

Institutional barriers

- **Weak regulatory, management, monitoring systems, and enforcement:** Existing useful laws and regulations remain less effective owing to weaknesses in regulatory, management, and monitoring system and enforcement. Factories often fail to comply to these rules and regulations because of lax enforcement and awareness regarding environmental compliance requirements. As an example, the Department of Environment (DoE) is responsible for enforcing the legal requirement stipulated in the Environmental Conservation Act of 1995 (ECA). This requirement mandates that all applicable industrial facilities must install Effluent Treatment Plants (ETPs) to treat their wastewater to meet specified standards before discharging it into the surrounding environment. Nevertheless, the enforcement of this mandate presents significant challenges due to a shortage of personnel and a lack of technical expertise within the concerned agency.

  As a result, many factories go unchecked, and violations often go unnoticed. Even when violations are identified, penalties for non-compliance may be relatively minor or inconsistently applied. This can lead some factory owners to view the penalties as a cost of doing business rather than an incentive for sustainability. Consequently, numerous factories engaged in processes such as washing and dyeing (classified as "red" industries) often display reluctance in operating their ETPs effectively, which results in degradation of environment.

  According to the KIIs, owners and managers of most of the factories think that the government rules and regulations are a significant factor in organisations' green management and these rules need to be stringent in the coming days. They were also of the opinion that weak implementation of the policies, rules, and regulations slow down the green transition process.

- **Lack of co-ordination among government agencies:** The lack of coordination and co-operation among various ministries and government agencies is hindering the formulation and implementation of synergistic green industrial policies (Hannan & Aigbogun, 2021). As an example, the management of solid and hazardous waste in Bangladesh involves the participation of multiple government entities, including the DoE, the Ministry of Industries, the Ministry of Commerce, and local city corporations. However, there is a notable absence of coordination among these agencies when it comes to the disposal and management of solid and hazardous waste.

  For instance, numerous garment and textile factories are located along the eastern banks of Turag River, which falls under the jurisdiction of the Dhaka North City Corporation (DNCC). Currently, the river is suffering because of gradual buildup of industrial and other waste. The Bangladesh Inland Water Transport Authority (BIWTA), responsible for maintaining the river's navigability, has faced challenges in terms of managing the available water resources and surrounding environment due to the lack of cooperation between these two agencies. This lack of coordination is also

evident among other agencies, primarily due to overlapping mandates.

Factory level barriers

- **Lack of information and awareness:** Access to information is crucial in driving firms' green investment decisions. However, many enterprises need more awareness and knowledge to integrate sustainable practices into their business models. The certification process can be particularly challenging due to a lack of information. A considerable lack of awareness has been identified from the survey result. Only 17.51 per cent of the owners and managers from the 377 non-green building certified factories knew about green building certifications. Further, disaggregation within these factories reveals that owners and managers of large factories are considerably more aware (80.70 per cent) when compared to small and medium factories (15.29 per cent) and micro factories (2.98 per cent).

  During the FGDs, export-oriented large factories were portrayed as having good understanding of the greening concept and environmental compliance issues. At the same time, the need for education and training pertaining to green practices for the smaller factories was also recognised. When it comes to the factory employees, 71.13 per cent of supervisors reported that they are aware of green or environmental-friendly practices in factories. The corresponding figure for workers was 78.99 per cent. In general, higher level of awareness is observed in large factories compared to small and medium, and micro factories.

  While the overall level of awareness is encouraging, it was mentioned during the FGDs that workers' understanding of green activities was primarily limited to physical and visual aspects of the workplace rather than the broader environmental impact of their work. Fine-tuning of these perceptions and promoting greater awareness of the benefits of sustainable practices may be vital in encouraging broader adoption of green technologies.

- **Finance-related constraints:** Access to finance is one of the most cited barriers for factories seeking environmental certification or adopting green practices. Initiatives such as obtaining green certification, retrofitting facilities, implementing sustainable practices, and adopting green technologies often require high upfront costs, which can deter factories from embracing green initiatives due to the perceived financial risk. Notably, the cost of obtaining various green certifications for different buyers is relatively high, which remains a challenge for many factories. Lack of funds, especially for small, medium, and micro-sized factories or factories in tier 2 and 3, may put them in a disadvantageous situation where the brands/buyers may avoid them for being environmentally non-compliant.

  Furthermore, these factories face obstacles when trying to access existing financial schemes due to their limited capacity to provide collateral. When these businesses were initially established, many had to secure loans using whatever collateral they had. Consequently, additional investments for environmental compliance becomes challenging as this entails further collateral requirement. While the Bangladesh Bank has introduced the 'Refinance Scheme for Green Products/ Projects/Initiatives,' accessing this scheme entails navigating a complex process such as developing project, application for loan from commercial banks, implementation of projects and submitting the project progress report to avail the refinance scheme from Bangladesh Bank. Such process also risky and lengthy as it proves to be challenging for these factories due to their limited capabilities and knowledge.

  The perceived financial risk associated with these investments can deter factories from embracing green initiatives, resulting in missed opportunities for cost savings, increased efficiency, and better environmental performance.

- **Limited capacity and capability of factories:** The wide variation in the capacity of factories in taking green initiatives is reflected in the embeddedness of environmental sustainability issues in their policies and workforce. The survey data shows that large factories were particularly performing better in terms of considering environmental sustainability in their strategic objectives, having sustainability-related policies, identifying environmental protection as factories corporate social responsibility. Other factories are lagging considerably behind when it comes to these aspects.

  Again, many large factories appointed a designated person to work on sustainability (or even a 'Head of Sustainability') along with a separate environmental compliance manager/ officer. In the cases of smaller factories, the situation is quite dismal. During the KIIs, it was acknowledged that majority of the workers do not have sufficient knowledge regarding the greening initiatives. It was mentioned that there is a shortage of skilled human resources when it comes to maintaining the greening-related technologies. The owners and managers often need to rely on foreign expertise when importing and installing state-of-the-art machinery in their factories. The FGDs highlighted the importance of education and training for workers to understand the environmental impacts of their work and the machineries they use.

- **Operational barriers:** Another set of barriers that hinders the adoption of green initiatives are operational barriers, such as the difficulty of greening in rented infrastructure or the factories which are already established. Factories operating within rented infrastructure may encounter considerable hurdles when attempting to make substantial investments in green initiatives. This difficulty arises from the inherent need for more control over the building and its systems to undertake significant green modifications. In rented spaces, the degree of control and authority over structural changes and technology upgrades can be limited, thus impeding the adoption of comprehensive green practices.

