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Assessment and Improvement of Safety Climate in Readymade Garment Industry

A Study from Bangladesh

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Dewan Ahsan

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Abstract

Safety culture or safety climate concept has become much more attractive to the researchers, academicians as well as different industry personnel worldwide after the Chernobyl accident in 1986. The wave of this concept is very new to the readymade garment (RMG) industry of Bangladesh amidst frequent accidents like the Rana plaza building collapse in 2013, the Tazreen fashion fire in 2012 etc.

This study focused on measuring safety climate level in the RMG factories of Bangladesh through a questionnaire survey in connection with the frequent accidents in three factories. The result showed that, a positive safety climate exists in the case study factories and these factories haven't had experience any accident over the last few years. Factor analysis was performed to see which factors represent safety climate in the RMG industry of Bangladesh. Three factors or components namely 'safety management and employee's involvement', 'management safety priority, ability and justice', and 'worker's trust and safety communication' explain the safety climate. The principal component analysis method was used with varimax rotation for the factor extraction.

This study also focused on the relationships between the demographic characteristics of the respondents and safety climate or its factors. Interesting results came up in this study. Educational qualification of the respondents has negative impact on the overall safety climate as well as on 'safety management and employee's involvement', 'management safety priority, ability and justice', and 'worker's trust and safety communication'. Managers have negative safety climate perceptions compared to that of workers. Those who heard about safety culture before, have negative perceptions compared to those who haven't heard about safety culture before the survey. And the same goes for if the safety culture was known to the respondents.

Some suggestions from the respondents regarding safety climate improvement in the respective factories was collected in this study. They put much more emphasis on the implementation of the existing laws and regulations as well as on the commitment, safety communication, management's safety priority and leadership in the factory level of the industry.

Stakeholder analysis suggests that the employer and worker associations should place more concentration on the workplace safety to improve safety climate in the RMG industry of Bangladesh.

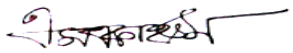
Preface

This report titled 'Assessment and Improvement of Safety Climate in Readymade Garment Industry- A Study from Bangladesh' is written as the fulfillment of the requirement of 30 ECTS master's thesis report for the 2-year master study program in risk and safety management, Aalborg University, Esbjerg, Denmark. This study report has been carried out in the 4th semester of the study program (From September 2019 to January 2020) and accomplished in collaboration with the three apparel factories in Bangladesh and, the Department of Inspection for Factories and Establishments (DIFE).

This study is intended for the persons and organizations who have interest in the ready-made garment (also named as apparel) industry, occupational health and safety, working environment, safety climate, multivariate regression analysis and stakeholder analysis.

This report consists of seven chapters and outline of the report is presented in page 14. The reference style used in this report is APA.

Finally, I would like to express my gratitude to my supervisor, Dewan Ahsan, for his kind support and guidance throughout the project study. I would also like to thank the respondents of the survey and the officials of DIFE, Mymensingh for their cooperation.



Abdul Kaium
Esbjerg, Denmark
06 January 2020

Table of Contents

Table of Figures

Table of Tables

Acronyms

Accord	The Accord on Fire and Building Safety in Bangladesh
ACSNI	Advisory Committee on Safety of Nuclear Installation
BGMEA	Bangladesh Garment Manufacturers and Exporters Association
DIFE	Department of Inspection for Factories and Establishments
EPZ	Export Processing Zone
FA	Factor Analysis
FSCD	Fire Service and Civil Defense
HSE	Health and Safety Executive
IAEA	International Atomic Energy Agency
IOSH	Institution of Occupational Safety and Health
ILO	International Labor Organization
ISO	International Organization for Standardization
KMO	Kaiser-Meyer-Olkin
MoLE	Ministry of Labor and Employment
MANOVA	Multivariate Analysis of Variance
NGO	Non-Government Organization
NOSACQ	Nordic Occupational Safety Climate Questionnaire
NI	National Initiative
OLS	Ordinary Least Squares
PCA	Principal Component Analysis
RMG	Readymade Garment
SC	Safety Climate
SD	Standard Deviation
SPSS	Statistical Package for Social Science

1 Introduction

Occupational accidents are very much unexpected as they create human suffering as well as costs for individuals, society and organizations. In recent years, the awareness regarding the importance of safety performance and safety management has been increased resulting less frequency of the number of occupational accidents over a few decades in Europe (Hudson, P., 2007). There are clear evidences that safety climate which is an aspect of organizational climate plays essential role in reducing accidents in organizations (Kines, P., Lappalainen, J., Mikkelsen, K. L., Olsen, E., Pousette, A., Tharaldsen, J., ... & Törner, M., 2011).

After the Chernobyl disaster in 1986, the concept of safety culture has become popular in the developed countries. Different studies have been going on regarding connection between occupational accidents and safety climate in organizations. Some researchers opined that, introduction of positive safety culture can help reduce occupational accidents (Kim, Y., Park, J., & Park, M. , 2016).

Due to the lack of consensus about safety culture concept, different definition comes up in the literature. Although there are some difficulties in pointing out the difference between safety culture and safety climate, a lot of aspects has been emerged. The safety management systems are turning into proactive from reactive in recent years and perception about accidents is changing from machine to human error. Although, Organizational culture, safety culture, safety performance all are different terms, but they are connected to each other in terms of realization.

In developing countries like Bangladesh safety culture or climate is very new concept whereas the developed countries have already found out the connection between accidents and safety climate in organizations (He, A., Xu, S., & Fu, G., 2012). Studies show that accidents have become very common over the last decade in the top export earner industry namely the RMG of Bangladesh (Hasan, M. M., Mahmud, A., & Islam, M. S., 2017). New laws and rules are being enacted in this vital sector following the guidelines from the international organizations like the ILO. But, why the number of accidents hasn't been decreasing?

This study has focused on the assessment of safety climate level in the RMG industry of Bangladesh through a questionnaire survey in three randomly chosen case study factories. As it mentioned above that safety climate level has impact on accident occurring in industries, the future improvement may best be realized through the existing safety climate level in the RMG industry (Cox, S. J., & Cheyne, A. J. T., 2000). Moreover, it is to be identified whether demographic characteristics have any impact on the safety climate level in organizations.

Perceptions of the employees working in the industry regarding improvement of safety climate level in the RMG factories are vital for the employers as well as government agencies to take further initiatives. This study also focused on the stakeholder's interest and power regarding safety climate improvement in the industry.

Literature regarding safety culture or climate is available but there is a huge lack of research regarding safety culture in the RMG sector of Bangladesh. The safety climate literature for other sectors like manufacturing, construction etc. in different countries has been used in this study.

1.1 Background Information

The readymade garment (RMG) sector of Bangladesh has been making crucial contribution to its economy over the last several decades and it has become one of the major catalysts for the development of the nation. This sector is the largest single export earner which is accounted for 81% of the total export earning of the country with about 4800 factories (Hasan, M. and Mahmud, A., 2107).

Bangladesh has become the second largest RMG exporter in the world with about four million workers in the sector by capitalizing the cheap sources of labor over the last few decades (Alam, M. N., Azim, M. T., & Alias, R. B, 2017). The RMG business started its journey in 1970s and it has been a long way to come to this world second position followed by China. This sector also has a massive contribution to the women empowerment of the country. Approximately, 80 percent of the workforce of this industry is rural women (Arefin, M., Islam, N., & Bapi, A., 2017).

Figure 1 shows the contribution of the RMG industry towards Bangladesh economy over the last few years. Along with the total export, RMG export has been increasing year by year and it is evident from the Figure 1 that the total export of the country depends on the export of RMG products.

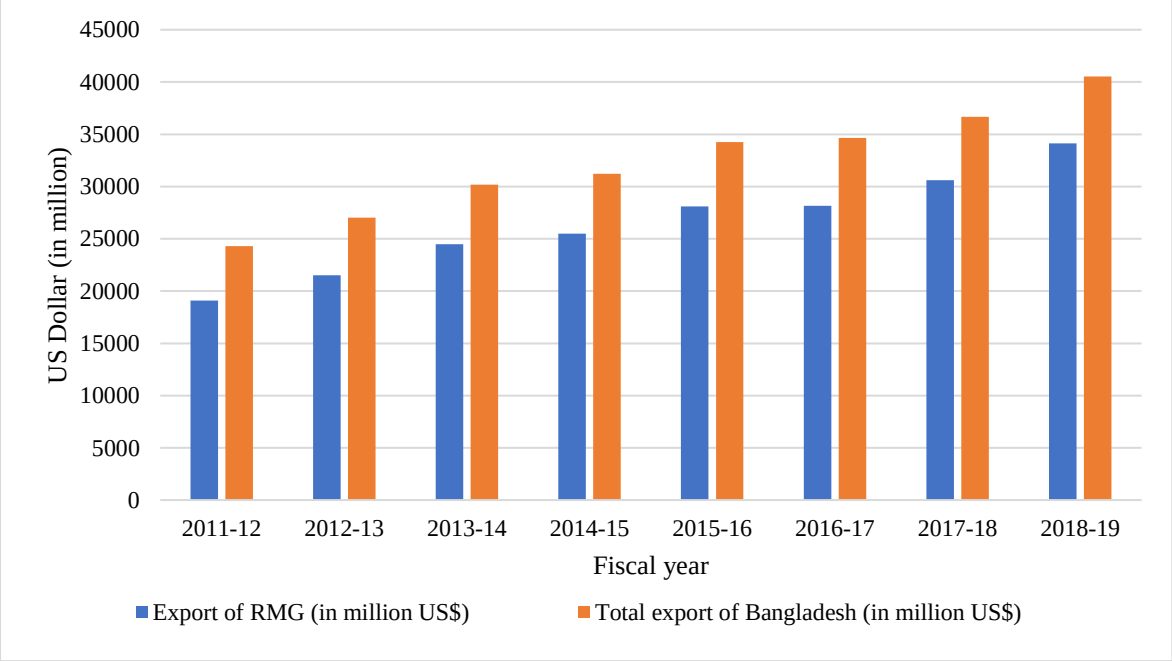


Figure 1: Contribution of the RMG sector to the Bangladesh economy (BGMEA, 2019).

During this journey, Bangladesh has experienced several tragedies concerning decent workplace. The Rana plaza collapse in 2013 resulting 1134 dead and over 2500 injured, and the Tazreen fashions fire in 2011 resulting 112 dead and more than 200 injured are the recent example of the workplace condition in this country (Kaium, A., Hasan, S., Mehmood, S., Ahmed, S., Kristensen, A. and Ahsan, D., 2019).

