A Critical Juncture in the Global RMG Production Network of Bangladesh: Safety Reformations through Rapid Transfer of Technology

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Article

A Critical Juncture in the Global RMG Production Network of Bangladesh: Safety Reformations through Rapid Transfer of Technology

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Abstract: Millions of livelihoods of the lower-income group of Bangladesh relies upon the Ready- Made Garment (RMG) industry- the epicentre of the global apparel production and supply chain network. The RMG sector of Bangladesh makes a significant contribution not only to the developing nation's overall welfare, but also its reputation and global image within the RMG global supply chain. Bangladesh had been making gradual progress on several compliance issues regarding workplace conditions such as adopting regulation against prolonged working hours and child labour. But the RMG industry received its wake-up call for ensuring safety in terms of factory building's structural integrity and fire protection through two major industrial catastrophes—the Tazreen Fashion fire incident in 2012 and the Rana Plaza building collapse in 2013. These two incidents represent the worst cases of RMG industry disasters, prompting major challenges to the country's safety regulatory authorities. The question addressed in this article is whether rapid transfer of technology can effectively deliver safety regulatory reforms in the production nodes within global supply chains. This article focuses on the two factory disasters to examine how they marked a critical juncture in safety policy development in Bangladesh, leading to a rapid transfer of technology from the global north to global south to sustain a globalised production network. It also seeks to outline a comparison between the effectiveness of policy reforms effected through technology transfer in achieving fire safety and ensuring structural integrity of factory buildings. Findings primarily drawn from literature review and interviews with professional resource persons suggest that although the RMG industry of Bangladesh has made substantial progress in correcting structural risks within factory buildings, fire still remains an unresolved issue posing unceasing threat to safety. These findings are significant for all stakeholders within the global supply chain network of Bangladesh, concerned with improving sustainability of the RMG industry and seeking to outline the responsibilities for each group of actors towards preventing building disasters. Both Tazreen Fashion fire incident and the Rana Plaza building collapse served as 'critical junctures' in rapid transfer of physical technology to enhance structural safety and streamline production planning within the RMG manufacturing factories within Bangladesh. However, the transfer of social technology within the supply chain network of a developing nation in areas such as development of organisational safety culture or promoting workplace ethics, requires long-term planning and prolonged practices. The paper thus concludes that in developing countries, transfer of physical technology is more readily achievable than the adoption of social technology.

Keywords: RMG; Bangladesh; fire; structural; developing; industry; safety; social technology; critical juncture; global; disasters

1. Introduction

To capitalise on economic development opportunities offered by participation in global supply chains, manufacturing centres in developing countries are expected to adopt certain production efficiency and working conditions. The expectations that productivity and working conditions would be aligned to globally acceptable models and compliant with internationally recognised safety standards may, however, not be fully met. The occasional occurrence of industrial building accidents in countries of the global south expose weaknesses in the governance of supply chain networks and

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inadequacy of their safety regulation regimes. Global sensitivity to extensively reported high profile disastrous incidents in the shape of industrial accidents, tends to prompt international intervention to resolve the underlying issues. This could either trigger temporary quick fixes or more permanent and sustainable measures ranging from one-off injection of resources to mobilization of awareness drives and establishment or streamlining of governance structures and policies [1]. Additionally, such incidents could mark critical junctures in the policy development path towards the establishment of safety culture through adoption of both physical and social technologies for improved building safety regulations in developing countries.

The Tazreen Factory fire and the Rana Plaza collapse are two garment manufacturing factory tragedies that unfolded in Bangladesh within just five months of each other during 2012 and 2013, attracting massive global attention. While Tazreen factory fire had made global headlines, it was overshadowed within five months by the occurrence of the Rana Plaza incident that triggered massive media attention and global scrutiny [2]. The incidents led to attempts to install workplace safety governance that could eradicate scope for human error and malpractices within governance systems that were identified as contributing to occurrence of the tragedies. The exposure expedited rapid transfer of regulatory responsibility through foreign intervention bringing about significant large-scale changes, marking a critical juncture in the country's policy development of safety regulations. This constituted a major shift in safety policy, adopting various technologies to attain internationally accepted working standards. These technologies also included components that deal with social or contextual behavioural patterns. According to Wahab, there are two components of technology transfer: the physical component in the shape of products, tools, etc.; and the information component, comprising know-how in management, marketing, production, etc. [3]. This article seeks to shed light upon the latter, focusing on the management aspects that are seen as part of 'social technology' described by Leibetseder [4] as technology related to human actions or behaviour.

In the aftermath of the Rana Plaza incident, the government of Bangladesh yielded to global pressures to institute policy reform to ensure safety within the workplaces as a strategy for the industry's image repair through rapid transfer of technology. This underscored the Bangladesh government and other stakeholders' realisation of the role human errors played in jeopardising the Bangladesh garment manufacturing sector. While substantial safety reforms were introduced yielding safer RMG factory buildings, unfortunately, threats to RMG workplace safety due to incidence of fire and other operational hazards persist.

This article seeks to elaborate the impact of rapid transfer of technology related to workplace safety governance on existing local regulatory regimes and governance frameworks. It emphasises the fact that while physical technology from the global north may be readily incorporated into developing countries, it is relatively challenging to incorporate social technology. This is so because many aspects of social technology are dependent on obstinate human behaviour and hence, social conditions prove more testing to adopt effectively in a different cultural context [5].

2. Methods

The article is based on data and findings that represent a part of a larger PhD study (HREC Approval Number: HRE2020-0743). Extensive literature review was supplemented by media scans to assess the state of affairs in the wake of the two RMG factory disasters occurring in 2012 and 2013 in Dhaka and the following years. Primary data was collected through interviews conducted about three years after the exit of the two external regulatory bodies representing international intervention for safety reform in the RMG sector, viz., Accord and the Alliance; the interviews were conducted with key actors involved in the design, execution, regulation and maintenance of RMG factories and other relevant stakeholders.

Semi-structured face-to-face interviews of key actors and resource persons were conducted using broad interview guidelines. Findings from the interviews comprised the opinions expressed by the interviewees that included practitioners (architects, engineers, etc.), regulators (professionals from regulatory agencies), factory owners or management bodies, global partners (international buyers, International Labour Organization-ILO, etc.) and educators from relevant disciplines

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(architecture, engineering, etc.). The interviews comprised multi-response queries as well as open-ended questions where the interviewees were free to refer to additional related matters and bring insights from their experience and expertise.