  Moreover, factories that are already established may struggle to meet the requirements for green certification and environmentally sustainable standards. The retrofitting of older facilities to meet these standards can be logistically, financially, and operationally challenging. Adapting existing infrastructure to comply with new environmental regulations and standards often necessitates substantial investments in technology, equipment, and facility modifications, presenting a formidable barrier to the adoption of green initiatives.

Market-related barriers

- **Lack of market-driven incentives:** The absence of market-driven incentives can pose a significant barrier to firms adopting sustainable practices. The survey conducted for this study found that firms were primarily motivated by internal factors and market-driven incentives rather than external factors such as regulatory pressure. Thus, the lack of incentives can demotivate firms from transitioning to sustainable practices. For example, the absence of premium prices for green products is a significant barrier to green transition in the textile and RMG sector. This discourages factories from investing in green production processes, as they may not see any additional revenue from such investments. Even if the factories are green certified, entrepreneurs may make less profit since the prices remain the same.

- **Lack of information and expertise on green technologies:** A disparity in access to information about green technologies can also hinder factories from developing their technological knowledge and capabilities. Insufficient information and awareness regarding green technologies and best practices can curtail a factory's capacity to embrace environmentally friendly technologies. This information gap is more pronounced in small and medium-sized as

well as micro-sized factories in comparison to their larger counterparts.

Additionally, the need for green technology varies among factories of different sizes. Consequently, the management of these factories often lacks clarity about where and how to obtain pertinent information on green technology. Moreover, some factories require assistance in identifying suitable green materials and technologies to implement sustainable practices, thereby compounding the challenges associated with making the transition.

8. Conclusions and Recommendations

The findings offer valuable insights into various facets of these industrial establishments. These factories, with a notable presence in the RMG and textile industries, demonstrate a trend of growth between 2000 and 2010. Factory sizes vary significantly, with a majority falling in the micro category. Among large factories, green building certification awareness varies, and some non-green certified factories embrace sustainability to meet environmental regulations and buyer expectations. A subset of factories operates within the EPZs. Tier-wise distribution within the RMG factories reveals varied characteristics.

Motivations for green certification encompass self-drive and market demands, while government regulations exert a weaker influence. Training in sustainability is more prevalent in large factories, and the adoption of green policies is higher among them, as well. Notably, large factories make substantial investments in green initiatives.

Areas of investment include energy, water, air, waste management, among others. Utility consumption patterns reveal disparities, with smaller factories relying more on grid electricity. Worker demographics vary by gender and age, with large factory workers demonstrating higher productivity and lower sickness-related absenteeism rates compared to their counterparts in smaller factories. These findings collectively depict the diverse landscape of factories, their sustainability efforts, and the characteristics of their workforce.

In view of the analyses based on the primary data collected from the survey, KIIs, and FGDs, this study makes a number of recommendations for securing green transition in the textile and RMG sector in Bangladesh. These recommendations have been clustered under five broad themes viz. policy and regulatory measures, economic incentives, green finance, awareness and knowledge sharing, and skills and capacity development. In this connection, it must be noted that these five themes are not mutually exclusive and may have considerable overlaps among them.

The present study also identifies the key actors that are relevant to each of the recommendations. Given the continuous effort required to secure green transition of the textile and RMG sector of the country, a multistakeholder approach has been considered. As can be seen from the discussion later, the government agencies play a central role in implementing these recommendations. From a sustainability perspective, this is justified as the non-state initiatives often end up in being short-term and project centric in nature. Additionally, the buyers, industry associations, and international development partners also have a critical role to play in the efforts towards securing green transition. As industry insiders and financers, they can contribute substantially towards green finance, awareness and knowledge sharing, and skills and capacity development. Finally, the academia and think-tanks can provide their support as knowledge actors in the efforts towards green transition.

Policy and Regulatory Measures

The task of securing green transition in the textile and RMG sector requires considerable effort in the policy domain. Given the multidimensional nature of the issue and the number and types of stakeholders involved, effective coordination among these players is critical so that policies are not contradictory to each other, and efforts are synergistic. Specific actions that can be taken in this regard include:

- **Developing a comprehensive strategy that covers all aspects of a green transition for the textile and RMG sector based on stakeholder consultation and evidence-based analysis:** The strategy should include short-term and long-term goals, indicators, targets, timelines, roles, responsibilities, budgets, and monitoring mechanisms. The Ministry of Environment, Forest and Climate Change (MoEFCC) and the Ministry of Industries (MoI) can take the lead in developing this strategy. Pertinent government agencies including the Ministry of Commerce (MoC), Ministry of Finance (MoF), Bangladesh Bank (BB), Ministry of Planning (MoP), and the Prime Minister's Office (PMO) needs to be closely involved and consulted in the formulation process. The industry associations, buyers, academia, and think-tanks must be consulted and be made part of the strategy development process. These actors can significantly contribute to the evidence generation process required for developing a comprehensive strategy.

- **Creating a task force/committee to review policies and regulations related to the green transition in the textile and RMG sector:** This will help identify any ambiguities or contradictions and take timely actions to address them, promoting a conducive environment for green transition. Government agencies such as MoEFCC, MoI, MoC, MoF, BB, and MoP should be integral parts of the proposed task force/committee. Besides, engagement with the industry and other stakeholders including academia and think-tanks to gather feedback and suggestions on policies and regulations will facilitate a comprehensive and participatory review process.

- **Developing a common framework for green standards and certification procedures based on international best practices and market requirements:** As mentioned, lack of a standard definition of greening results in various operational difficulties for the firms. To this end, government agencies such as MoI, MoEFCC and non-state actors including industry associations, buyers, academia, and think-tanks can collaborate towards developing a common framework for green standards and certification. All firms would adhere to the same environmental benchmarks with a uniform standard. Moreover, a uniform certification procedure would make it easier and less costly for factories to obtain green certifications required by various buyers, eliminating the need to undergo multiple audits or certifications.

- **Providing assistance to obtain green-related certifications:** Technical assistance and guidance could be provided to factories to help them in implementing green standards and certification procedures, such as conducting audits, improving energy efficiency, reducing waste, and using renewable energy sources. To this end, state actors including the MoI and Sustainable and Renewable Energy Development Authority (SREDA), and the industry associations and buyers can take the lead role. Furthermore, firms could be incentivised to adopt green standards and certification procedures via offering preferential access to buyers, financing, tax breaks, or subsidies.

Economic Incentives

Factories which are currently investing and are willing to invest in promoting green measures, technological development, productivity enhancement, skill development of and higher welfare for the workers should be supported through economic incentives. Correspondingly, the following initiatives could be taken:

- **Providing market-driven incentives, such as tax breaks and subsidies, for factories that invest in sustainable production processes:** These incentives should be aligned with the sectoral climate goals and environmental standards. Tax incentives may be provided to small and medium factories which want to import effluent treatment plants and obtain green certificates. The MoI, MoF,

and MoC need to collaborate to come up with the instruments to incentivise investments in sustainable production processes.