Table 1 represents the accidents occurred with injuries and fatalities in this industry over the last decade. After the Rana Plaza tragedy, the national and international stakeholders have taken various steps to make the workplace safe for the four million people working in this industry (KAIUM, A., HASAN, S., Ahmed, S., Mehmood, S., Kristensen, A., & Ahsan, D., 2019). Special taskforce was formed headed by the government agencies with buyers and brands. To carry out remediation activities, the North American buyers and brands formed the Alliance, the European buyers and brands formed the Accord, and the Bangladesh government formed the National Initiative supported by the ILO. The three initiatives started remediation of 3780 factories in 2014. Out of 3780 factories, the remediation program of 714 factories has been completed by the Alliance, 1133 factories by the Accord and the rest is ongoing by the NI (The Alliance, 2018; The Accord, 2019).

Table 1: Accidents in RMG sector of Bangladesh (Hasan, M. M., Mahmud, A., & Islam, M. S., 2017).

Year	No. of accidents	Fatalities	Injuries
2016	1	34	70
2015	3	0	38
2014	9	4	37
2013	23	1173	2864
2012	18	114	741
2011	1	2	62
2010	2	50	75
2006	3	69	295
2005	2	92	174
2004	1	7	50
2001	1	24	100
Total	64	1569	4506

The Rana Plaza tragedy was a wakeup call for the local and international stakeholders including workers, leaders, government agencies, employees, employers, buyers and retailers across the world. This wakeup call iterates the fact that despite the benefits that the sector has been providing to the global consumers and buyers as well as to the domestic workers and its people, this sector needs more attention to make it safe and sustainable in the long run (As-Saber, S., Wilson, B., Waheduzzaman, W., Islam, S., 2016). Considering the contribution of this industry to the economy, more attention should be given by the stakeholders as well as the researchers for the development of the occupational safety and health in the industry.

1.2 Problem Analysis

Alam, M. N., and others identified several issues contributing to non-compliance in the RMG industry of Bangladesh e.g. non-entrepreneurial background of factory owners, low literacy level of workers, owner's tie with the political power base, non-existence of trade union, lack of professionalism in managements etc. They also opined that a handful of RMG factories, mostly located in the EPZs, comply with the expected level of occupational health and safety standards (Alam, M. N., Azim, M. T., & Alias, R. B, 2017). Here could be a debate on this issue of noncompliance. But this leaves research scope that why these few factories are compliance. This could be the outcome of organizational culture which varies organization to organization.

Although the RMG business has been expanding over the last decades, a safe and decent workplace couldn't be ensured by the agencies concerned. Bangladesh government and other national and international stakeholders have also been making efforts in ensuring workplace safety in this vital sector. Bangladesh government has strengthened its labor inspectorate, enacted laws and regulations regarding safety. There is a lack of research that why these regulations have not been working as expectation in this sector. It can be mentioned here that in the investigation report of the Chernobyl disaster, the IAEA described that it was the behavior and thinking of the employees of the nuclear plant that contributed to the disaster not the laws or regulations (International Nuclear Safety Advisory Group, 1986).

The safety culture concept can play important role in this regard. The concept deals with the perception of the individuals or groups regarding values, beliefs, attitudes, commitment etc. (Choudhry, R. M., Fang, D., & Lingard, H., 2009). Hale and Hovden noted that occupational safety and health management systems are not effective where the safety culture is poor (Hale, A. R., & Hovden, J., 1998). So, to make the safety management systems in the RMG sector of Bangladesh effective, employers first need to diagnose the safety climate level of their organization and take measures accordingly. Not only the employers, but also government can assess safety climate in different sectors and set its priority accordingly for further steps for improvement.

It is important to know the factors that have impact on the safety climate perception, and the relationship between the employee's characteristics and safety climate factors. If the relationship is known, safety climate level can further be improved in the industry. As the RMG sector has become the strength of Bangladesh' economy, it deserves to be the prime research topic for the safety researchers in achieving a positive safety climate in this industry.

1.3 Research Objectives

The overall objective of this study is how to improve safety climate in the RMG industry of Bangladesh to reduce accidents. To do so, the existing level of safety climate needs to be measured, and the factors related to safety climate in the RMG sector need to be identified. There are characteristics that may have influence on the overall safety climate or its factors. These relationships need to be analyzed for further improvement of the industry. And, how these relationships can be improved and what would be the role of stakeholders in this regard? To fulfill the main objective of the study, some specific objectives are posed as stated as follow:

- What is the level of safety climate existing in the case study factories?
- What are the factors that have influence on the safety climate of the industry, and what are the relationships of the factors or dimensions of safety climate with employee's demographic characteristics?
- How to improve safety climate in the factories as well as the RMG industry based on respondents' suggestions and the findings of this study?
- Who are the key stakeholders and what are their roles to improve safety climate in the RMG sector of Bangladesh?

1.4 Problem Delimitation

This thesis study only covers three RMG factories in Bangladesh and it doesn't cover the whole RMG sector of Bangladesh. Only the safety climate level of these three factories has been analyzed throughout the research study. Due to time and other constraints, the sample size couldn't be impressive from statistical view. The implementation of the recommendations made in this study is out of the scope as well. The name or information about the factories and participants can't be published in this report due to the data protection of the individuals and organizations. Due to the small sample size, it is not possible to say that the findings of this study reflect the whole RMG industry of Bangladesh.

1.5 Report Outline

Chapter one of this report describes the objectives of the study as well as the background and importance of the industry, the problems that are being faced by the RMG industry over the last decade. This Chapter also describes the limitation of the study.

Chapter two analyzes the theoretical concepts of the safety culture, safety climate etc. from different literature. This part also emphasizes on the research studies carried out on this topic and the elements used by the researchers in different industries.

Chapter three presents the method and materials used in this study. The materials like choosing a questionnaire (NOSACQ-50), statistical analysis software SPSS and, the methods like how the survey and data collection were carried out etc. are explained in this chapter of this research paper.

Chapter four narrates the results from the statistical analyses e.g. factor analysis, multivariate regression analysis specially the MANOVA and the OLS.

Chapter five analyzes the result from the previous Chapter. It explains the result and suggest recommendations for the improvement of the results.

Chapter six summarizes the whole research study and its key findings.

Chapter seven discusses the future scope that can be performed if there was no delimitation of this study.

2 Literature Review

Theoretical analysis has been performed in this chapter. Definition of safety climate, how this concept comes to the research study, and how the researchers or scholars explain or measure this concept etc. will be discussed in this chapter.

2.1 Organizational Culture

Organizational culture is the parent concept of safety culture and it is defined as critical for any organizations' success or failure (Glendon, A. I., & Stanton, N. A., 2000). According to Garves, the prime function of culture is to contribute to organization's success (Graves, D., 1986).

There are two popular approaches in defining organizational culture namely functionalist and interpretive. The first approach assumes that organizational culture exists only to meet the corporate interest and it supports organization's ideologies, strategies, goals and systems to control or coerce (Smircich, L., 1983). The interpretive approach assumes that organizational culture is an emergent phenomenon of social grouping and it works as the medium for all members of an organization to interpret their collective identity, beliefs and behaviors (Waring, A.E., 1996a). That means organizational culture is not owned by any group rather it is created by all the members of organization.

2.2 Safety Culture

The term safety culture was first coined after the Chernobyl disaster in 1986. And, it was used in the accident summary report prepared by the International Atomic Energy Agency (IAEA) to describe how the thinking and behaviors of the employees regarding safety contributed to the nuclear plant accident (International Nuclear Safety Advisory Group, 1986).

Later the Advisory Committee on Safety of Nuclear Installation (ACSNI) investigated some disasters including the Chernobyl, and they opined that the breakdowns didn't occur due to the fault of safety management of the respective organizations rather they took place due to the lack of safety culture. And, they drew lesson that the creation of corporate culture or atmosphere where safety would be the number one priority is essential for organizations (ACSNI, 1993). The ACSNI Human Factors Study Group defined the safety culture as "the product of individual and group values, attitudes, perceptions, competencies and patterns of behavior that can determine the commitment to, and the style and proficiency of an organization's health and safety management system" (ACSNI, 1993).

In aligned with the concept of organizational culture, a range of meanings has been attached to safety culture in which three of them are reviewed by the Institution of Occupational Safety and Health (IOSH, 1994). The first one refers the aspects of culture that affect safety. The second one includes the shared values, attitudes, beliefs and practices relating to safety and effective controls. The third one concerns to the product of individual and group values, attitudes, competencies and commitment to the safety programs (Health and Safety Commission, 1993).

According to the IAEA, there are five elements of a positive safety culture (IAEA, 2006). Firstly, leadership commitment to safety by top management. Secondly, safety should be communicated as a value, not as a priority and that cannot be traded. Thirdly, accountability of the management and decentralized decision-making system. Fourthly, employees need to learn

about safety and contribute to improving safety by sharing their experiences, knowledge etc. Finally, a positive safety culture is one where safety is the ultimate priority and it is exercised in every aspects of the management procedure. Among the above mentioned five characteristics, the leadership commitment is the key to developing a positive safety culture (Kim, Y., Park, J., & Park, M. , 2016).

Turner, et al 1989 initially provided a characterization of safety culture as the set of beliefs, norms, attitudes, roles and, social and technical practices that minimizes the exposure of employees to situations considered dangerous or injurious (Turner, B. A., 1989, November).

Pidgeon identified three main elements of safety culture such as norms and rules for dealing with hazards, attitude towards safety, and reflexibility on safety practice (Pidgeon, N. F., 1991). The norms and rules that governs safety within the organization is the heart of the safety culture. These corporate guidelines shape the actions, perceptions of an individual or a group of people working there. The attitude is the belief of the people towards safety as well as to the management. This is about the commitment regarding the safety priority. The reflexibility means the freedom of expression among the co-workers about the safety and procedures in the organization (Pidgeon, N. F., 1991).

It is argued that safety culture represents a new way of conceptualizing the risk assessment and risk management in organizations (Pidgeon, N. F., 1991). But the problem is having no boundary or specific definition for the term safety culture. Researchers made lot of efforts in limiting boundaries for the safety culture idea, but it became tough for them to come to a concurring definition. It happened due to the abstract understanding of the term safety culture like beliefs, attitudes, values etc. Safety culture is the most important part of the safety management system in organizations and a positive safety culture help reduce accidents in enterprises (He, A., Xu, S., & Fu, G., 2012). It can be said from the understanding of the safety culture that a positive safety culture is a prerequisite for sustainable development as well as quality production in the RMG sector.