This article reports on the responses to questions put forward in the interviews that relate to the effectiveness of safety regulatory reforms in the production nodes within global supply chains introduced by external transnational regulatory regime. These questions sought to assess the difference that external intervention could make through rapid transfer of technology, especially in matters falling within the ambit of social technology. Key actors interviewed were asked to express their level of agreement/disagreement with the following statement: "Almost three years after the exit of the external regulatory regimes, the RMG workplaces are no longer prone to disasters". They were then asked to identify human behavioural traits that, in their opinion, lead to fire hazards in the workplace.

In a complementary questionnaire survey administered to RMG factory workers, workers were asked to state their perception of safety within their workplace. They were also specifically asked about the frequency of fire drills that were conducted in the factories. This particular question was also put up to the owners of those factories who were interviewed, to compare the views of both sides.

3. Literature Review

Interventions by transnational regulatory regimes into developing countries in the global south manifest in three interlinked but not mutually consistent deliberations:

- an acknowledgement that leading supply chain purchasers can actively or inactively serve to influence workplace safety standards in manufacturing factories [6];
- a recognition that developing nations seldom possess a regulatory capacity or rather the willingness to neutralise adverse effects of hazardous workplaces [7];
- the acceptance of the expectation that the authority of multinationals within the global garment supply chain may be utilised to develop local workplace safety standards [8].

In the operation of global supply chains, there are concerns that powerful "global companies can directly or indirectly manipulate weaker regulatory environments both for labour and environmental standards, thereby reducing their costs or lead times" [9]. Broader associations of global stakeholders thus share a joint interest in refining the performance of global supply chains by motivating production centres situated in developing countries to conform to internationally acceptable labour and working standards. This is accompanied by the conventional expectation that stakeholders can influence workers' welfare and workplace safety standards in global production chains through targeted interventions and transfer of relevant regulatory policies and technology, where necessitated.

Towards this end, Martin [9] reports there are two options available to global stakeholders; "the first is 'soft law', with guidelines, and the second is straightforward regulations with mandatory due diligence mechanisms". The Accord on Fire and Building Safety taking over in 2013 after the Rana Plaza tragedy in Bangladesh between some global brands and retailers is an instance of adopting the latter approach [9]. This rigorous approach was possibly opted in response to the gravity of the aftermath underscored by intense global media coverage of the devasting tragedy. Martin [9] further states that the 2013 Accord was replaced in 2021 by the International Accord for Health and Safety in the Textile and Garment Industry. Both were legally binding, although some major brands had not consented to it.

Despite the substantial work done over time towards defining global and industry workplace health and safety standards, much significant divergence remains between countries [9]. This is owing to the diversity of contextual realities of nations where the standards are applied. In the case of industrial relations procedures for example, Philips and Eamets explain that the outcomes are "constrained by cultural norms valuing hierarchy and security. Countries' strategies vary due to

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historical circumstances, resources, and internal political dynamics, including the influence of trade unions" [10] (p.182). This aspect perhaps challenges the effortless delivery of technology reliant on dissolving prevalent societal practices and behaviours. The following literature reviews are based on the identification of the two types of technologies that are being discussed in this article- physical and social.

3.1. Physical and Social Technology

Lemos and Dechandt define 'technology' as the act of "adapting nature to the needs of human survival" [11] (p.514). Technology could be segregated into various parts according to its nature. Technology does not merely cover physical aspects of hardware and software such as those associated with manufacturing, construction, and communication, etc., but also covers social aspects of how people interact, perform, and implement various guidelines or regulations as individuals or as communities. Leibetseder [4] describes 'social technology' as technology that refers to social form and is related to human actions or behaviour. The meanings attached to the term social technology have evolved over the past couple of centuries and currently two main directions of using this term have emerged: (a) human-oriented technologies and (b) artefact-oriented technologies [12].

On the other hand, physical technology is defined as any tangible product that has physical form and is operated by people to perform tasks, for instance, tools, devices, clothing, or even building or construction techniques [13]. Comprehensibly, physical technologies cannot be separated from the society in which they evolve and the communities that avail them.

It is suggested that because "social technology is in itself a process of social, and, therefore, political construction (not just a product), social technology should be implemented according to the given conditions of the specific environment in which it will occur" [11] (p.516). The researchers further emphasize that technologies need to be approached "as a development project to be constructed or considered in terms of its conceptual and institutional basis" rather than as drastic actions. Additionally, the idea to view each technological evolution as a "stage of social development" is stressed upon [11] (pp. 514-515).

In this article, it is contended that interventions by external global actors, i.e., the Accord and the Alliance, to amend safety regulatory regimes of RMG factories in Bangladesh, attempted to transfer both physical and social technologies. It possibly avoided due consideration to conditions of the contextual environment in Bangladesh where they were to be executed. It is further argued that the physical technologies were more promptly embraced than the social technologies because the latter were less attuned to the phase of social development.

3.2. Two RMG Disasters Marking a Critical Juncture in Safety Policy Development

Critical junctures are described as comparatively brief spans of time during which the decisions taken have a high probability of impacting an outcome of interest. The phase classified as a juncture is often abrupt in comparison to the process it activates [14]. Conclusions reached during critical junctures create a status quo which is qualitatively dissimilar from the "usual" or predicted development of institutional interest [15]. High-profile occurrences like the Rana Plaza can mark such "critical junctures" in the initiation of a nation's policy procedures towards safety and sustainability. The policy remediation and reformation of safety regulations in response to the two appalling industrial catastrophes occurring in close succession —the Tazreen Factory fire incident in 2012 and the Rana Plaza structural collapse five months later in 2013, therefore, demonstrate a "critical juncture" in policy development regarding workplace safety regulations in Bangladesh.

3.2.1. The Tazreen Factory Fire Disaster

On the 24th of November 2012, a fire originated on the ground floor of a garment manufacturing factory situated on the periphery of Dhaka, the capital of Bangladesh. The same floor was then illegally functioning as a storage space for yarn, allowing the fire to spread rapidly as it was not confined within a fireproof warehouse as required by law [16]. The fire alarm alerted the occupants

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on the second, third and fourth floors. The blaze that had apparently started from a short circuit, swiftly spread upwards due to the presence of flammable materials on the windowless ground floor [17]. Panic-stricken factory workers attempted to escape but they were soon summoned by the managers to return to their workstations claiming it was a false alarm. Soon after, lights went out and dense smoke reached every corner of the multi-storied factory trapping hundreds of workers inside [18]. However, the workers soon realised the intensity of the situation and hurried towards the exits only to find them locked from outside. Escaping via staircases was not an option as they led to the ground floor where the situation was more severe. Some workers had attempted to escape by either jumping off the building or climbing down the scaffoldings as the fire engulfed almost the entire factory [19]. It took 17 long hours to finally extinguish the blaze the next day [20].