- **Withdrawing fiscal support to the polluters:** Fiscal support to polluting industries and fossil fuel-based power generation should be withdrawn and transferred to clean technologies. The textile and RMG factories investing in green production processes should have access to those funds. Given the contentious nature of the initiative, the MoI, MoF, and Ministry of Power, Energy and Mineral Resources (MoPEMR) will need to play a strong leadership role.

- **Providing premium prices for products from green factories:** As mentioned earlier, premium prices are expected to encourage more factories to engage in greening initiatives. Furthermore, such an initiative will be able to compensate for the huge initial investment required for greening the factories. The buyers will have to play the lead role in this regard. The industry associations will need to continuously pursue this agenda. The MoI can act as the interlocutor in case of a possible deal or agreement between the buyers and the industry.

Access to Green Finance

Both the state and non-state actors can contribute towards ensuring easy access to green finance through mechanisms like soft loans, grants, and seed funds. Information on the availability of funds should be disseminated by the relevant departments of the government and industry associations. Some actions that can be taken in this regard include:

- **Creating a comprehensive system for accessing green financing programmes:** Easy access to green finance can be facilitated by creating an online portal for factories that want to invest in sustainable practices. The ICT Division of the government can develop the portal and may include all relevant information pertaining to green finance opportunities and how to access them. Furthermore, increasing the allocation of funds for green financing programmes, developing a help desk to assist in accessing green financing, streamlining the application process, limiting the documentation requirement, and reducing the time required for approval will be greatly beneficial for factories interested in green financing. The MoF, BB, and MoI can work jointly to this end.

- **Establishing a credit guarantee scheme to enable smaller factories to access sustainable financing options:** Such options may include providing guarantees or insurance for SMEs that face difficulties obtaining loans for green investments. The Bangladesh Bank and commercial banks will have an important role to play in making green funds available to these firms. The buyers and international development partners can financially contribute towards these funds, while the MoI can serve the role of an interlocutor.

Awareness and Knowledge Sharing

All types of factories in the textile and RMG sector should have access to information on greening their outlets. Awareness is needed on the meaning and implications of greening and ways to be green. Information on green transition should be easily available not only to the owners but also officials, workers, and trade union members. Specific actions that can be taken in this regard are:

- **Making information on greening publicly available:** The government, keeping in mind its climate-related goals and commitments, should ensure that information on effective green management, practices, and technologies is readily available to all interested parties. The MoEFCC and the MoI can be instrumental in this regard. The goal of information sharing can be achieved by establishing a central database or platform for disseminating information on sustainable practices. The ICT Division can develop such a platform. Non-government entities such as

industry associations, academia, and think tanks should also be allowed to contribute to this platform. By making this information publicly available, firms can gain access to the necessary knowledge and tools required to transition toward sustainable practices.

- **Conducting workshops, training sessions, and campaigns to foster changes in values and attitudes toward sustainability:** The government, in collaboration with the buyers, industry associations, and international development partners, should organise regular workshops and training sessions to raise industry stakeholders' awareness of the benefits of sustainable practices. These sessions give participants a comprehensive understanding of sustainable practices, their benefits, and the steps required to implement them. Among the government agencies, the MoEFCC and the MoI should take the lead in this case to ensure continuation and sustainability of the initiatives. Launching campaigns to promote sustainable practices and their importance can also be beneficial in spreading awareness. Both the Ministry of Information and Broadcasting (MoIB) and the media can be instrumental in this regard.

- **Providing technical guidance and support to mitigate knowledge gaps:** The government, in collaboration with the buyers, associations, international development partners, and academia, should offer technical guidance and support to assist factories in adopting sustainable practices and addressing knowledge gaps. This can include assistance in obtaining green certifications, identifying cost-saving opportunities for factories to transition to sustainable practices, and helping them develop sustainable business models.

Skills and Capacity Development

There should be special training and workshop for the factories, particularly the small and medium enterprises to raise their awareness and encourage them to undertake green measures. Women's participation in such trainings must be ensured. These can be organised by industry associations with support from academia and think-tanks and be funded by buyers and international development partners. Training programmes for the firms on the source of finance, how to access and how to utilise those funds should be organised by relevant ministries and departments, associations, and the central bank, Bangladesh Bank. Training should be an ongoing process since rules and regulations often change and all stakeholders related to the sector including the owners, managers, trade unions, and workers should be made aware of such changes. Hence, the government agencies including the National Skills Development Authority (NSDA) and the MoI can take the lead coordinating role. Some initiatives in this regard could be:

- **Increasing the availability of skilled human resources:** This can be achieved via developing and expanding apprenticeship and mentorship programmes in green industries, developing partnerships with private sector organisations to provide training and certification programmes for green skills, and incentivising individuals and businesses to participate in green skills training programmes. The NSDA, MoI, and industry associations can jointly work on this issue while buyers and international development partners can contribute financially.

- **Establishing a green skills development fund:** This will support firms to provide training for their workers on energy efficiency, waste management, and circular economy. A levy on high-carbon energy sources or a portion of the green incentives for firms could finance the fund. The MoEFCC, MoI, MoF, BB, and industry associations can jointly work towards initiating and managing this fund. Besides, the international development partners and buyers can also contribute to this fund.

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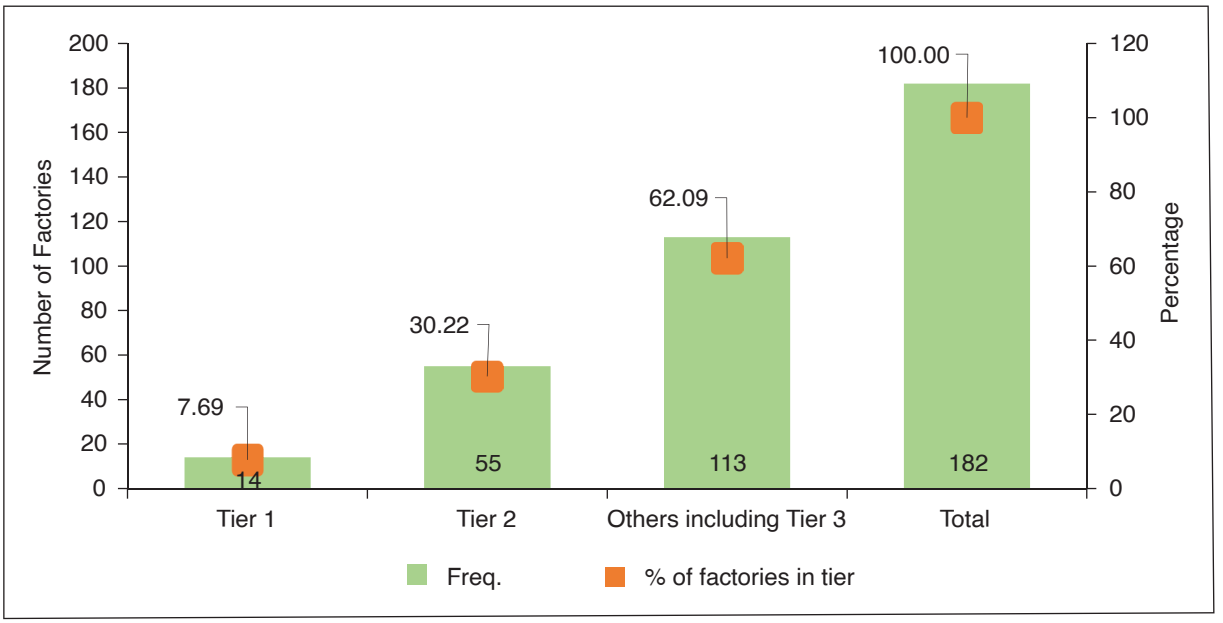
Annex