2.3 Safety Culture Model

A safety culture model describes the manner where safety culture is thought to be implanted in the organization's practice and safety management systems (Choudhry, R.M., Fang,D., Mohamed,S, 2007b). So, organizational culture has a great impact on safety culture. The psychological functioning in terms of individual and environmental factors in personal behavior engagement was first explained by the Social Learning Theory and Social Cognitive Theory (Bandura, A, 1977, 1986). Due to the strong relationship between safety culture and organizational culture the interplay of people and organization regarding safety is reflected in some safety culture models (Fang, D., & Wu, H., 2013). Jacobs and Haber tried to construct a model adjusting safety culture into organizational culture but didn't work out (Fang, D., & Wu, H., 2013). Later, a socio-technical model of safety culture comprising safety management, safety culture and socio-technical systems was developed to present the interplay of people, technology and organization in their relation to safety (Grote, G., Künzler,C, 2000).

Another popular safety culture model that is presented in Figure 2 was developed by Gellers and it is known as safety triad (Geller, E. S. , 1996). It presented the basic factors and theory of safety culture in safety triads namely person factors, environment factors and behavior factors. These three domains explain the safety culture through the factors. The 'Safety Triad' illustrated the composition of the safety culture but it didn't illustrate the inter-relationship among the triads (Fang, D., & Wu, H., 2013).

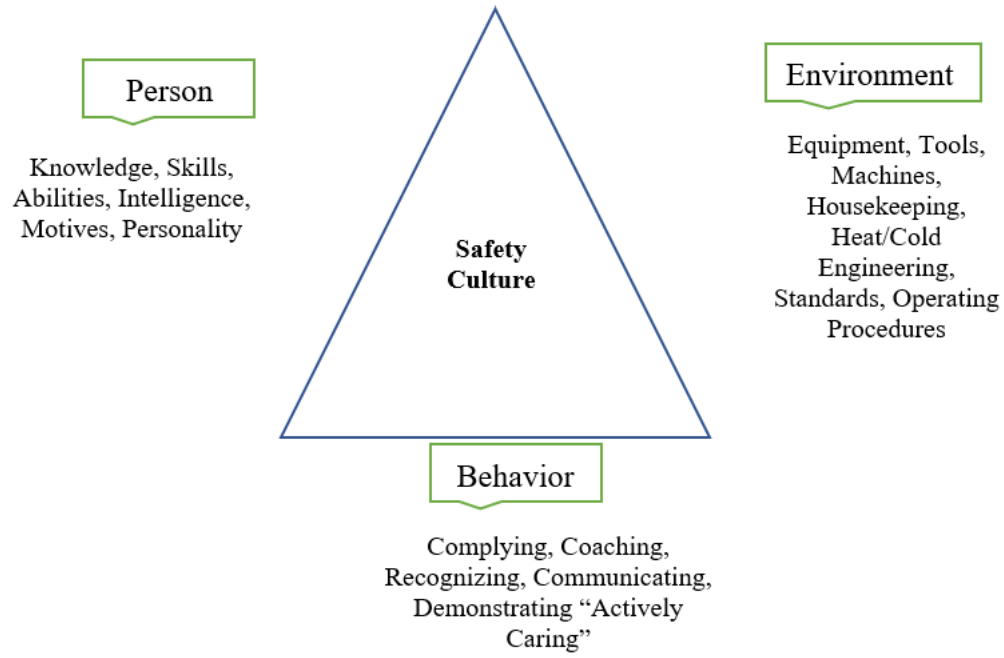


Figure 2: Safety culture model (Geller, E. S., 1996).

2.4 Safety Performance

The safety performance means the use of all available resources to achieve the safety goal of an organization. Theoretical and empirical studies confirm the relationship between safety culture and safety performance. Safety performance is the external expression of the organization about dealing with safety (He, A., Xu, S., & Fu, G., 2012). K. J. Nielsen found in a study through comparison between two homogenous enterprises that excellent safety culture can effectively reduce accidents and improve safety performance (K.J.Nielsen, K.Rasmussen, D.Glasscock, S.Spangenbe, 2008). Cooper also found the correlation between safety culture and safety performance in his study (Cooper M.D., Phillips R.A, 2004). Xu Zhimin also pointed out numerical relationship between safety culture and safety performance meaning safety culture has a positive correlation on safety performance (Xu Min-zhi, 1998).

2.5 Safety Climate

The concept of safety culture is predated by the organizational culture and climate, where culture depicts values, beliefs and underlying assumptions, and climate defines descriptive measure reflecting employee's perception of the organization (Gonzalez-Roma, V., Peiro, J., Lloret, S., Zornoza, A., 1999). Cox and Flin reviewed some arguments and concluded that the term 'safety climate' is preferred when it comes to operationalizing the concept into practical measurement (Cox, S., Flin, R., 1998).

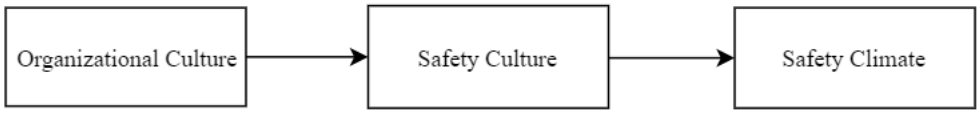


Figure 3: Relationship among organizational culture, safety culture and safety climate.

Safety climate is regarded as the surface features of safety culture recognized from the employee's attitudes, perceptions, beliefs at a given point of time (HSE, 1999). Hence, it is a snapshot of the state of safety providing indication of safety culture for an enterprise or organization. Figure 3 depicts the relationship of organizational culture, safety culture and safety climate.

From the safety research literature, Table 2 has been developed identifying elements for the safety climate assessment by different researchers.

Table 2: Dimensions/Elements used in assessing safety culture/climate by different researchers.

Researcher (s)	**Measure**	**Elements**	**Industry**	**Sample size and country**
(Yousefi, Yadolah, et al, 2016)	Safety climate	Persian version of NOSACQ-50 questionnaire	Steel company	661, Iran
(Sutalaksana, I. Z., & Anatasia, M, 2016)	Relation between Safety climate perceptions and behavior type	NOSACQ-50 and DISC questionnaire	Hazardous workplace	755, Indonesia
(Liu, X., Huang, G., Huang, H., Wang, S., Xiao, Y.,, 2015)	Safety climate	Management commitment, safety supervision, co-worker support, and safety training	Manufacturing	3970, China
(Morrow, S. L., Koves, G. K., & Barnes, V. E., 2014)	Safety culture	Management commitment to safety, Willingness to raise concerns, Decision making, Supervisor responsibility for safety, questioning attitude, Safety communication, Personal responsibility for safety, Prioritizing safety, Training quality	Nuclear power	2876, USA
(Lu, C. S., & Yang, C. S., 2011)	Safety climate	safety policy, safety motivation, emergency preparedness, safety training, and safety communication	Passenger ferry	155, Taiwan
(Choudhry, R. M., Fang, D., & Lingard, H., 2009)	Safety climate	Modified HSE questionnaire	Construction	1120, Hong Kong
(Neal, A., & Griffin, M. A., 2006)	Safety climate	Management values, communication, training, and safety systems	Hospital	135, Australia

(Zohar, D., & Luria, G., 2005)	Safety climate	Action, expectation	Manufacturing	401
(Michael, J. H., Evans, D. D., Jansen, K. J., & Hai, 2005)	Safety climate	Management attitudes, Promotion, Social status, Safety training, Level of risk, Work pace, Safety officer, Social status, and Safety committee.	Manufacturing	641, USA
(DeJoy, D. M., Schaffer, B. S., Wilson, M. G., Vand, 2004)	Safety climate	Seven-item version of the NIOSH Safety Climate Scale	Retail	2182, USA
(Mearns, K., Whitaker, S. M., & Flin, R. , 2003)	Offshore Safety Questionnaire (OSQ)	Involvement in health and safety, Communication about safety, Satisfaction with safety activities, Perceived supervisor competence, Management commitment to safety, Written rules and procedures	Offshore industry (Oil and Gas Installation)	682 & 806, UK
(Neal, A., Griffin, M. A., & Hart, P. M., 2000)	Safety climate	Manager Values, Personnel Training, Safety Communication, Safety Equipment, Safety Knowledge Inspections	Manufacturing & mining	1264, Australia
(Williamson, A. M., Feyer, A. M., Cairns, D., & Bia, 1997)	Safety climate	Safety awareness, Safety responsibility, Safety priority, Management safety commitment, Safety control, Safety motivation, Safety activity, Safety evaluation	Manufacturing	660, Australia
Cox and Cox (1991)	Safety climate	Individual responsibility, Work environment, Safety arrangements, Safety system, Personal immunity	Gas	630, Europe

2.6 Stakeholder Theory

The concept of stakeholder theory has become popular in modern days in business managements. In recent business, managements are not only committed to maximizing profits of the shareholder rather they are keeping all stakeholders happy (Ahsan, D., Pedersen, S., Nielsen, M. R. B., & Oves, 2019). According to one of the founders of the stakeholder theory, stakeholders are the persons, as groups, whose contributions are very crucial for the success or survival of a company or organization (R.E. Freeman, 2002). Based on this definition, management can identify the key stakeholders who are important to their business and how to deal with them efficiently.

The stakeholder theory can be descriptive, instrumental and, normative (T. Donaldson, L.E. Preston, 1995). In this study, the instrumental approach is used to identify the stakeholders. This approach primarily focuses on the stakeholder groups who can play key role, positively or negatively, in achieving organization's goal. This approach is used in this study to identify the stakeholders who have interest and power in improving safety climate in the RMG sector of Bangladesh. Based on literature, interview and experience, the qualitative methods have been used in identifying the key stakeholders. The stakeholder's interest/power matrix, proposed by Eden and Ackermann, is used in this study (C. Eden, F. Ackermann, 2013). According to this theory, stakeholders are categorized into four groups namely *players,*

subjects, *context setters* and, *crowd* based on their levels of power and interest in the project. *Players* have the high power and high interest on the project activities to influence or to be influenced; *subjects* have high interest but low power; *context setters* have high power but low interest and; *crowd* has the low power and low interest on the project (Ahsan, D., Pedersen, S., Nielsen, M. R. B., & Oves, 2019). These four groups are presented in a two-by-two matrix in Figure 4.