Nearly 117 people died in the Tazreen Fashion Factory fire incident, over 300 workers were severely injured and never returned to work owing to their injuries that had either crippled or disabled them [18]. Among various factors that resulted in the massive death toll, the main causes identified by police investigation were predominantly based on human errors – such as the application of padlocks on collapsible gates and refusal by managers and security guards to permit workers to leave the premises. Moreover, the ground floor stocked with inflammable materials had no walls to hinder the rapid spread of the fire [21]. Fire department officials claimed that fire safety license for the manufacturing factory had expired five months prior to the accident in June 2012. Firefighters also reported that during the rescue operation, they needed to break locks of the gates leading to staircases [22]. The strings of such negligent human errors could have been possibly avoided by responsible and conscientious behaviour of all actors managing or occupying the workplace. They point to a lack of sense of responsibility of various actors that is reflective of a fragile culture of safety. These contextual dynamics of human practices components regarding workplace safety are addressed by social technology, rather than physical technology.

3.2.2. The Rana Plaza Structural Collapse

On April 24, 2013, only five months after the fateful Tazreen Fashion Factory fire tragedy, another garment manufacturing factory building- the Rana Plaza collapsed, killing or injuring thousands of workers who were employed at just 25 US cents an hour [23]. According to Jacobs and Singhal [24], the magnitude of the disaster enhanced awareness regarding underlying structural risks and detriments of sourcing from developing countries, and the urgency to reform supply chain governance mechanisms for better workplace environments.

A day before the catastrophe, workers in the Rana Plaza had reportedly noticed cracks on the walls of the building and that very morning an engineer from the national building control regulatory body had warned the factory owner about the potential structural risks, suggesting evacuation of all occupants [25]. However, following a discussion between the owner and a local government official, the building was pronounced to be safe [26]. The factory workers were directed by the factory management to return to work the next morning to meet the stringent production deadlines. They were threatened with dismissal from their jobs if they disobeyed [27]. On the ill-fated day, six diesel generators, unlawfully placed on the upper floors and weighing a few tons a piece, reverberated into action. The vibrations began to ripple as the entire structure started to crumble down floor by floor generating a monstrous pile of concrete wreckage over thousands of workers [28]. It had taken only 90 seconds for the Rana Plaza building failure to result in 1,134 deaths and over 2,500 injuries, making it the deadliest structural disaster in human history. Hundreds of people remained trapped for days under the debris and the only possible way to free them from the weight of debris and rescue them was by amputating parts of their limbs [29].

The Rana Plaza tragedy resulted from structural collapse blamed on the failure of the building regulatory and development control regimes in place. This was further compounded by a gross disregard for safety concerns by the management amounting to gross criminal negligence. It is a case of failure of physical or engineering technology in terms of the factory building's structural design and execution, and monitoring and maintenance of the building. At the same time, it also points to the absence or failure of social technology that deals with the adoption of a safety culture. Among

numerous human errors and lack of principled judgments that may have initiated the disaster, some basic structural flaws were evidently responsible for one of the worst industrial disasters the world has witnessed to date.

The building owner was arrested four days after the accident along with others from the management team on account of two main charges linked with the collapse: murder and violation of building regulations. In 2016, another 41 individuals were also charged however, extended legal delays on various pretexts have prevented their trials from resuming [25]. Whilst their trials have not resumed to date, the Rana Plaza marked a critical juncture for safety reformations and policy development within the RMG industry of Bangladesh.

3.3. Aftermath of the Critical Juncture

The occurrence of Tazreen Fire closely followed by the Rana Plaza collapse, unmasked the true cost of doing business in Bangladesh to those allured by cheap labour, as facilitated by misuse of power and greed for more profit. A plethora of safety culture concerns came under scrutiny- unstable infrastructure, restricted labour rights, a weak and/or lenient regulatory environment, compromised and/or neglected safety standards, stringent production deadlines, and a permissive supply chain network allowing accumulation of overbearing pressure to meet unrealistic production deadlines from global brands. The RMG industry necessitated the production of fast fashion at low costs, paired with poorly constructed factories comprising risky workplaces for more than four million people [30].

As the death toll of the Rana Plaza disaster was tenfold that of the Tazreen Factory, the reactionary media focus, perhaps disproportionately, shifted their attention to focus structural safety concerns such as those associated with the Rana Plaza over the fire safety issues that had led to the Tazreen Factory disaster. With the public eye shifting from the Tazreen incident to the Rana Plaza disaster, attention diverted from fire vulnerabilities within RMG workplaces to the factory buildings' structural weaknesses.

Nevertheless, a few easily avoidable human errors were unveiled through investigations in case of both disasters. Safety negligence by management bodies and disregard for warnings received in advance (fire alarm in case of the Tazreen, regulator's warning in case of the Rana Plaza) were common in both tragedies [31]. Moreover, factory workers had been coerced and intimidated into continuing to serve in workplaces that had already been identified as potentially unsafe alerting to the possibility of disastrous consequences. The role of powerplay within the country's global supply chain network was hence uncovered through these consecutive factory disasters. These facts point to the absence of a safety culture and practices that are covered under social technology.

The Rana Plaza Incident has been described as a "perfect storm" of inferior conditions and practices where the trajectory of the RMG industry's progress was hindered by exploitation that primarily impacted the most vulnerable and least equipped [32]. These highlighted the absence of adequate safety regimes and governance mechanisms that involve both physical and social technologies. In the aftermath of the wake-up call by the Rana Plaza tragedy, few companies importing Bangladeshi garments withdrew all production activities from the country, addressing the government's failure to employ safety regulations [33]. Fortunately, some retailers and global stakeholders, adopted a more constructive approach to improve workplace conditions within Bangladesh. The Bangladesh Government was thus expected to undertake prompt actions to assist the RMG sector recuperate and improve the overall working conditions to repair the industry's global reputation.