Figure A4.1: Tier-wise Distribution of Surveyed RMG Factories



Source: Calculated from the CPD Green Transition Study survey data.

Table A4.1: Other Environmental Certificates

Name of the Certificates	Frequency	Per cent
BCI	5	6.58
BSCI	6	7.89
Environment Clearance Certificate	7	9.21
GOTS	7	9.21
OCS	13	17.11
RCS	1	1.32
GRS	4	5.26
Higg Index	1	1.32
OEKO -TEX	13	17.11
ISO 14001	1	1.32
OHS	1	1.32
SGS	1	1.32
Sedex	14	18.42
ZDHC	1	1.32
Step octax	1	1.32
Total	76	100.00

Source: Calculated from the CPD Green Transition Study survey data.
Note: Classification was not created since only large firms have the certificates.

Table A5.1: Investments, Loans, and Interest Rate

Investments, Loans, and interest rate	Large Factories			Small and Medium Factories			Micro Factories		
	Yes (%)	No (%)	Avg. Amount/ Avg. Interest rate (%)	Yes (%)	No (%)	Avg. Amount/ Avg. Interest rate (%)	Yes (%)	No (%)	Avg. Amount/ Avg. Interest rate (%)
Total Investment in last 5 years	100.00	0.00	187,060,870.98	58.82	41.18	8,391,080.00	54.89	45.11	989,139.53
Take bank loans for making investment	56.63	43.37	12.38	28.00	72.00	9.21	20.93	79.07	8.63
Green Investment Only in last 5 years	91.57	8.43	78,067,209.04	20.00	80.00	1,371,176.47	13.19	86.81	162,258.06
Take bank loans for making green investment only	28.29	71.08	7.08	3.53	96.47	9.33	1.28	98.72	8.67
Percentage of Green investment of total investment	-	-	68.67	-	-	47.00	-	-	80.00

Source: Calculated from the CPD Green Transition Study survey data.

Table A6.1: Distribution of Respondents by Size and Gender

Category		RMG		Textile	
		Female Worker	Male Worker	Female Worker	Male Worker
Large Factories	n	796	556	75	202
	%	58.88	41.12	27.08	72.92
Small and Medium Factories	n	101	430	78	492
	%	19.02	80.98	13.68	86.32
Micro Factories	n	116	566	63	1066
	%	17.01	82.99	5.58	94.42

Source: Calculated from the CPD Green Transition Study survey data.

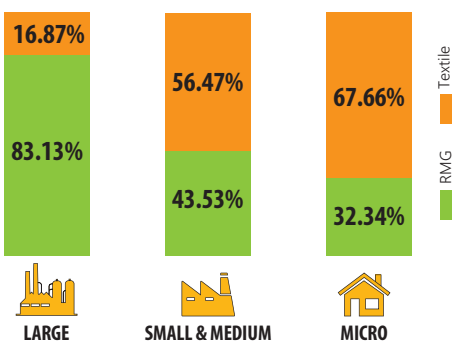
Infographic 1

Securing
Green Transition of the
Textile and Readymade Garments Sector in Bangladesh

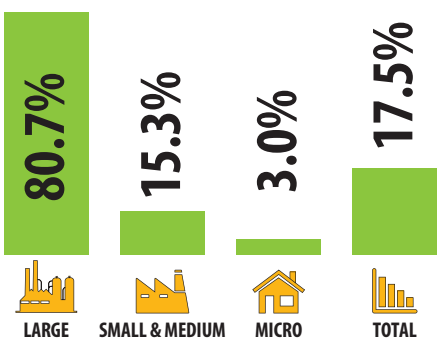
HOW FACTORIES ARE ADOPTING GREEN INITIATIVES A SNAPSHOT

CPD carried out a nationwide survey which covered owners and managers of 403 factories in Bangladesh. Of these, 182 were RMG and 221 were textile factories. Additionally, a total of 4,541 workers and supervisors were interviewed as part of this survey.

SIZE AND TYPE OF SURVEYED FACTORIES



WHETHER FACTORIES KNOW ABOUT GREEN BUILDING CERTIFICATION?

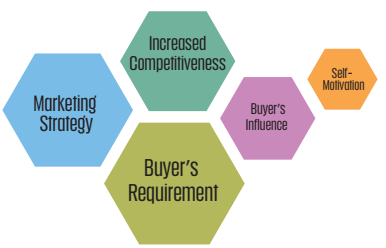


WHAT MOTIVATES FACTORIES TO ATTAIN GREEN BUILDING/PRODUCTION/PROCESS CERTIFICATION

Factories with green building certificate

Factories that do not have any green building certificate but want to obtain in the future

Factories with green product/ material/ resources/production process certificate

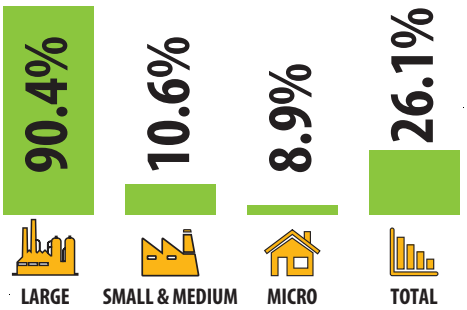


Factories that want to obtain green product/ material/resources/production process certificate in future

(Infographic 1 contd.)

(Infographic 1 contd.)

DO FACTORY EMPLOYEES RECEIVE GREEN-RELATED TRAINING?