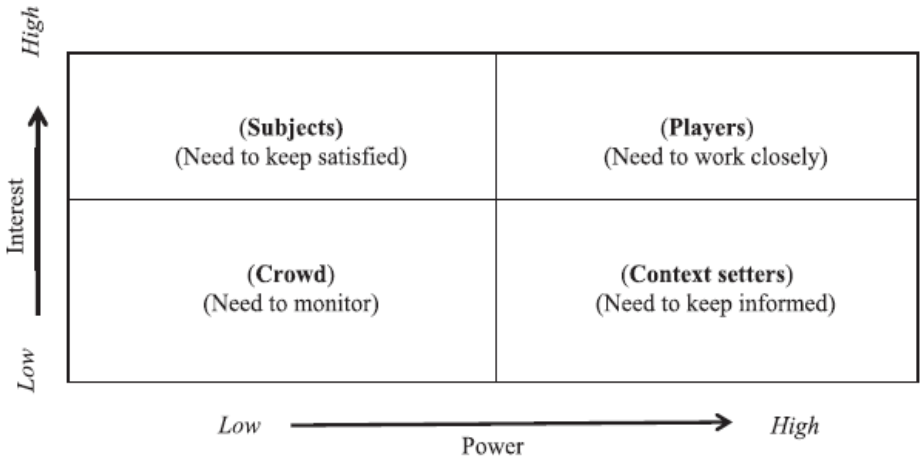


Figure 4: Stakeholder power and interest matrix (C. Eden, F. Ackermann, 2013).

3 Research Methodology

After a thorough literature review, an understanding about the safety culture, safety climate and safety climate survey was developed. From the understanding and available questionnaires about diagnosing safety climate, a questionnaire was identified. The chosen questionnaire was then translated and modified with the help of focus group discussion meeting. A pilot survey with 10 participants was also carried out to see the compatibility of the modified questionnaire. The sample location was chosen by the stratified random sampling technique and then performed the survey in three different RMG factories in three different districts of Bangladesh. The survey result was then analyzed with IBM SPSS Statistics 23 package. The whole research methodology is presented in Figure 5.

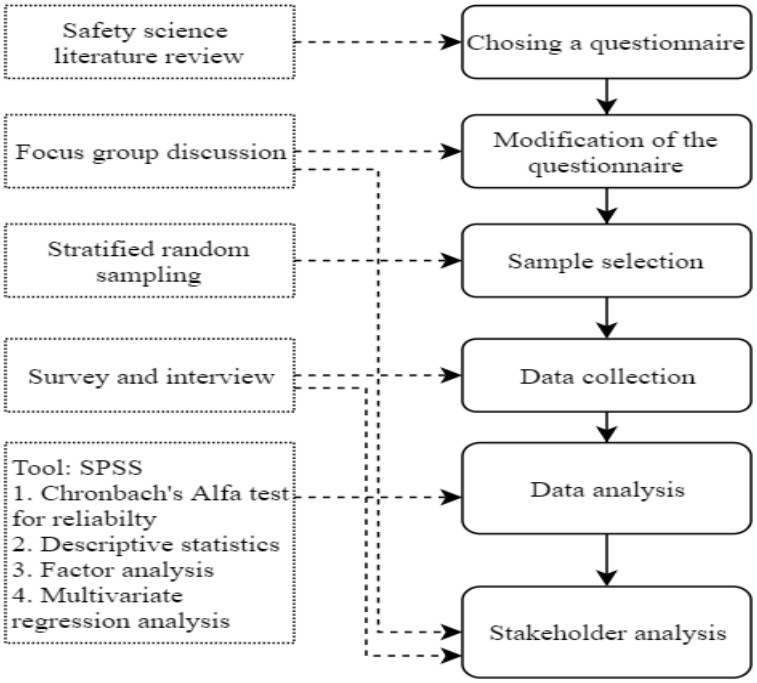


Figure 5: Research methodology of the study.

3.1 Selection of Questionnaire

It was not possible to develop a questionnaire for the study due to the lack of time and other constrains. Developing a questionnaire also requires reliability test as well as validation. That's why it was out of the scope.

A thorough literature review was performed about the safety climate assessment in the readymade garment industry. There are different questionnaires available for assessing safety climate in different sectors. The search also found that there was no specific tool for assessing safety climate only for the RMG industry. After that a generic questionnaire for assessing safety climate for all sectors was chosen. And, on an important note, no specific questionnaire was found that assessed safety climate in RMG in Bangladesh.

The questionnaires found in the search have a large variety in the dimensions and themes regarding safety climate assessment. And, some of these doesn't have the reliability and validity. I was searching for a questionnaire that would have the confirmed reliability and

validity as well as it would be simple and in English as there was no questionnaire developed in Bangladesh in Bengali language.

After making a proper comparison among the available questionnaires, the Nordic Occupational Safety Climate Questionnaire (NOSACQ-50) was chosen. This questionnaire was chosen because it had a match with my searching criteria, and these are listed below.

- The questionnaire is available in over 35 languages including English and results are being collected from all over the world (NOSACQ-50, 2010).
- It has the confirmation of its validity and reliability in different industries in all the Nordic countries (Pousette, M. T. A., Mikkelsen, P. K. K. L., Lappalainen, J., Tharaldsen, J., & Tómasson, K., 2008).
- An international database is being developed for benchmarking and further improvement (NOSACQ-50, 2010).
- It includes all the possible dimensions for diagnosing safety climate in an enterprise (Pousette, M. T. A., Mikkelsen, P. K. K. L., Lappalainen, J., Tharaldsen, J., & Tómasson, K., 2008).

3.1.1 The Nordic Occupational Safety Climate Questionnaire

The Nordic Occupational Safety Climate Questionnaire (NOSACQ-50) is a tool for diagnosing occupational safety climate and evaluating safety interventions in an organization. It was developed by a Nordic group of safety researchers with the support from the Nordic council of ministers (Kines, P., Lappalainen, J., Mikkelsen, K. L., Olsen, E., Pousette, A., Tharaldsen, J., ... & Törner, M., 2011).

Initially this questionnaire was tested for validity and reliability in four Nordic countries in native languages. It is a reliable and dependable instrument for measuring safety climate, safety perceptions and safety interventions. Further, the validity of the NOSACQ-50 was confirmed for diagnosing safety climate in organizations (Kines, P., Lappalainen, J., Mikkelsen, K. L., Olsen, E., Pousette, A., Tharaldsen, J., ... & Törner, M., 2011).

The questionnaire is based on organizational and safety climate theory, psychological theory, previous empirical research, empirical results acquired through international studies, and a continuous development process (NOSACQ-50, 2010). It consists of 50 questions or items with 7 dimensions that assess the shared perceptions of: 1) management safety priority, commitment and competence; 2) management safety empowerment; 3) management safety justice; 4) workers' safety commitment; 5) workers' safety priority and risk non-acceptance; 6) safety communication, learning, and trust in co-workers' safety competence; and 7) workers' trust in the efficacy of safety systems (Yousefi, Yadolah, et al, 2016). Each dimension has 6 to 9 items. The NOSACQ-50 questionnaire in English and Bangla is attached in Appendix A and Appendix B respectively. The dimensions are explained with example in Table 3.

Table 3: Dimensions in the NOSACQ-50 questionnaire.

SL	Dimension	Aspects	Example
01	Management safety priority, commitment and competence (9 questions)	This dimension includes the perception of: How management prioritize the safety; How much commitment the management has towards safety and; how much ability the management has in dealing with safety.	Question 1: Management encourages employees here to work in accordance with safety rules - even when the work schedule is tight.
02	Management safety empowerment (7 questions)	How management empowers the workers regarding safety; How they engage the workers in safety related decision making and; How much they inspire the workers in participation in decision making.	Question 16: Management involves employees in decisions regarding safety.
03	Management safety justice (6 questions)	How management treats the workers involved in accidents or near miss accidents and; How they find out the actual reasons behind accidents.	Question 22: Management treats employees involved in an accident fairly.
04	Workers' safety commitment (6 questions)	How much commitment the workers have towards safety and; How they cooperate each other at workplace regarding safety.	Question 25: We who work here do not care about each other's' safety.
05	Workers' safety priority and risk non-acceptance (7 questions)	How the workers prioritize safety from production and; How they maintain risk non-acceptance attitude.	Question 33: We who work here never accept risk taking even if the work schedule is tight
06	Safety communication, learning, and trust in co-worker's safety competence (8 questions)	How much the workers talk about the safety with the co-workers; How much they learn from experiences; How much they help others work safely and; How much trust do they have in the co-worker's competence regarding safety.	Question 38: We who work here have great trust in each other's' ability to ensure safety.
07	Workers' trust in the efficacy of safety systems (7 questions)	How much trust they have in the safety representatives and safety rounds and; How much trust they have in safety trainings, early planning and clear-cut goals.	Question 46: We who work here consider that safety training to be good for preventing accidents.

The NOSACQ-50 is a four-point Likert scales (strongly disagree, disagree, agree, and strongly agree) questionnaire and mainly divided into two parts: Management's dealing with safety (Question 1 to 22) and Workers' dealing with safety (Question 23 to 50). The questionnaire has two types of questions like positive and negative or reverse. The reversely formulated questions enable the detection of acquiescence bias that is the tendency to answer in an indiscriminately positive way (Altermatt, B, 2011). An example of this is, if any respondent answers 'strongly disagree' to both the question number 1 and 5, there will be the acquiescence bias. The list of the positively and reversely formulated questions is attached in Appendix C.

Table 4: Scoring for the positively and reversely formulated questions (NOSACQ-50, 2010).

	Strongly disagree	**Disagree**	**Agree**	**Strongly agree**
Score for positive questions	1	2	3	4
Score for reversed questions	4	3	2	1
Example of a positively formulated question	Question 1: Management encourages employees here to work in accordance with safety rules - even when the work schedule is tight.			
Example of a reversely formulated question	Question 5: Management accepts employees here taking risks when the work schedule is tight.			

Table 4 shows the scoring for the positively and reversely formulated questions in the safety climate questionnaire survey. The mean score for the questionnaire is 2.5 as the scale is from 1 to 4. Initially, the mean score for each dimension and respondent is calculated and then the mean score for population is calculated. A mean score for any population over 2.5 is considered positive result or positive safety climate at that organization but there is room for improvement. Table 5 explains the safety climate levels and its measures for further improvement.

Table 5: Safety climate levels and measures.