To sustain the industry and the country's economy, the government agreed to the transfer of technology through the advent of transnational regulatory regimes within months of the Rana Plaza collapse. The government's attempt to respond to the garment industry's image repair demands amounted to transplanting foreign regulatory regimes assembled by global buyers primarily based in the global north, into a developing country like Bangladesh. This was perhaps seen as a quicker way to rectify safety issues related to RMG workplaces while satisfying the demands of the global stakeholders. It amounted to a leapfrog approach to transfer the required technology from the north,

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rather than initiating a gradual modification or strengthening of prevalent institutions to build an effective local governance and regulatory system that would promote safety culture.

A game-changing rapid transfer of technology thus occurred within the regulatory system of Bangladesh's RMG sector via the entry of two regulatory regimes: the Accord led by European clothing retailers; and the Alliance led by United States and Canadian fashion companies. These agencies were launched to motivate garment manufacturing factories to conduct safety assessments and remediation [34]. The Alliance and Accord can be seen as global actors facilitating transfer of technology in the RMG sector, representing the interests of global stakeholders whose tenure began after the Rana Plaza collapse in 2013 and ended in 2019 after extension of the five-year agreement.

3.3.1. The Impact of Transnational Intervention

The launching of foreign regulatory bodies and transfer of physical technology exemplified a "retailers to the rescue" pattern where renowned brands and organisations seemingly participated for reputational benefits [35]. During the introduction of the international regimes, few firms manufacturing in Bangladesh affiliated with the Accord, others joined the Alliance, and several had avoided participation in either. While the signatories trumpeted their cooperation, little was revealed about those who had refused to collaborate [36].

The Accord and Alliance shared many similarities as they were both created for the same purpose by similar sets of stakeholders based in the Global North. They were both meant to significantly enhance Bangladesh's existing national building and safety codes and their audit systems and follow-up compliance mechanisms. However, the two also had many dissimilarities in their approach towards the task. These dissimilarities largely reflect the variations prevalent in the home bases of the two sets of global players relating to labour laws and management approaches. The similarities and dissimilarities of these two regimes are shown in Table 01. Despite their somewhat different approaches, both regimes operated for roughly the same period between 2013 and 2019 and received similar support and cooperation from the Bangladesh government. After their exit, the RMG Sustainability Council (RSC) was formed to monitor garment factories; it is a collaborate initiative by the Bangladesh Garment Manufacturers and Exporters Association (BGMEA) and factory owners.

Table 1. Similarities and Differences between the Accord and the Alliance. Source: Adapted from Donaghey and Reinecke [37].

Similarities	**Differences**	
The Accord & The Alliance	**The Accord**	**The Alliance**
-Five-year agreements		
-Inspection of fire, structural and electrical safety of factories	-Started in May 2013, with signatories from all over the world.	-Started in July 2013, with North American brands only.
-Common set of safety standards based on the Bangladesh National Building Code (BNBC)	-Plurarist- resulting in transnational co-determination.	-Unitarist- resulting in industry self-regulation
-Common reporting template		
-Mutual recognition of audits in factories covered by brands under both agencies	-Labour-driven governance	-Corporate-driven governance
-Remediation plans follow inspections and follow-up inspections are conducted	-Credible commitment due to legally binding agreement	-Flexible commitment due to voluntary agreement
-Factories can be declared ineligible for business for failure to implement recommendations	-Exclusion of the Bangladesh Garment Exporters and Manufacturers	-Incorporation of the BGMEA as a partner
-Issuance of Corrective Action Plan (CAPs)		

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	Association (BGMEA) from Steering Committee	
-Aim to establish Occupational Health and Safety Committees within factories		-Focus on developing rapid solutions
-Safety trainings for management and workers	-Focus on capacity building of workers	
-Publication of progress reports on websites		-Buyers and employers share compensation
-Mechanisms to resolve workers' complaints	-In case of factory closure, employers compensate workers	
-Offer of compensation to workers of terminated factories		-Setting up toll-free helpline for workers to report complaints
	-Installing complaint mechanism through collective action of workers, unions and buyers	

3.3.2. Effectiveness of Transfer of Physical Technology against Social Technology

The Accord and the Alliance undoubtedly reduced building safety-related issues and there has been no major incident of structural failure since the implementation of the transnational regulatory agencies. This fact reflects an effective transfer of physical technology. However, problems like low wages, unpaid overtime, abusive supervision, corruption, unethical practices and rejection of unions and collective bargaining have not been resolved and continue within the industry [38]. These issues fall within the ambit of social technology, as they relate to everyday practices and a sense of individual and collective responsibility that define social values that are vital ingredients of a shared workplace safety culture.

The transnational regulatory agencies extensively resolved the apparent structural issues underlying the factory buildings that had resulted in a tragedy like the Rana Plaza. Indeed, the international agencies' most crucial achievement has been that the RMG sector of Bangladesh has not witnessed another structural collapse since the Rana Plaza [39]. Another achievement noted in recent literature in this regard relates to the establishment of 'green' factory buildings in Bangladesh. In less than a decade since the two unprecedented disasters, the country can boast of having the highest number of green RMG factory buildings in the world. There are currently 155 green factories located in Bangladesh that includes 40 of the world's top 100 garment factories [40]. These green factories certified by LEED have been widely publicised by factory owners and management associations as evidence of improved safety standards in the country's RMG sector. The successful transfer of physical technology from developed countries into developing nation is, hence, evident.

However, it has been revealed through several studies that despite rigorous efforts made by the private compliance strategies, both the Accord and Alliance have been relatively ineffective in implementing enhanced fire safety standards. Before discussing the range of justifications for the unsatisfactory outcomes, it needs to be clarified that LEED certification of 'green' buildings does not verify adequacy of fire protection measures but rather focuses on the environmental performance of buildings [41].

4. Revelations through Study

4.1. A Scan of Media and Literature Covering Post Rana Plaza Period

A media scan was carried out particularly after the Rana Plaza disaster in 2013 to determine the state of affairs relating to workplace safety in Bangladesh. While it is noted that not all industrial fire accidents occur within the RMG sector, this sector employing over 4 million people in around 6,000 garment manufacturing factories within and around Dhaka has been identified as the most

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vulnerable section of the city's built environment [4]. Factory fire remains a recurring nightmare which mostly appears to be a consequence of negligence rather than a structural or building design flaw. As reported by The Daily Star [42], in the year 2022 alone, there had been a total number of 24,102 fire incidents claiming nearly a hundred lives, 13 of them being firefighters.