EMBEDDEDNESS OF GREEN POLICIES WITHIN FACTORIES

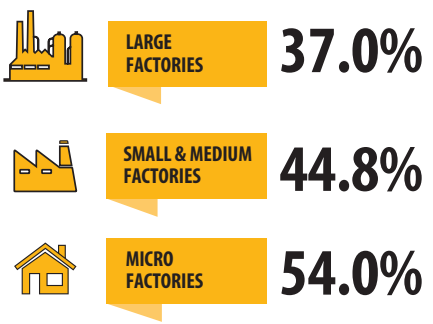
25.6% factories' strategic objectives mention environmental sustainability issues to prevent future health and environmental damage

26.8% factories have clear policies promoting environmental sustainability or awareness in all functional areas

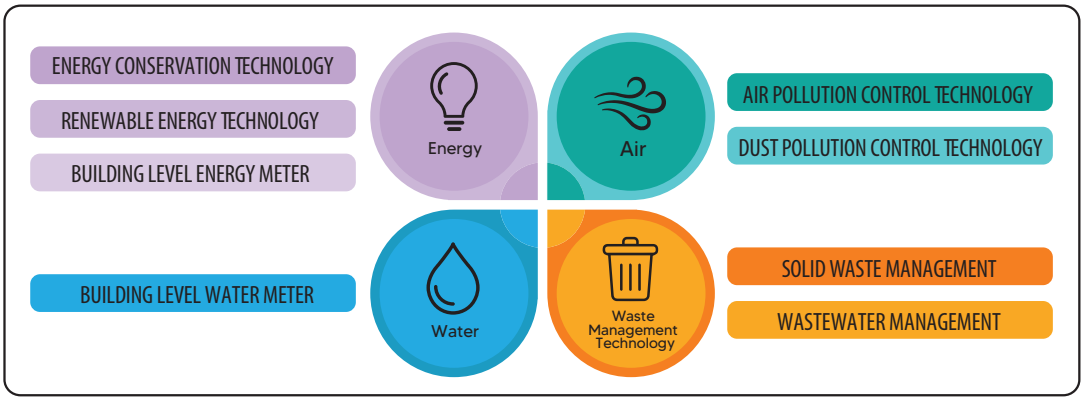
28.0% factories identify environmental protection as its corporate social responsibility