Mean score	Safety climate level	Measures
More than 3.30	Good level	Maintaining and continuing development
3.00 to 3.30	Fairly good level	Slight need of improvement
2.70 to 2.99	Fairly low level	Need of improvement

3.1.2 Modification of the Questionnaire NOSACQ-50

Some modifications to the NOSACQ-50 has been done after a focus group discussion. A meeting with 8 managers and 12 workers from different RMG factories, and 5 labor inspectors was held regarding the NOSACQ-50 questionnaire. Based on their recommendation, 10 questions about improving current safety climate in the organization has been added and some background information was also added to find relationship between the perception and the background like education, birth date, experience etc. After piloting with the modified questionnaire, some of the background questions has been revised e.g. ‘Birth date’ has been changed to ‘Age’ and the background information has been moved from the beginning to the end of the questionnaire.

The questionnaire was mostly closed type with four-point Likert scales and it also included some dichotomous questions with ‘yes’ or ‘no’ answers. The questionnaire had eight dimensions after the modification. The first seven dimensions were about measuring safety climate and the last dimension was about how to improve the current safety climate in the factory.

3.1.3 Translation of the NOSACQ-50

The guidelines for the translation procedure of NOSACQ-50 are followed into this translation to Bangla language. One forward and backward translation (English-Bangla-English) has been carried out by linguistics students. The translation was not word by word rather it was meaning by meaning. The laymen's word or phrases like 'safety', 'culture' etc. were kept same as the master version of the questionnaire. After subsequent revisions by the author and some native speakers, it was presented in the focus group discussion meeting. A pilot survey with 10 participants was carried out in a factory. After the piloting, some of the wording was revised and then finalized.

3.2 Site Selection Procedure

Most of the RMG factories are situated in 7 districts (administrative unit) out of 64 districts of Bangladesh. The stratified random sampling technique has been applied in this study. These 7 districts were considered as seven stratums. It was assumed that the sample would be homogenous for an administrative area. Firstly, three districts were selected randomly from the 7 districts (Red and black circled in Figure 6). Secondly, two factories were selected from each selected district randomly. The author approached to these six factory managements and only three of them cooperated with the survey. Finally, the survey was carried out in three factories from three different districts. And these three garment factories were from Mymensingh, Tangail and Gazipur (Black circled in Figure 6) in Bangladesh.

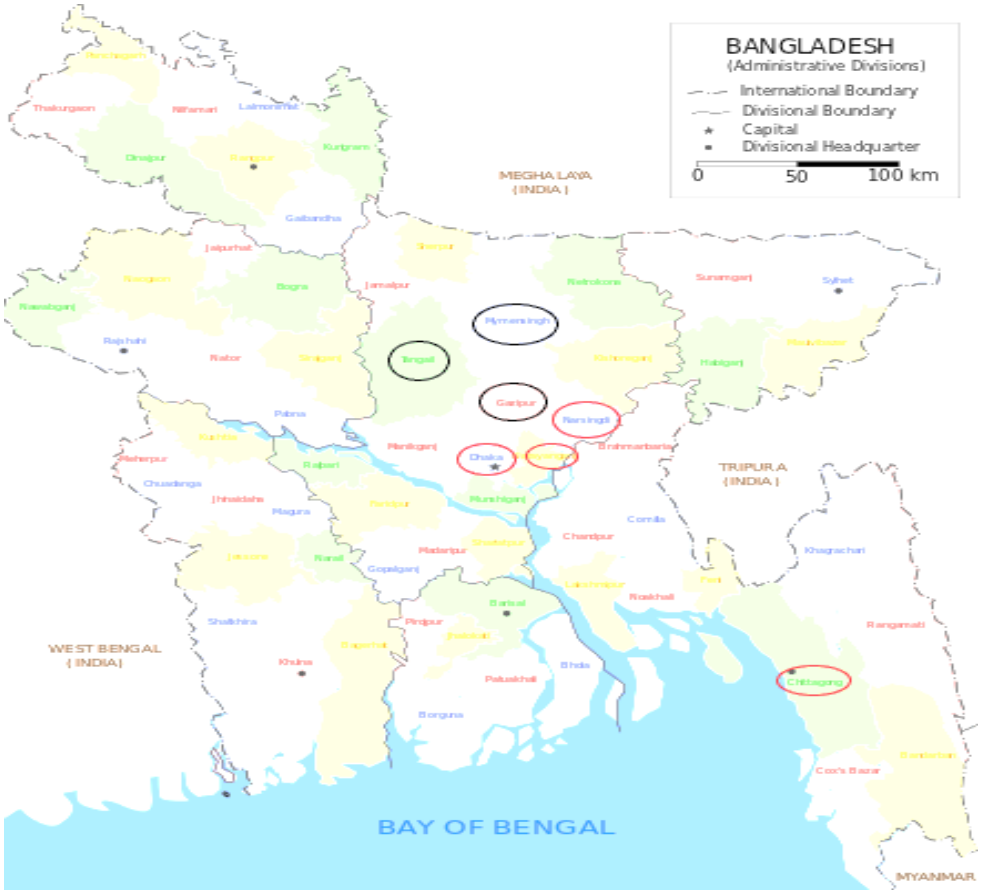


Figure 6: Map of Bangladesh with major RMG-dense districts (Armanaziz, 2007).

3.3 Factory Description

In this part of the chapter, the overall scenario of the factories visited has been described. Factory names can't be published due to the privacy policy and the actual number of the workforces are not published here in this report. The following factories have been visited by the author with a view to collecting data through questionnaire survey and interview.

3.3.1 Factory A

Factory A (name of the factory can't be published) is situated in Tangail district of Bangladesh with 2000 employees. This factory has different shades for different units with approximately 2,00,000 square ft area. Production process is almost same in these three RMG factories and only the basic steps are described in Figure 7. Based on the order from the buyers, fabrics are collected and stored in the factory area. These fabrics then be in the cutting according to sizes provided by the buyer or buyers. Inspection is made by the buyers to check quality after the finishing of the products. Then the products are stored in the factory before the shipment.

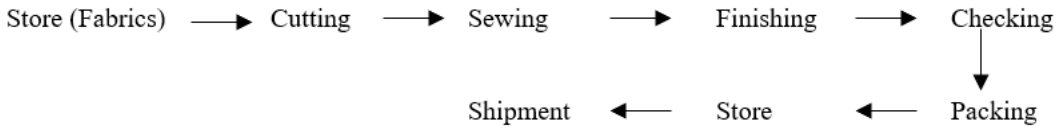


Figure 7: Process flowchart of the factory.

3.3.2 Factory B

Factory B (name of the factory can't be published) is situated in Mymensingh district of Bangladesh with about 1400 (administration 150 and 1250 workers) workforce and area of approximately 1,88,000 square ft.

This factory is combined of a garment and a textile unit. There are separate sections like Knitting and manufacture, printing, dying, and utilities. The administrative building is separate from the production building. It houses guest rooms, kitchen, conference room, child care, health care etc. There are two shifts e.g. day and night at the factory. Jeans, shirts, t-shirts etc. are the main products of this enterprise.

3.3.3 Factory C

Factory C (name of the factory can't be published) is in Gazipur district of Bangladesh. Approximately 2000 (actual number is not published) people work in this readymade garment factory with 1700 (900 male and 800 female) workers and 300 (272 male and 28 female) managements. The area of the six-storied factory building is approximately 1,55,000 square feet. The ground floor of the building is used for storing, 1st and 4th floor for finishing, 2nd and 5th floor for sewing machines, 3rd floor for cutting and 6th floor for administration. The health and child care are in the ground floor of the factory building.

Fabrics and accessories are used as raw materials for the factory. The production process of the factory is explained in Figure 7. And the main products of the factory are medical dress, tops, blazer and jackets.

3.4 Survey Procedure

In the RMG sector, the worker level is mostly uneducated, they are just skilled at what they do in the workplace. They can read but understanding the questionnaire is tough for them. If I send the questionnaire to them by postal mail or any other way, there is a high risk of no-cooperation by the worker respondents (Ahsan, D., 2011). On that note, the survey was done in two way. Firstly, some of the questionnaires was sent to the management officials and they filled up themselves in their desk without any help from the author's side as they are educated enough to understand the questions. Secondly, face to face survey was conducted with the workers. Along with some trained personnel, the author conducted the face to face survey with the workers in group. The author read the questions and the respondents answered accordingly. In the first page of the questionnaire, there was introduction of the survey, the objectives of the survey and the anonymity issue of the individuals. The respondents (both managers and workers) were ensured regarding their anonymity and their privacy about themselves and their opinion. It was ensured that no individual opinion would be presented in any way to the study or to the factory owners. Operators, technicians etc. are considered as workers and officers with duty of monitoring or supervision are considered as managers in this study. Managers are ranged from officer or supervisor to director or managing director of the factories.

The survey and interviews were carried out in native language (Bangla) from July to November 2019. I approached to 230 people and 217 questionnaires was returned with 94% return rate. The rate was high as I approached to the workers directly (face to face) and talked to the top management for the managers' response.

After the survey, a few interviews were taken to obtain a deeper understanding of the results from the questionnaire. 20 people was asked, only 8 came up for the interview. The duration of the interviews was approximately 20-30 minutes and they were told that their identifications and opinions would be secret. The interview was done in the local language and it was pre-formatted. Ten questions regarding the questionnaire was asked in the interview and the interview template is attached in Appendix D.

3.5 Data Analysis Procedure

All computation of this study was performed with IBM SPSS Statistics 23. Only the radar chart for safety climate level was performed in Excel.

Standard parametric statistical procedures were assumed to be appropriate for this study (Meuwissen, M.P.M., R.B.M. Hurine, and J.B. Hardaker, 2001). Missing values were replaced with the mean value of the valid response following the procedures by Lien et al (Lien, G., O. Flaten, A.M. Jervell, M. Ebbesvik, and P.S. Koesling, 2006). There were 21 reversely formulated questions in the questionnaire, and they were recoded. The mean value for each dimension was used in the radar chart for safety climate level based on NOSACQ-50 seven dimensions.

To check the factor representation of the data in the RMG industry of Bangladesh, factor analysis was performed. The KMO and Cronbach Alfa test was performed as well. Then the multivariate regression analysis was performed among and between the newly extracted factors and demographic characteristics of respondents. The assumptions were tested before performing the multivariate regression analysis.