The issues that had culminated into a tragedy like the Tazreen Fire in 2012 were overshadowed and sidelined by those of the Rana Plaza. Perhaps this fact contributed towards allowing fire risks, primarily caused by reckless and unprincipled behaviour by the factory owners and management bodies, to prevail within the RMG industry. In a developing nation like Bangladesh, where workers have limited knowledge and awareness regarding their rights to safe working conditions, incorporation of foreign social technology to enhance safety practices could be challenging. Moreover, corruption, greed, and the allure of more profit, often influence employers to compromise with fire related precautions through procedural shortcuts and deliberate negligence which can more conveniently be swept under the carpet.

Since the debatable exit of the Accord and the Alliance in 2019, regulatory responsibility of the RMG industry of Bangladesh has been taken over by the RMG Sustainability Council (RSC)- an agency that comprises members from the BGMEA (Bangladesh Garment Manufacturers and Exporters Association), government officials and, ironically, a considerable number of garment factory owners themselves. Hence, this "self-regulatory" monitoring system has once again put the garment industry's ethical operation and safety in question.

In this scenario, the media scan reveals a dire situation regarding workplace safety within factories in Bangladesh due to frequent fire incidents. According to a 2022 media report [43], there had been more than 16,000 fire incidents around the country in a decade, 80% of which were related to export-related factories. As reported in the New Age Bangladesh [44], there has been 285,000 fire incidents in the country over the past two decades. Notably, in 2019, the year of exit of the transnational regulatory agencies, Bangladesh witnessed the highest number of fire hazards in a year, with 24,040 reported fire incidents [43]. It was followed by the second highest number in 2020 with a total of 21,073 fire occurrences. On the contrary, no major incident of structural failure has been reported since the intervention by international regulators to date. Most factories observe safety culture in response to pressure faced by factory owners and management from buyers.

According to an article in The Diplomat, there prevails an overt lack of remediation in numerous RMG factories that had been under the Accord, 118 manufacturing factories serving for the brand H&M were found to lack safe fire exits, 159 factories did not have fire alarms, 163 factories did not have sprinklers installed and 44 required immediate attention for remediation [45]. Such shortcomings within factories catering to renowned international brands, ascertain negligence and unethical practice corroborating with factory owners, regulators, and foreign buyers. The prevalence of such shortcomings again points to discounting elements of social technology that seeks to install a safety culture that would discourage such disregard for regulations and promote compliant behaviour.

Literature shows that there is a greater dependence on fire escapes and firefighting measures than on precautionary measures related to maintenance and operation. Matters relating to physical technology that could, for example, lead to structural issues can be clearly and instantly identified during design and construction approval of factory establishments. Moreover, they can also be detected during building inspections. Implementing physical technology through installation of fire safety equipment such as fire extinguishers and structural elements including fire-retardant doors and fire escapes are easy to enforce and monitor. However, implementing social technology relates to more complex aspects requiring incorporation of values, behaviours, and practices, such as conducting fire safety drills effectively and regularly.

The adoption of physical technology requires knowledge and expertise about employing material technology and incorporating technical processes and techniques. These normally relate to design of structures, selection of appropriate building materials and adopting the processes of certification of safety standards to improve safety performance of factory buildings. However, fire safety performance could be drastically compromised by lack of social technology that could allow

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irresponsible management practices such as blocking exits with storage of combustible raw material or locking fire doors to go unnoticed. Such practices whereby noncompliance to safety standards can be kept hidden or temporarily forged to pass safety inspections result from prevalent human behaviour and contextual norms, i.e., aspects covered by social technology. Additionally, the overall context within which physical technology is meant to operate is influenced by its political, social and cultural environments that define the safety culture that could be shaped by adoption of appropriate social technology.

Figure 1 reveals that fire is the most common cause of workplace safety hazards, contributing to 94% of work-related deaths. However, the death toll of a single incidence of structural failure resulting in the collapse of a factory building, the Rana Plaza, can make a much larger impact on public perception (Figure 2). In 2013, Rana Plaza tragedy caused ten times more fatalities than the factory fire at Tazreen Factory in 2012, eclipsing the urgency to resolve fire issues and instead commanding immediate attention to resolving structural failure concerns. Also, while the magnitude of death toll caused by fire over the years is much greater than that by structural collapse of RMG factory buildings in Bangladesh, the fact is lost unless the Rana Plaza disaster occurring in 2013 is discounted from the statistics (Figure 2).

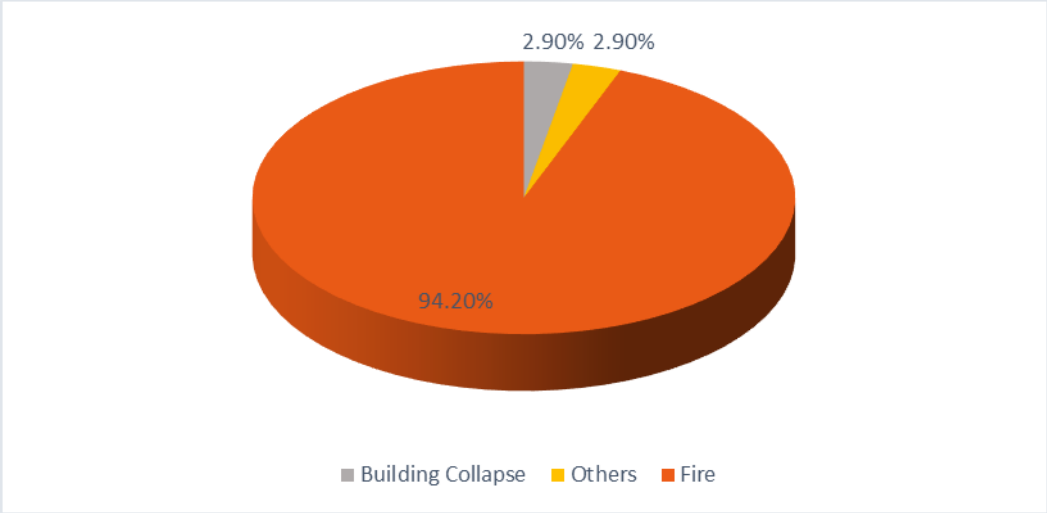

Figure 1. Causes of Deadly Incidents in RMG Industry in Bangladesh till 2017. Source: Solidarity Center [46].