MAJOR FACTORS INFLUENCING FACTORIES' GREEN INVESTMENT DECISIONS

GREEN INVESTMENT OUT OF TOTAL INVESTMENT IN LAST FIVE YEARS

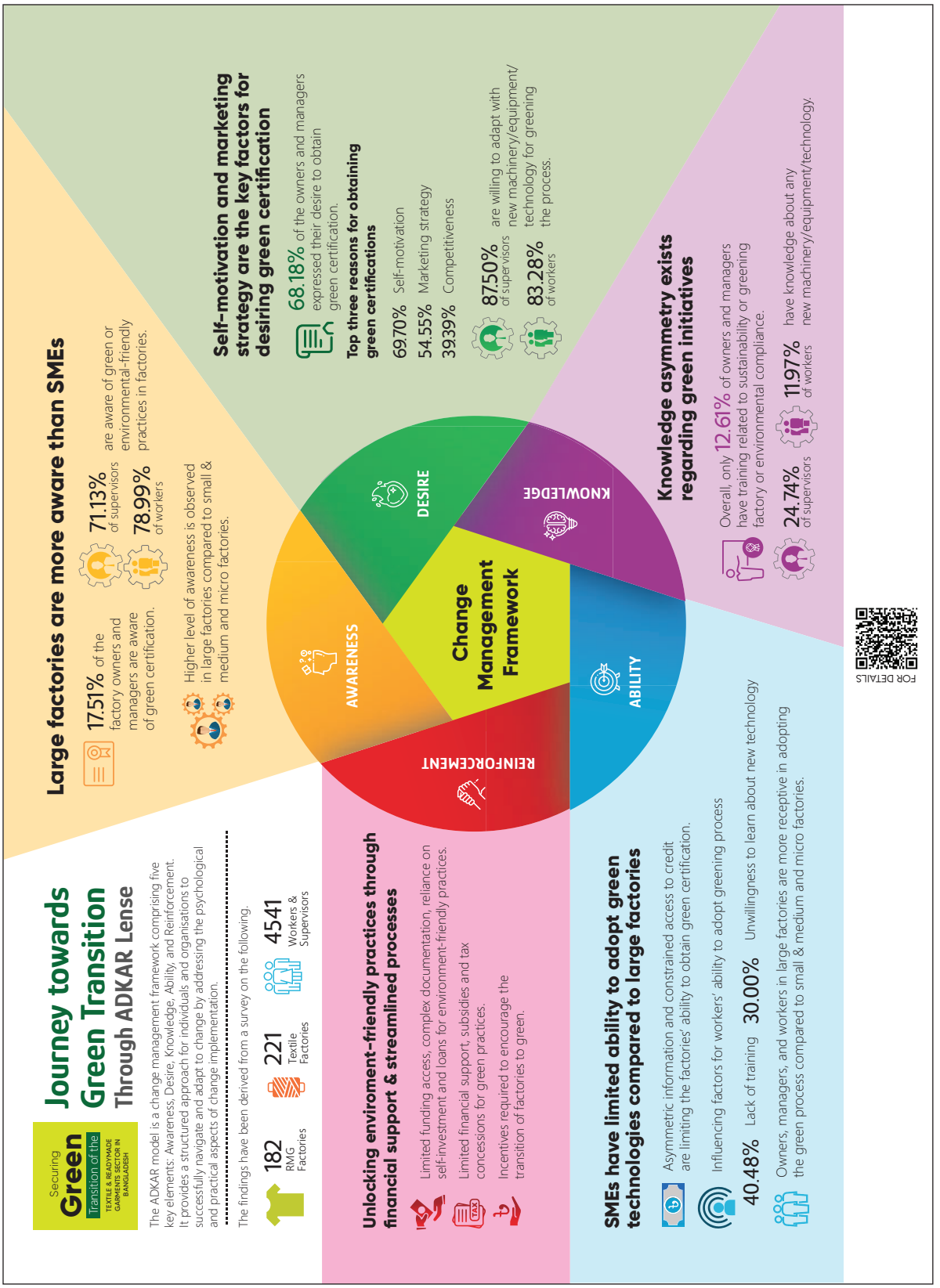


MAJOR AREAS OF GREEN INVESTMENT BY FACTORIES



FOR DETAILS

Infographic 2

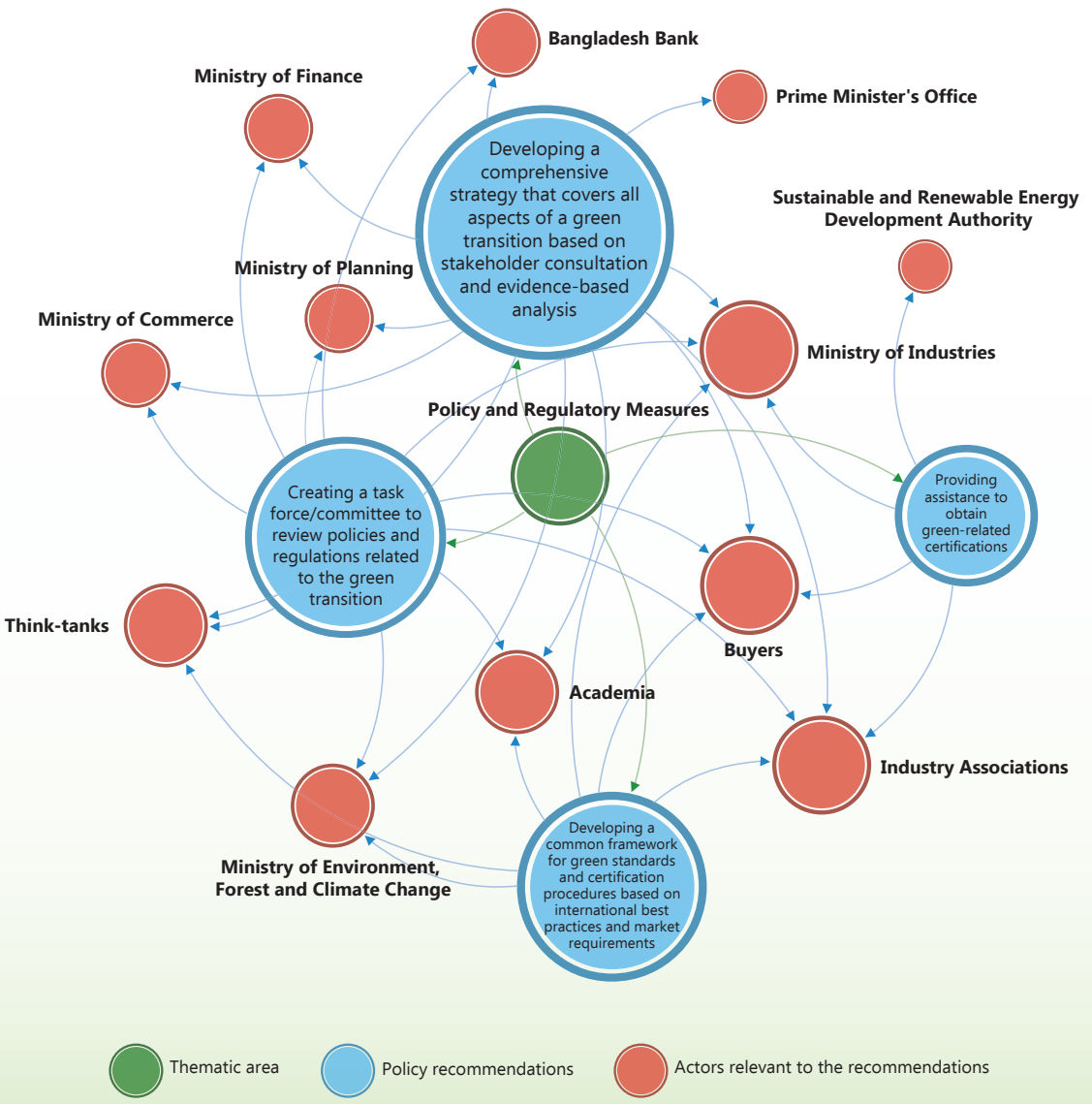


Infographic 3

Securing Green Transition of the TEXTILE & READYMADE GARMENTS SECTOR IN BANGLADESH

PATHWAYS TO GREEN TRANSITION OF THE TEXTILE AND RMG SECTOR

Thematic Area 1 POLICY AND REGULATORY MEASURES



FOR DETAILS

(Infographic 3 contd.)

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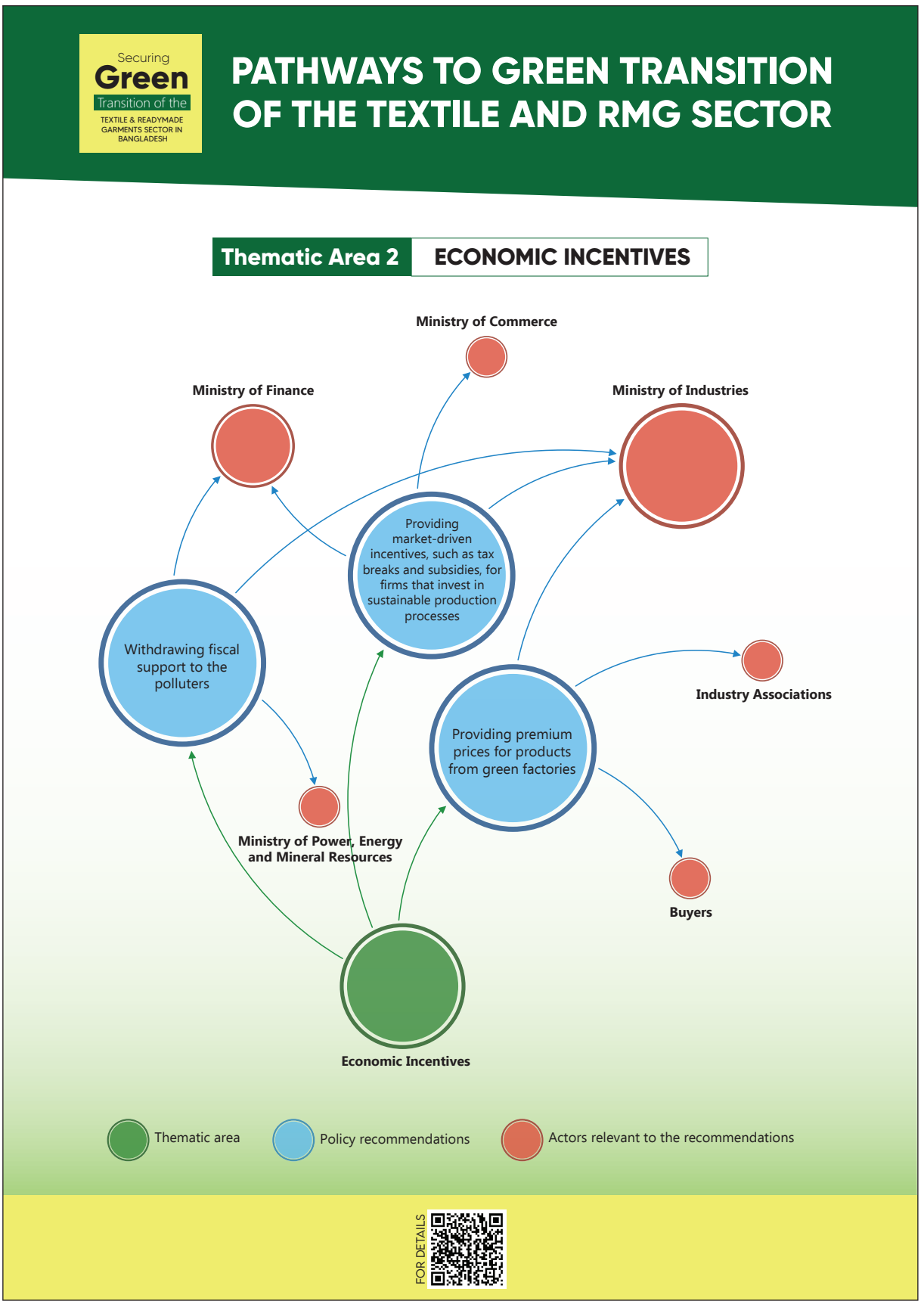