4 Results

This chapter presents the findings from the statistical analysis based on theory described in earlier chapter. Demographic characteristics of the respondents, safety climate level of the case study factories, newly extracted factors, and the relationships between the factors and demographic characteristics of the respondents are presented in this chapter. It also presents the respondents view on improving safety climate as well as the stakeholder analysis for improving safety climate in the RMG industry.

4.1 Demographic Characteristics of Respondents

Of the respondents, 63.8% are male and 36.2% are female in this study. Most of the respondents (42%) are aged between 25 to 30 year, 25% are below 25 and only 7% are above 40 years old. Most of the respondents (65%) have undergraduate level of educational qualification (primary 25.7%, secondary 20.9% and higher secondary 18.4%) where 35% have tertiary level of educational qualification (graduate 16.5% and post graduate 18.4%). In this study, majority (63.4%) respondents were workers and the rest were managers. The larger part of the respondents (65.7%) have working experience for zero to five years, 33.8% have 6 to 15 years of working experience, and a negligible part has more than 15 years of experience in the RMG industry.

Almost half of the respondents (47.6%) worked one or two factories before joining the current factory where a significant number (34%) is working for the first time in the RMG industry. Only 13.5% respondents have worked with 3 to 5 factories where a non-significant portion (4.3%) have worked with more than 5 factories before joining the current station.

Most of the respondents (82.7%) heard the term safety culture before this survey where only a few numbers of respondents (17.3%) wasn't aware of the term. The larger part of the respondents (67.6%) know what safety culture is where the rest don't know about the safety culture.

Table 6: Demographic characteristics of the respondents.

Characteristics		Frequency	Valid Percent (%)
Gender	Male	132	63.8
	Female	75	36.2
Age	Under 25	50	25
	25 to 30	85	42
	31 to 35	29	14
	36 to 40	24	12
	Over 40	13	7
Educational qualification	Primary	53	25.7
	SSC	43	20.9
	HSC	38	18.4

	Bachelor	34	16.5
	Masters	38	18.4
Designation	Worker	126	63.6
	Managers	72	36.4
	0 to 5 years	136	65.7
Experience	6 to 15 years	70	33.8
	More than 15 years	1	.5
	0 or zero factory	72	34.6
No. of factories worked before	1 to 2 factories	99	47.6
	3 to 5 factories	28	13.5
	More than 5 factories	9	4.3
Safety culture term heard	No	35	17.3
	Yes	167	82.7
What safety culture is	No	60	32.4
	Yes	125	67.6

4.2 Safety Climate Level in the RMG Industry

Figure 8 depicts the overall safety climate level for the three organizations together. The radar chart represents mean value of the seven dimensions of safety climate provided by the NOSACQ-50 guidelines.

It is evident from the Figure 8 that the mean value for each dimension is relatively higher with positive safety climate level. The dimension 5 (workers safety priority and risk non-acceptance) has the lowest score and there is slight need of improvement.

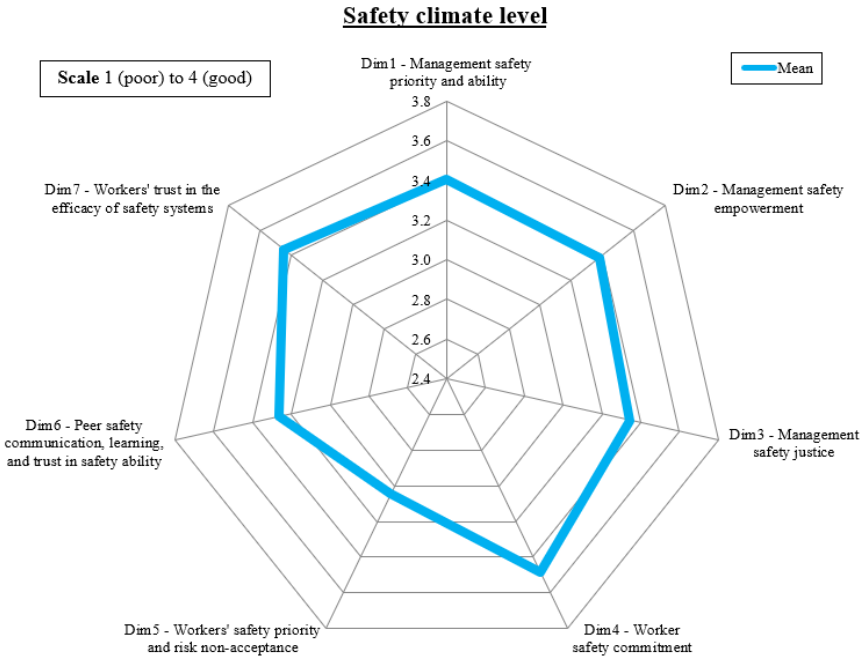


Figure 8: Overall safety climate level in three study case RMG factories.

Figure 9 shows the safety climate level of the three factories differently. It is evident from the radar chart that the factory A has the highest level of safety climate for each dimension, and A and B don't have much difference in the safety climate level.

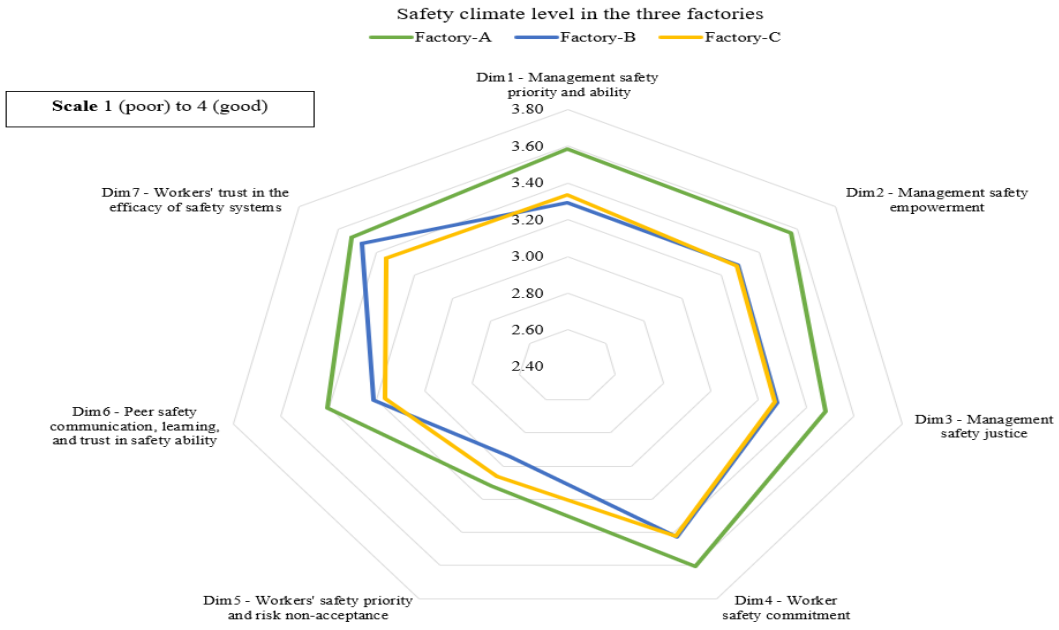


Figure 9: Safety climate level in factory A, B and C.

The interesting fact is that, all the three factories has the lowest score in the same dimension describing workers safety priority and risk non-acceptance, and these factories even have the highest score in the same dimension namely workers safety commitment.

4.3 Factor Analysis

Factor analysis (FA) was performed to identify the factors that mostly explain the variables of safety climate questionnaire. The Principal Component Analysis (PCA) was performed on the 50 questions with varimax rotation. The Kaiser-Meyer-Olkin (KMO) that measures sampling adequacy should be more than 0.50 to perform FA (George, D., and Mallery, P., 2006). In this test, the KMO was 0.814 which is higher than minimum threshold value indicating the FA is good to proceed. Another important thing about the factor analysis is that the population correlation matrix can't be an identity matrix. To check this, Bartlett's Test of Sphericity was performed. In this test p-value less than 0.005 indicates that the population correlation matrix is not an identity matrix (George, D., and Mallery, P., 2006). The result shows that the test statistic is large (approximate Chi-square value is 4757.253 and 1225 degrees of freedom) with small significance level (p-value is 0.000) that indicates the correlation matrix is not an identity matrix. The FA would be meaningless if the population correlation matrix was an identity matrix. The both prerequisites (KMO and Bartlett's test) for FA was good enough to proceed for further analysis.

Using the PCA with eigen value greater than 1 and varimax rotation, 13 components or factors was extracted from the 50 questions. These factors explained 64% of the total variances. From these 13 factors, loading for the first 4 factors was higher than 0.4 whereas the loading for the other 9 factors was lower. The Scree plot (Figure 10) shows that there is a clear break in the third and fourth factors. In this situation, based on the Scree plot and the factor loading, a 3-factor solution was seemed appropriate for further analysis (Pallant, J., 2007).

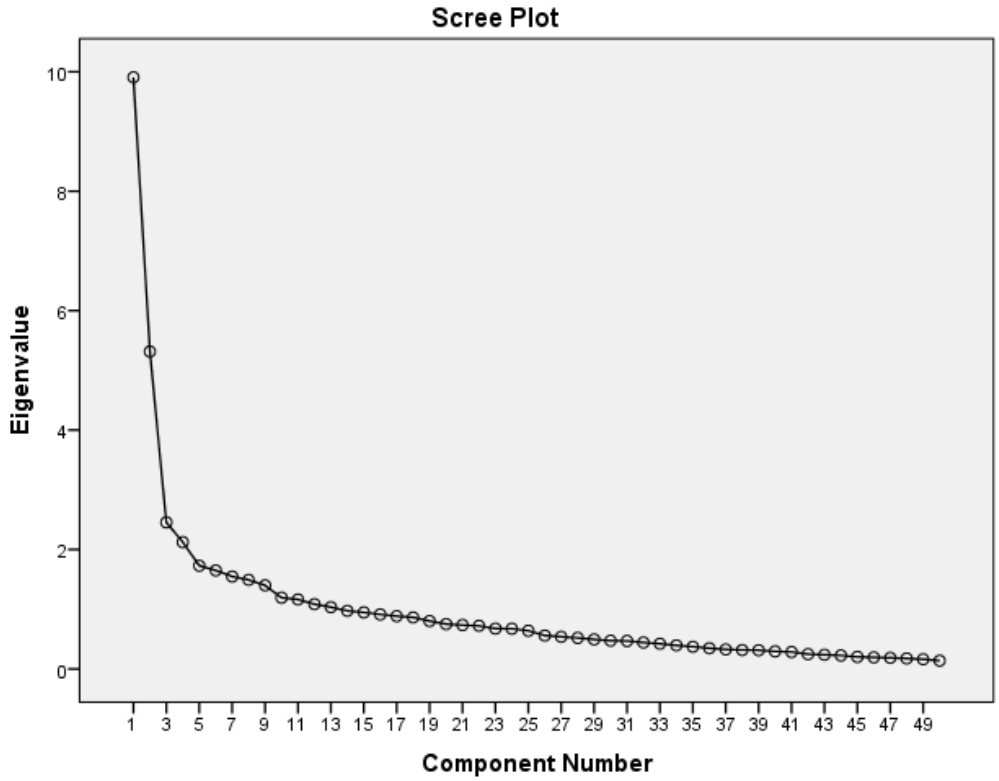


Figure 10: Scree plot for 50 items influencing safety climate.