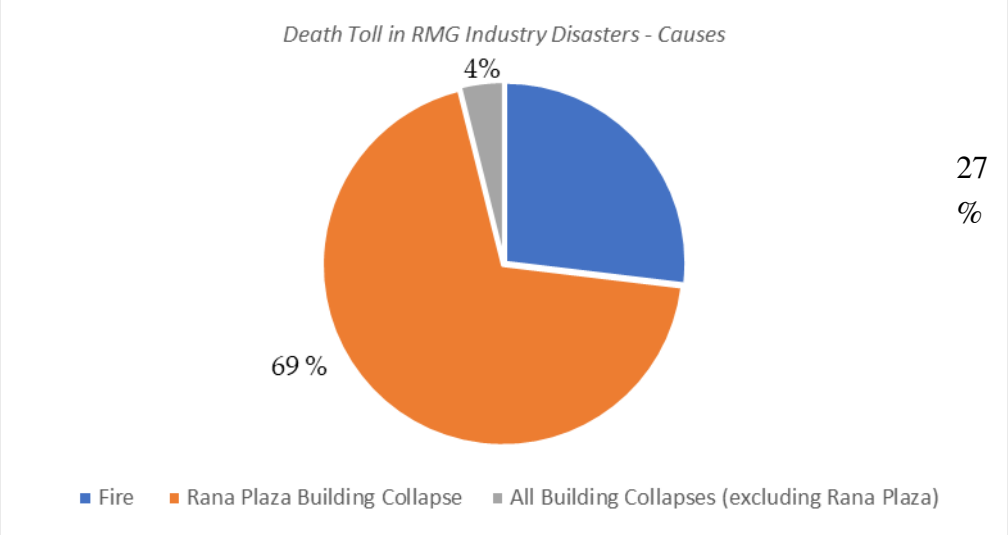

Figure 2. Death Toll in RMG Industry Disasters in Bangladesh until 2017 Source: Adapted from Islam et al [47].

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Although the number and frequency of building collapses that are life threatening have reduced, resulting in a lower death toll, fire incidents continue to occur registering a much higher death toll. In this milieu, it is observed that the country is yet to perpetually resolve the prevalent threats of hazards within RMG workplaces and incorporate comprehensive safety culture related to sustainability [19].

4.2. Interviews and Survey of Key Players in the RMG Sector

To assess the impact made by the intervention on the workplace safety situation within RMG factories in Dhaka, we interviewed and/or surveyed key actors in 2022, around three years after the exit of the transnational regulatory agencies, as part of a larger study. As mentioned earlier, the data and findings represent a part of a larger PhD study. Around 50 professionals playing various key roles within the RMG industry of Bangladesh were interviewed to get an insight into their assessment of the workplace safety situation on the ground. The interviewees included architects, engineers, educators, RMG factory owners and stakeholders. Their responses exposed several underlying concerns that prevail even after the exit of the external regulatory agencies.

When asked whether, after the exit of the external regulatory regimes, Dhaka's overall built environment including the RMG workplaces was less prone to disasters, only a little over a quarter (27%) of the interviewees responded in the affirmative. Meanwhile, almost two-thirds (64%) either disagreed (38%) or strongly disagreed (26%) with the assertion. This puts a serious question mark on how the achievements of the transnational intervention are perceived among those who play a key role in the design and maintenance of RMG factories, even though no structural failures resulted in RMG factories following the intervention.

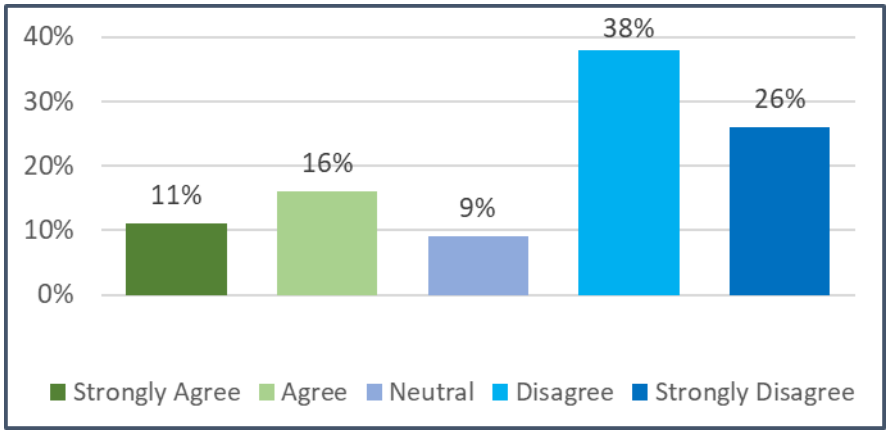

Figure 3. Key Actors' Response to Statement: "Dhaka's built environment is now less prone to disasters".

The interviewees were then asked to choose from a list of human behavioural traits those traits that they believe lead to the creation of workplace hazards. The most cited traits interviewees collectively identified were greed, unethical practices, and negligence (Figure 4). In follow-up questions, interviewees revealed that these traits were most commonly found among practitioners, regulators, factory owners as well as international buyers. This response provides an insight into the contextual reality within which RMG factories operated and were managed in Dhaka after the technology transfer by external transnational regulatory agencies. It suggests that aspects of reform attributable to transfer of social technology had not materialised.

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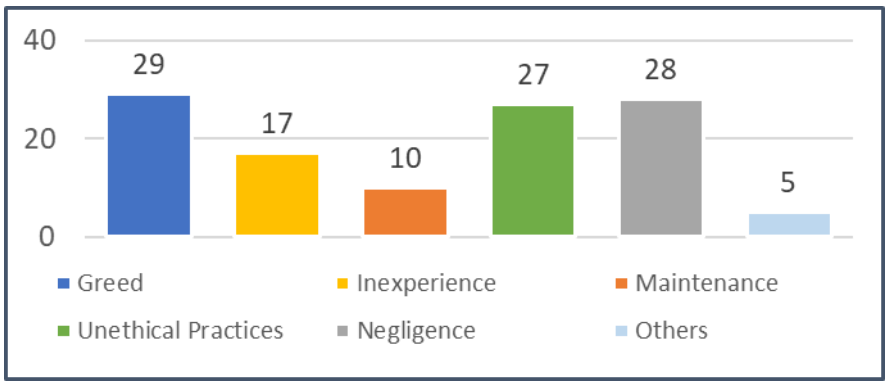

Figure 4. Distribution of Key Actors' views on Major Human Traits Leading to Workplace Hazards.