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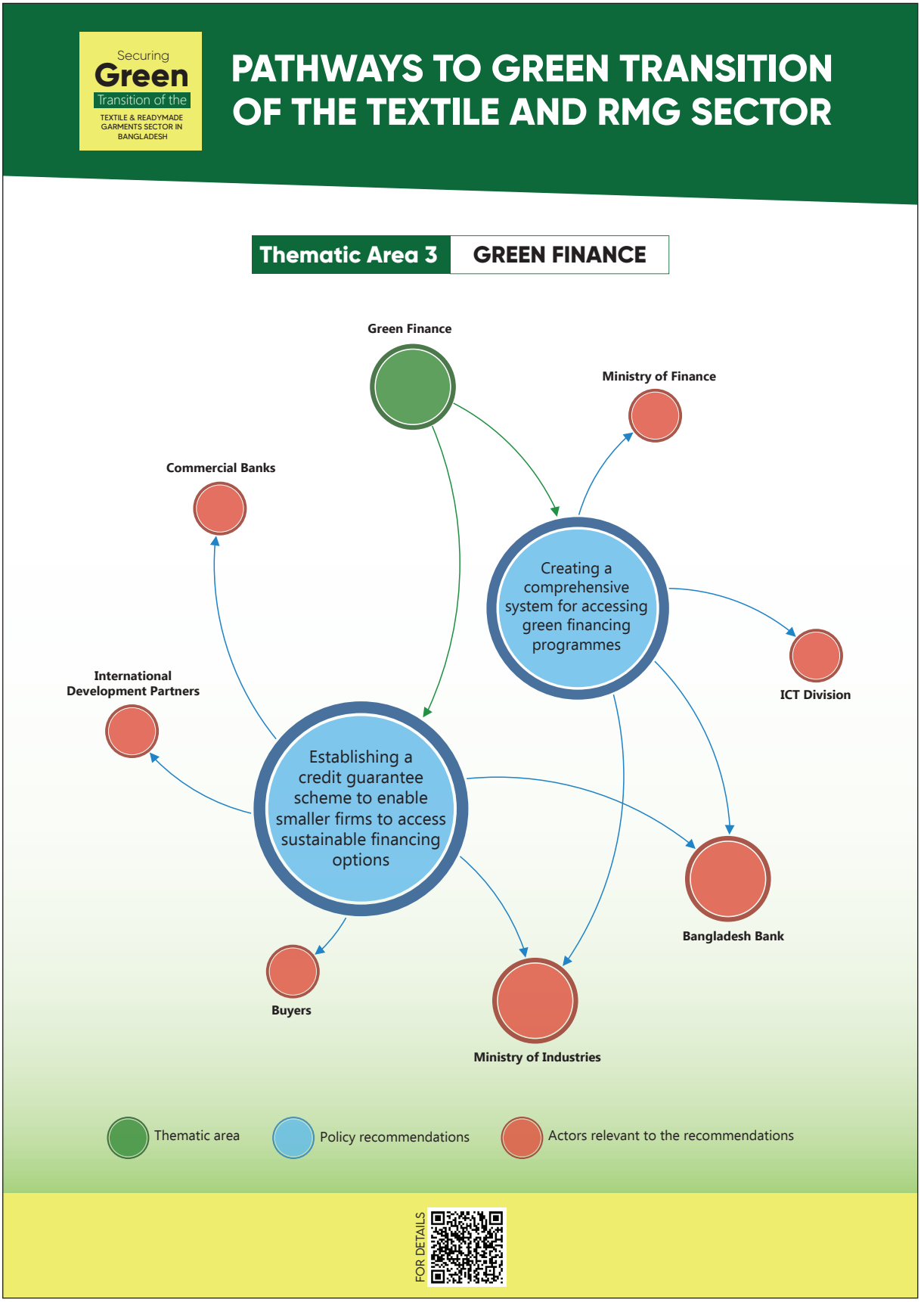