In this step, a forced 3-factor analysis was performed with varimax rotation, and it revealed that only 39.59% variance was explained by these 3 factors. Then, the items (1, 14, 16, 22, 24, 27, 29, 32, 33, 34, 35, 39, 41, 46) with low communalities (less than 0.30) and low loading (less than 0.40) were excluded from the analysis. Finally, the KMO and Bartlett's test were performed again. From the table it shows that the KMO and Bartlett's value is well above from the threshold value.

Table 7: KMO and Bartlett's Test.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.860
Bartlett's Test of Sphericity	Approx. Chi-Square	3022.194
	df	496
	Sig.	0.000

In the final PCA, the 3-factor explained 45.76% of the total variances from the 32 items. The percentage of variance explained by the factors is acceptable compared to the same kind of analysis performed by other researchers (Choudhry, R. M., Fang, D., & Lingard, H., 2009). The loadings for each factor are described in Table 8. Factors loading is the relationship between factor and item. The number describes how much an item explains the underlying factor. The loadings are arranged in descending order in Table 8.

Table 8: Factor loadings by PCA with varimax rotation.

Number and Questions/Items	Factor loading
Factor/Dimension 1: Risk and safety management, and employee's involvement; Eigenvalue 8.11; Variance explained 25.344%, Cronbach Alfa 0.901	
Q13 Management never considers employees' suggestions regarding safety	0.717
Q8 When a risk is detected, management ignores it without action	0.696
Q18 Fear of sanctions (negative consequences) from management discourages employees here from reporting near-miss accidents	0.686
Q47 We who work here consider early planning for safety as meaningless	0.678
Q21 Management always blames employees for accidents	0.677
Q15 Management never asks employees for their opinions before making decisions regarding safety	0.674
Q28 We who work here take no responsibility for each other's' safety	0.650
Q49 We who work here consider safety training to be meaningless	0.648
Q25 We who work here do not care about each other's' safety	0.646
Q3 Management looks the other way when someone is careless with safety	0.641
Q12 Management encourages employees here to participate in decisions which affect their safety	0.586
Q26 We who work here avoid tackling risks that are discovered	0.582
Q30 We who work here consider minor accidents to be a normal part of our daily work	0.581
Q10 Management strives to design safety routines that are meaningful and actually work	0.515
Q45 We who work here consider that safety rounds/evaluations have no effect on safety	0.507

Q31 We who work here accept dangerous behavior as long as there are no accidents	0.492
Factor/Dimension 2: Management safety priority, ability and justice; Eigenvalue 4.373; Variance explained 13.665%, Cumulative 39.009%; Cronbach Alfa 0.829	
Q4 Management places safety before production	0.670
Q7 Management ensures that safety problems discovered during safety rounds/evaluations are corrected immediately	0.670
Q9 Management lacks the ability to deal with safety properly	0.658
Q5 Management accepts employees here taking risks when the work schedule is tight	0.640
Q11 Management makes sure that everyone can influence safety in their work environment	0.624
Q6 We who work here have confidence in the management's ability to deal with safety	0.595
Q17 Management collects accurate information in accident investigations	0.570
Q19 Management listens carefully to all who have been involved in an accident	0.565
Q23 We who work here try hard together to achieve a high level of safety	0.506
Factor/Dimension 3: Workers' trust and safety communication; Eigenvalue 2.161; Variance explained 6.75%; cumulative 45.761%; Cronbach Alfa 0.831	
Q37 We who work here feel safe when working together	0.709
Q43 We who work here can talk freely and openly about safety	0.700
Q36 We who work here try to find a solution if someone points out a safety problem	0.675
Q44 We who work here consider that a good safety representative plays an important role in preventing accidents	0.670
Q38 We who work here have great trust in each other's' ability to ensure safety	0.586
Q40 We who work here take each other's' opinions and suggestions concerning safety seriously	0.555
Q50 We who work here consider it important to have clear-cut goals for safety	0.550

In NOSACQ-50, there were 7 dimensions with 50 items. After the successful factor analysis, this study found 3 dimensions with 32 items that explains the safety climate most for the RMG sector of Bangladesh. The Cronbach alfa is quite high for each dimension that means high reliability among the variables in dimension. The naming of the factors is subjective, it may vary researcher to researcher. The newly extracted factors with corresponding items are explained below.

4.3.1 Factor 1: Safety Management and Employee's Involvement

Factor 1 or Dimension 1 consists of 16 items or questions. The reverse items show that the study factories involve its employees in the safety management system, and they take employee's suggestion seriously. Risk detection (*Q8 When a risk is detected, management ignores it without action*), reporting near miss accidents (*Q18 Fear of sanctions (negative consequences) from management discourages employees here from reporting near-miss accidents*), early planning (*Q47 We who work here consider early planning for safety as meaningless*), safety training (*Q49 We who work here consider safety training to be meaningless*), responsibility (*Q25 We who work here do not care about each other's' safety*), Management's carelessness (*Q3 Management looks the other way when someone is careless with safety*), blame culture (*Q21 Management always blames employees for accidents)*, risk

tackling (*Q26 We who work here avoid tackling risks that are discovered),minor accidents treatment (Q30 We who work here consider minor accidents to be a normal part of our daily work), safety routines (Q10 Management strives to design safety routines that are meaningful and actually work) safety rounds (Q45 We who work here consider that safety rounds/evaluations have no effect on safety) dangerous behavior (Q31 We who work here accept dangerous behavior as long as there are no accidents)* represent the safety management systems in the enterprises or factories. Employee's suggestion (*Q13 Management never considers employees' suggestions regarding safety), employee's opinion in decision making (Q15 Management never asks employees for their opinions before making decisions regarding safety), responsibility of coworkers (Q28 We who work here take no responsibility for each other's' safety)* deal with the employee's involvement in the risk and safety management system of the factories.

4.3.2 Factor 2: Management Safety Priority, Ability and Justice

Factor 2 or Dimension 2 consists of 9 items or questions. *Q4 Management places safety before production* and *Q5 Management accepts employees here taking risks when the work schedule is tight* denotes the safety priority of the management in the factories.

Q7 Management ensures that safety problems discovered during safety rounds/evaluations are corrected immediately, Q9 Management lacks the ability to deal with safety properly, Q6 We who work here have confidence in the management's ability to deal with safety, Q17 Management collects accurate information in accident investigations express the ability of the management to deal with safety.

Q11 Management makes sure that everyone can influence safety in their work environment, Q19 Management listens carefully to all who have been involved in an accident, Q23 We who work here try hard together to achieve a high level of safety describe safety justice to employees at the workplace.

4.3.3 Factor 3: Workers' Trust and Safety Communication

Factor 3 or Dimension 3 consists of 7 items or questions. *Q37 We who work here feel safe when working together, Q36 We who work here try to find a solution if someone points out a safety problem, Q44 We who work here consider that a good safety representative plays an important role in preventing accidents, Q38 We who work here have great trust in each other's' ability to ensure safety* deal with the worker's trust in the safety system as well as trust among themselves.

Q43 We who work here can talk freely and openly about safety, Q40 We who work here take each other's' opinions and suggestions concerning safety seriously, Q50 We who work here consider it important to have clear-cut goals for safety denotes the safety communication within peer group or management about safety at the workplace or the factories.

4.4 Multivariate Regression Analysis

There are some assumptions to be met before performing multivariate regression analysis. There shouldn't be any outlier in the dataset, there shouldn't be any multicollinearity among the dependent variables, variables should be linear and normally distributed (Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L., 2006).

Outliers

To check the outliers in the data, linear regression was performed on the dependent variables namely Factor 1, Factor 2, Factor 3 and Overall safety climate. The critical Mahalanobis distance for 4 dependent variables is 18.47 (Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L., 2006). Four of our observations had higher distance than the critical value. ID 94, ID 167, ID 98 and ID 62 with Mahalanobis distance 44.05, 26.25, 19 and 18.53 respectively were deleted from the data set for further analysis.

Multicollinearity

The multicollinearity test of the four dependent variables was performed to check if there is multicollinearity. If the correlation among the variables lies higher than 0.8, multicollinearity exists among the variables (Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L., 2006). Table 9 shows that, there is no multicollinearity among the three factors.

Table 9: Multicollinearity among extracted factors.

		Factor 1	Factor 2	Factor 3
Factor 1	Pearson Correlation	1		
	Sig. (2-tailed)			
Factor 2	Pearson Correlation	.279**	1	
	Sig. (2-tailed)	.000		
Factor 3	Pearson Correlation	.262**	.543**	1
	Sig. (2-tailed)	.000	.000	

Multivariate Normality

According to the central limit theorem, variables with large sample size tend to follow normal distribution (Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L., 2006). The dependent variables in my study are approximately normally distributed. Figure 11 shows the normal Q-Q plot of the variable safety climate (SC).