A survey of factory 50 workers who are the primary users of RMG factory buildings and also those most affected by workplace incidents was carried out. They were randomly chosen from nine different RMG factories. The workers were asked whether they felt the factory they worked in was safe. The majority (62%) of the workers reported they did not consider their factory to be safe while only 28% felt it was safe (Figure 5). It is notable that a significant proportion (12%) of respondents chose not to comment on this question. This could perhaps have been the case of fear of being reprimanded by their employers. In any case, the majority response again points to a rather negative image about the perceived safety of operation and management of RMG factories.

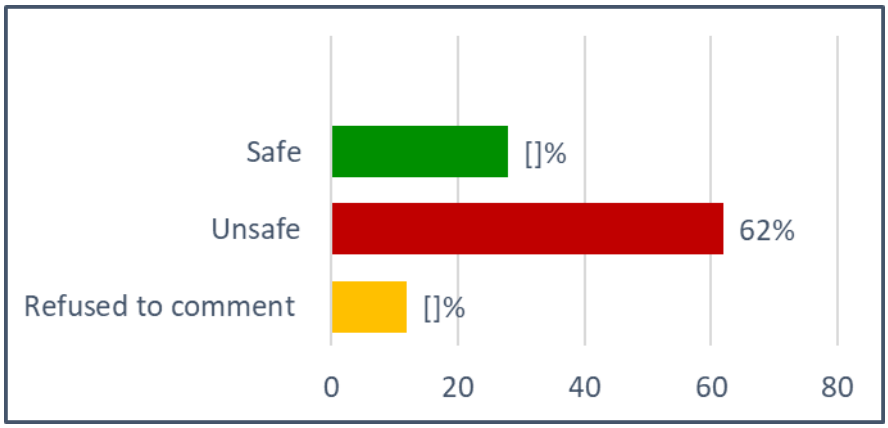

Figure 5. Workers' Perception of Safety in their Workplaces.

Interestingly, when the same question was put to the owners of those nine factories that were interviewed, it derived an almost unanimous positive response confirming the perceived safety of the factories (Figure 6). The only one respondent responding differently, maintaining that despite adopting the most stringent precautions, destiny could play a role in jeopardising workplace safety.

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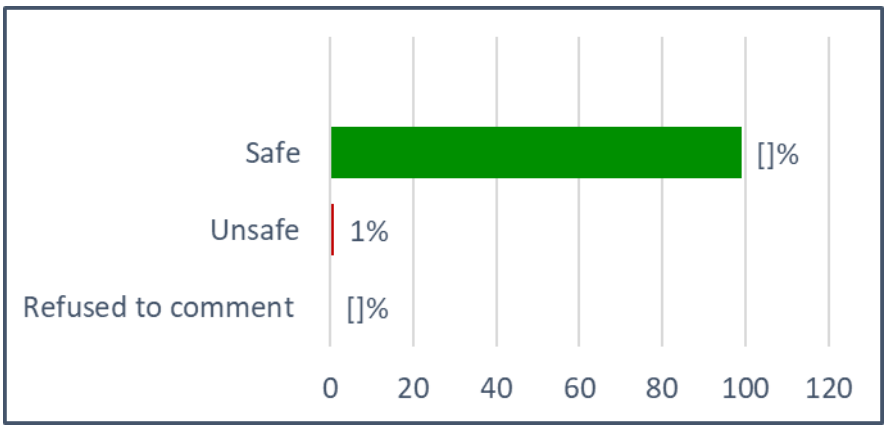

Figure 6. Factory Owners' Perception of Safety in their Factory.

Another question in the factory workers survey sought to confirm workers' perception of negligence and reluctance on part of the management bodies to undertake action to safeguard workers and eliminate potential workplace injuries. The workers were asked about the frequency of safety drills which the factory management bodies are committed to conduct to improve their safety and wellbeing in the event of a fire incident. More than half (58%) of the workers reported that in their opinion, the drills were not conducted regularly, while one-third (33%) found them to be regular and 9% workers chose not to respond (Figure 7). Interestingly, when the same question was put up to factory owners who were interviewed, the results were strikingly different. An overwhelming majority (97%) of factory owners believed the fire drills were conducted regularly, while an insignificant minority (3%) reported otherwise (Figure 8).

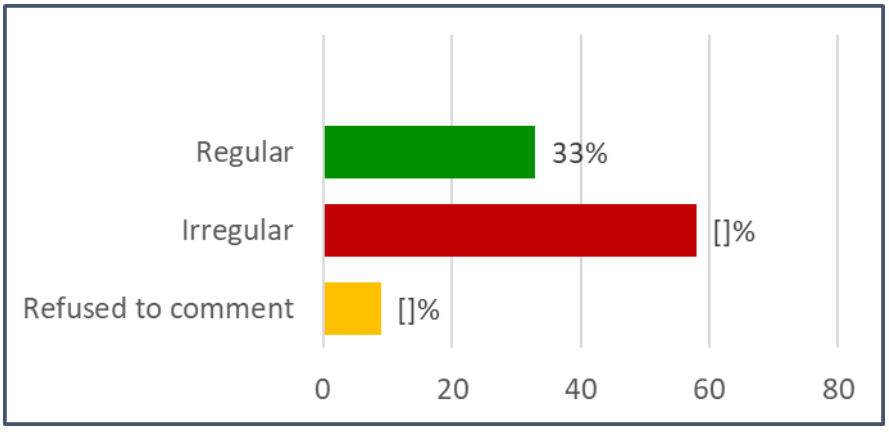

Figure 7. Factory Workers' Perception of Regularity of Fire Drills.

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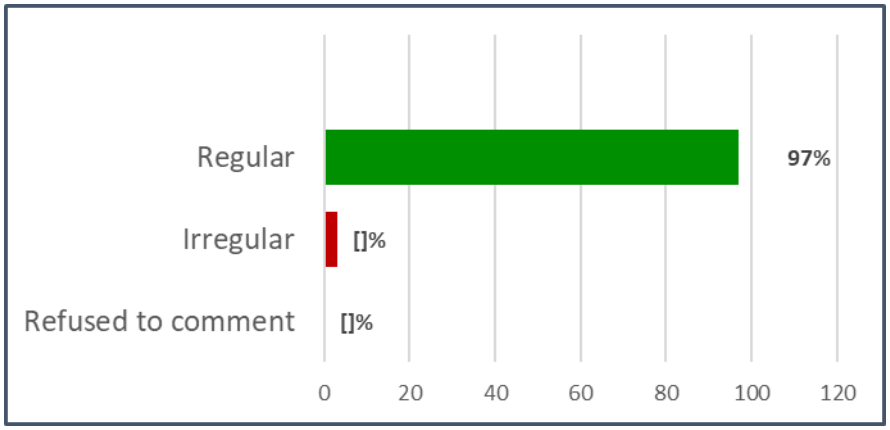

Figure 8. Factory Owners' Perception of Regularity of Fire Drills.