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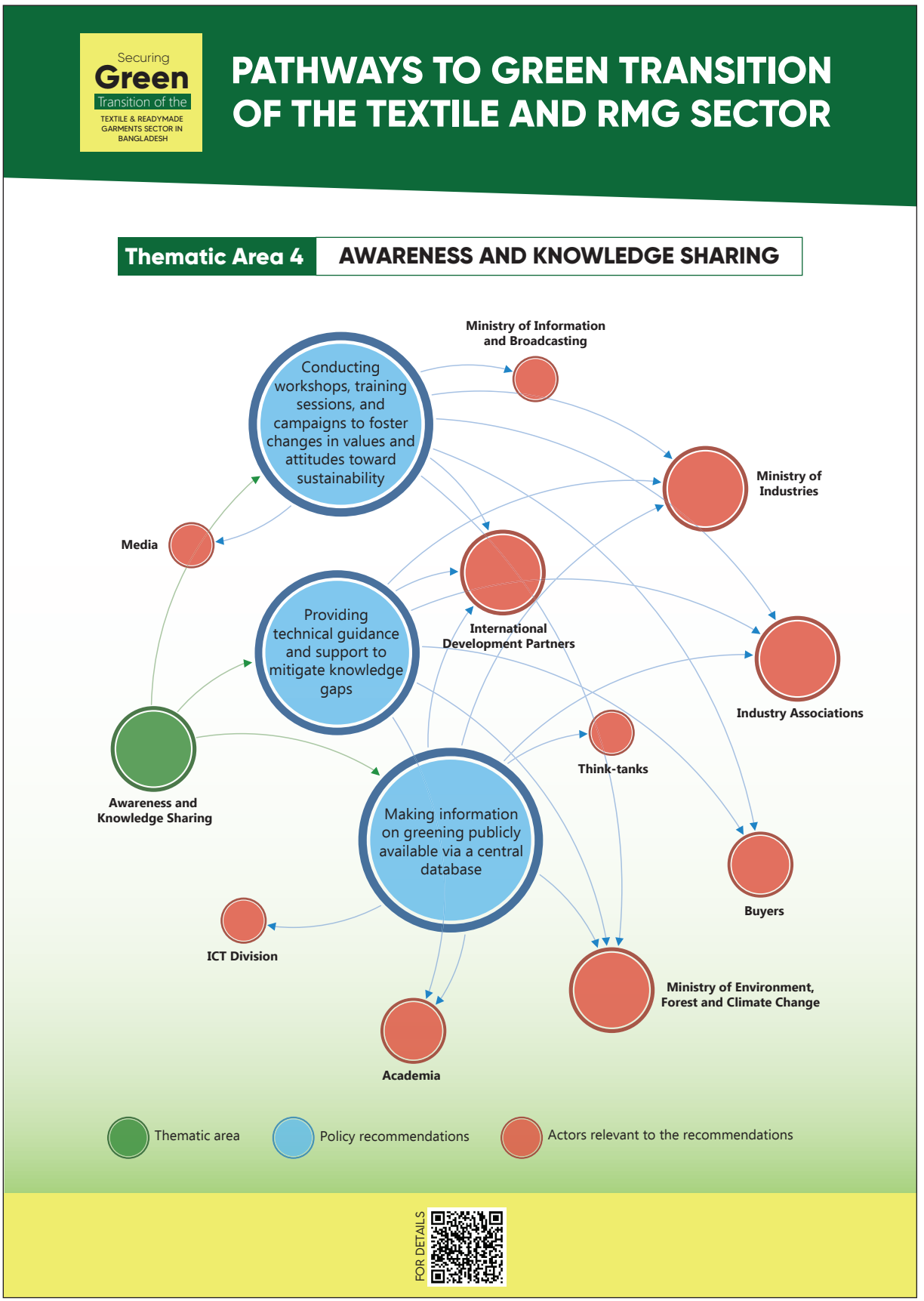

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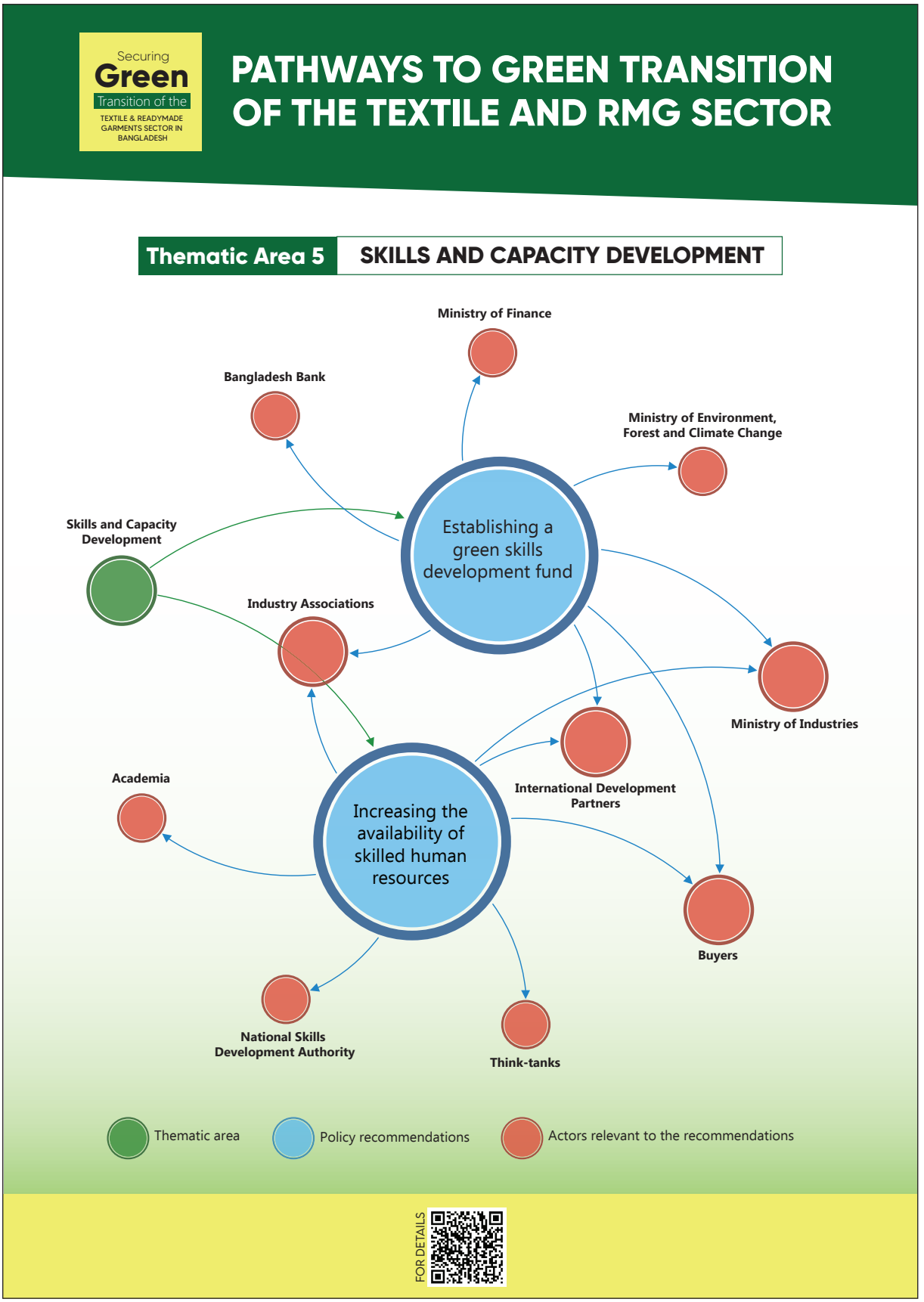

The report emphasises the need for securing green transition of the textile and readymade garments (RMG) sector in the backdrop of Bangladesh's graduation from the least developed country (LDC) category, and swiftly evolving standards and compliance requirements in the global markets. Based on a nationwide survey of 403 factories, the study findings depict their diverse landscape, their sustainability efforts, and the characteristics of their workforce. From the analyses based on the primary data collected from the survey, key informant interviews (KIIs), and focus group discussions (FGDs), this study makes a number of recommendations under five broad themes viz. policy and regulatory measures, economic incentives, access to green finance, awareness and knowledge sharing, and skills and capacity development. The study also identifies the key actors relevant to each of the recommendations which include government agencies, brands and buyers, industry associations, international development partners, and the academia and think-tanks.

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978-984-98096-2-3