Summary of Findings

The dissimilarity in the responses of workers and owners is cause for skepticism. This may be seen as a case where the fire drills are actually not being conducted regularly as the workers perceive. The response from factory owners would then suggest as cover up by them at worst, or lack of awareness of ground conditions in the factories at best. In case the fire drills are being held regularly but perceived as being irregular by factory workers, the situation may be different, but equally alarming. This would suggest that perhaps the fact that fire drills are not be pre-scheduled pre-announced events but occur without notice are seen as irregularity of their implementation. If this were the case, it indicates that there is a lack of communication and awareness among the factory workers about the purpose of the drills. This indicates there is a need to apply social technology to create general awareness among all stakeholders about their rights and responsibilities in guaranteeing the safety of the workplace. While the fire extinguishers and other fire safety equipment may be present, they may not be employed appropriately by factory workers exposed to a fire hazard.

5. Discussion of Findings

Much of the achievements made regarding workplace safety in RMG factories may be attributed to transfer of "physical technology" that involved incorporating technical equipment, adoption of specifications of building design and construction techniques and building in monitoring and certification processes. The processes covered are those that can be easily envisaged as part of structural design and production planning with clearly identified crucial checks and cross-checks for safety compliance. These can be seen as technical tasks to be carried out at specific instances by specified personnel. These are different to actions carried out daily as part of generally adopted cultural practice or human behaviour which do not require the incorporation of compliance monitoring.

It has been argued that the regulatory initiatives are significantly influenced by the magnitude of stakeholder pressure and the intensity of compulsion created on the manufacturers to improve working conditions [48]. It may be summarised from the discussions that while physical technology transplantation resulting from post-disaster pressure of global attention did open the door for structural improvements in regulatory and safety regimes in Bangladesh, fire incidents still continue to threaten the RMG workplaces of Bangladesh. Moreover, this fact raises questions regarding the prospects of successful social technology transfer from developed countries to developing countries of the global south.

The gap in adaptation of social technology to meet international standards of safe workplaces is reflected in the series of fire incidents that happen within the country. Almost 94% of disasters are found to be caused by fire, 3.03% by building collapse, and the remaining by other factors [49]. A

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number of schemes and initiatives were undertaken to curb the frequency and severity of fire accidents, without much success.

Factory workers have limited knowledge about safety culture as the relevant policies describing roles and responsibilities of workers and managers are not prioritised by factory management nor by regulating agencies. Workers' ignorance and the management's negligence of Occupational Health and Safety (OHS) often leads to breach of safety standards. They can often lead to fire hazards in factories that, according to [50], have high Fire Risk Index (FRI) indicating fire regulation standards below acceptable levels.

It is clear that the safety culture has not evolved from reformed social attitudes and behaviour leading to a sense of responsibility towards sustaining the industry, aspects covered by social technology. Factory management largely tend to be more willing to comply with the material aspects covered under physical technology while continuing to ignore basic building safety issues in the absence of safety culture. Even then, many factories are found to be lacking in adopting the material aspects of physical technology as well.

It is assumed that fire safety requires recognition and ownership of responsibility – ethical considerations and knowledge about actions and their consequences. The assumption that consequences of non-compliance of legal regulations can be avoided by the powerful elite, is perhaps the reason why this segment of suppliers can afford to remediate their factories and continue to gratify international brands and retailers. Much of the remaining RMG industry either cannot or will not spend on safety enhancements, consequently leaving their workers at risk [51]. Although significant building safety improvements have been achieved, factory workers had little to contribute in the progress in spite of being the group that is mostly at risk and impacted most by workplace disasters. Owing to the robust powerplay within Bangladesh, the huge social gap between factory owners and workers still prevails. Responses reported in Figures 5 and 7 show that a considerable number of workers abstained from commenting on safety related questions which could indicate the prevalence of fear among workers. This reinforces media reports of situations leading to intimidation, threats, violence or loss of employment when workers voice their demands. Government-imposed obstacles to formation of workers' unions deprive workers collective power required to hold employers accountable for maintaining workers' rights that includes a guarantee of safe workplace. Therefore, disasters resulting from human errors, unethical practices and sheer negligence are more common. These are all elements that depict the country's contextual norms dominating ground realities that would be improved through adoption of social technology.

5. Conclusion

The Rana Plaza structural failure obscured the Tazreen Factory fire accident, diverting the focus from prevailing fire issues to structural integrity. The death toll of over a hundred people at the fire incident appeared insignificant in comparison to more than ten times that due to the structural collapse. This seems to have lowered the priority of fire safety reformation by the transnational regulatory agencies that intervened, and fire risk remains high to date. The advent of these agencies to transfer safety technology have evidently resolved the structural shortcomings in factory buildings to a great extent but the recurring fire incidents in the industrial buildings have repeatedly attributed to safety lapses within the rapidly growing RMG sector. The successful transfer of physical technology is evident in the effective prevention of another structural failure since the Rana Plaza as well as the construction of green RMG factories in the country. But human behavioural and ethical issues constituting social technology, that contribute to fire hazards failed to have been effective in inspiring a safety culture within Bangladesh to provide workplaces free of threats of fire.

The RMG industry of Bangladesh should recognise the urgency to resolve fire issues. Although the reformations brought about by external intervention by the Accord and the Alliance have been praiseworthy, the reality is that practices within the RMG industry of Dhaka persist to fail to deliver a fire resilient, safe workplace. Despite amendment of laws, implementation of stringent regulations and practice of regular inspections, the cause of violations of compliant procedures is rooted in ethics. Willful negligence or even managerial incompetence can cause horrific hazards. Even in structurally

sound and safety compliant RMG factory buildings, operational and managerial negligence of fire risk avoidance could result in more incidents like at the Tazreen Factory tragedy or perhaps magnified in scale. The effective impact of transfer of physical technology via transnational agencies is obvious but social technology from developed countries into the developing nation of Bangladesh, is yet to be successfully transplanted.

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