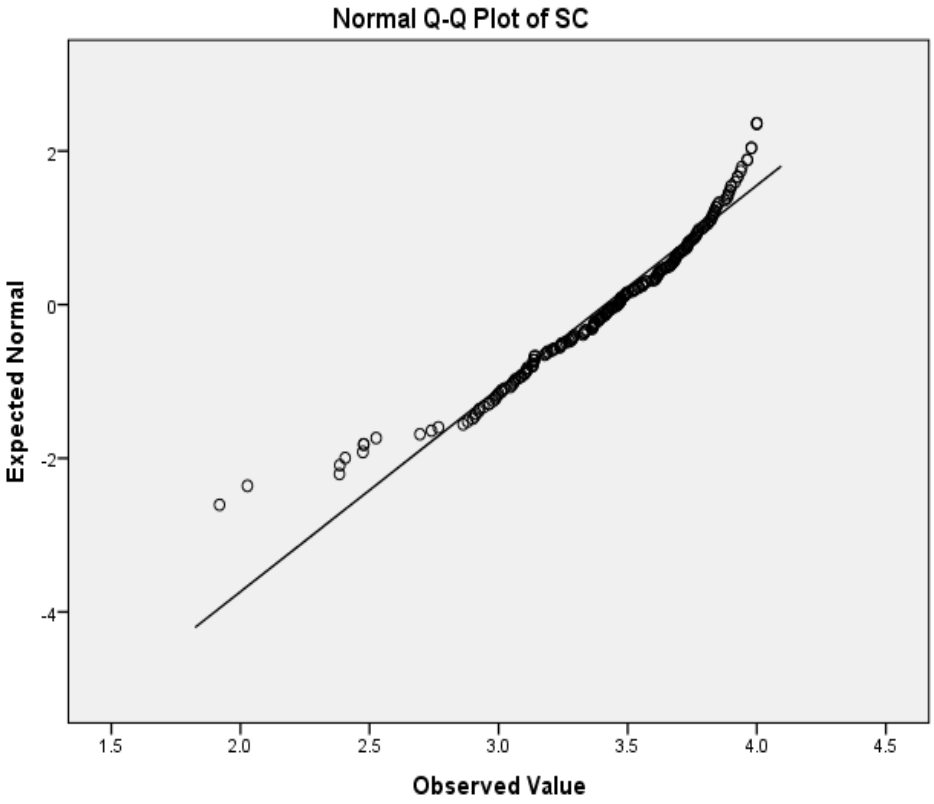


Figure 11: Normal Q-Q plot for one of the four variables.

Linearity

Scatterplot was drawn to see the linearity of the variables against some fixed factors e.g. designation, gender etc. The scatter plot matrix in Figure 12 shows the approximate linearity of each variable. The curves from lower left to upper right shows the linearity among the dependent variables.

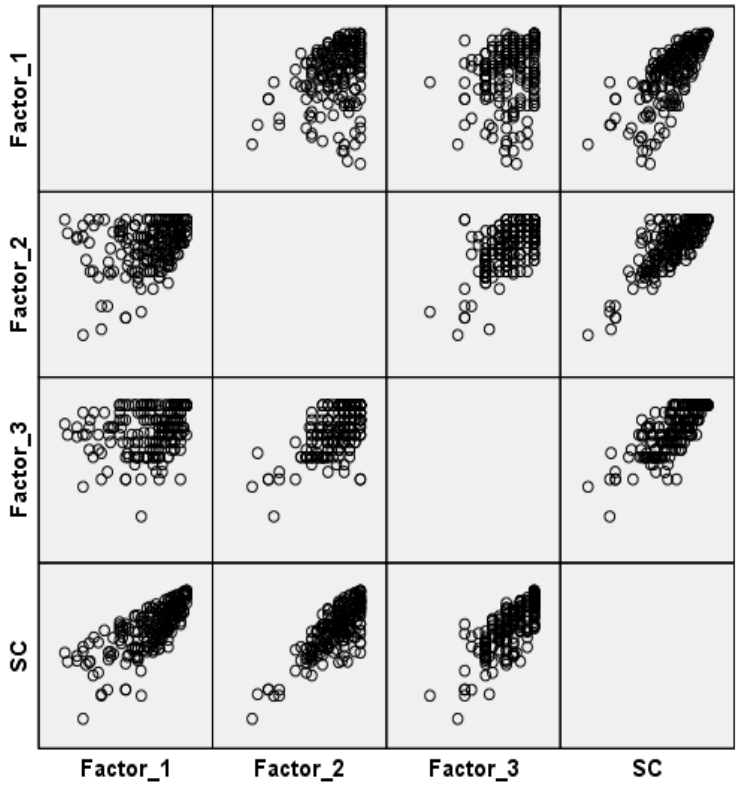


Figure 12: Scatterplot of the dependent variables.

4.4.1 Multivariate Analysis of Variances (MANOVA)

As the assumptions regarding multivariate regression analysis were met, the multivariate analysis of variances (MANOVA) was performed between and among multi-level of the independent (demographic characteristics) and dependent variables (safety climate factors and overall safety climate itself). The demographic variables, nominal in nature, have different level of measurement e.g. designation has two level namely worker and manager, educational qualification has five levels namely primary, secondary, higher secondary, bachelor and, masters.

Table 10: Safety climate comparison with demographic characteristics.

Source	Significance	Factor 1	Factor 2	Factor 3	Safety Climate
Designation	F	3.456	0.032	0.455	0.539
	P	**0.05**	NS	NS	NS
Gender	F	1.601	0.686	1.026	0.482
	P	NS	NS	NS	NS
Education	F	2.164	2.846	4.101	2.102
	P	**0.05**	**0.026**	**0.004**	**0.05**
Age	F	1.115	0.056	0.86	0.767
	P	NS	NS	NS	NS
Factory Name	F	1.004	8.915	1.001	4.093
	P	NS	**0.000**	NS	**0.019**

Service year	F	1.39	1.129	0.159	0.844
	P	NS	NS	NS	NS
How many factories worked before	F	1.142	0.372	0.928	0.415
	P	NS	NS	NS	NS
Safety culture term heard	F	0.704	0.000	0.531	0.479
	P	NS	NS	NS	NS
Safety culture known	F	2.243	1.858	0.884	2.67
	P	NS	NS	NS	NS

*NS- Non significant

Table 10 shows the impact of demographic characteristics on the overall safety climate and its factors (safety management and employees' involvement; management safety priority, ability and justice; workers trust and safety communication). The null hypothesis for every independent variable (Designation, Gender etc.) is that there is no significant difference in the means of two groups. If the p-value is less than 0.05, the null hypothesis is rejected at 95% confidence interval meaning there is a significant difference in the mean of two groups. In other words, the independent variable has impact on the dependent variable.

Table 10 shows that Gender, Age, Service year, experience, knowing what the safety culture is don't have any significant impact on the safety climate level in the RMG of Bangladesh. A possible explanation of this result is that, the RMG factories in Bangladesh have a different environment themselves and the employees working in these factories need to follow the safety instructions strictly nevertheless of their age, gender, experience etc. Another important fact might be the understanding of the safety culture concept. As the safety culture or climate is about perceptions, they may not have any perception.

Designation doesn't have any impact on the Factor 2 (workers trust and safety communication), Factor 3 (management safety priority, ability and justice) and overall safety climate level but it has significant impact on the Factor 1 (safety management and employees' involvement).

Education level is the most important characteristics that has significant impact on the overall safety climate and all its factors (safety management and employees' involvement; management safety priority, ability and justice; workers trust and safety communication).

The overall safety climate level varies factory to factory significantly. Also, the Factor 2 (management safety priority, ability and justice) itself varies significantly factory to factory.

4.4.2 Ordinary Least Squares (OLS)

Table 11 shows the significant relationship between the dependent variables and independent variables. The demographic characteristics of the respondents are considered as independent variables and, the safety climate (SC) and three other factors (safety management and employees' involvement; management safety priority, ability and justice; workers trust and safety communication) are considered as dependent variable for the multivariate regression analysis specially the ordinary least squares method.

Dummy variable was created based on the number of categories of each independent variable. The number of dummy variables should be n-1, where n is the number of categories of independent variable. For example, 'Gender' has two categories (male and female), so there would be only one dummy variable. The dummy variables are denoted only with '1' and '0'.

Table 11: Influence of demographic characteristics on the dependent variables (extracted factors).

Independent variables (Demographic characteristics)	Dependent variables			
	SC	Factor 1	Factor 2	Factor 3
Age[a]	0.053	-0.058	0.082	0.134**
Gender[b]	0.080	0.275****	0.01	-0.046
Education[c]	-0.171***	0.192*	-0.350****	-0.356****
Designation[d]	0.098*	-0.201**	0.217****	0.277****
Experience[e]	-0.153	-0.248	-0.121	-0.091
Factories worked[f]	0.042	-0.100	0.116	0.064
SC term heard[g]	-0.148**	-0.253***	-0.157*	-0.035
SC known[h]	-0.196****	-0.370****	-0.184***	-0.034

Variables and models are significant at *p<0.10, **p<0.05, ***p<0.01, ****p<0.001

[a] Measured as a dummy variable where 1 denotes 'up to 25' and 0 denotes 'otherwise'.

[b] Measured as a dummy variable where 1 denotes 'Male' and 0 denotes 'otherwise'.

[c] Measured as a dummy variable where 1 denotes 'Postgraduate' and 0 denotes 'otherwise'.

[d] Measured as a dummy variable where 1 denotes 'Worker' and 0 denotes 'otherwise'.

[e] Measured as a dummy variable where 1 denotes 'More than 15 years' and 0 denotes 'otherwise'.

[f] Measured as a dummy variable where 1 denotes 'More than 5' and 0 denotes 'otherwise'.

[g] Measured as a dummy variable where 1 denotes 'Not heard' and 0 denotes 'otherwise'.

[h] Measured as a dummy variable where 1 denotes 'Not known' and 0 denotes 'otherwise'.

Table 11 represents the correlation coefficients (B) of dependent and independent variables. It means that one unit change in the independent variable how much change occurs in the dependent variable. The independent variable 'Age' doesn't have any impact on safety climate, Factor 1 and Factor 2 statistically except Factor 3. The respondents, who are under 25 years old, has a positive view on the Factor 3 with 5% confidence interval compared to the respondents who are older than 25 years.

Respondent's gender is not statistically correlated with SC, Factor 2 and Factor 3. But the male respondents have positive impact on Factor 1 compared to female respondents with 0.1% confidence interval.

Respondents with postgraduate degree has negative perceptions about safety climate as well as Factor 2 and Factor 3 compared to the respondents with undergraduate or lower level education

with significance level 0.01, 0.001 and 0.001 respectively while they have positive perception on Factor 1 with 0.10 significance level.

Worker's perception on safety climate and its factors except Factor 1 is positive compared to the managers.

Experience regarding working with other factories or service year of respondents is not statistically significant for the dependent variables e.g. safety climate.

The respondents, who heard the term safety culture before or know what safety culture is, have negative perceptions compared to those who weren't aware of the safety culture term or concept.

4.5 Respondents Suggestions on Improving Safety Culture

As discussed in the methodology chapter, the questionnaire was also consisted of 10 more questions regarding how to improve safety climate in the respective factories and the result is shown in Figure 13.

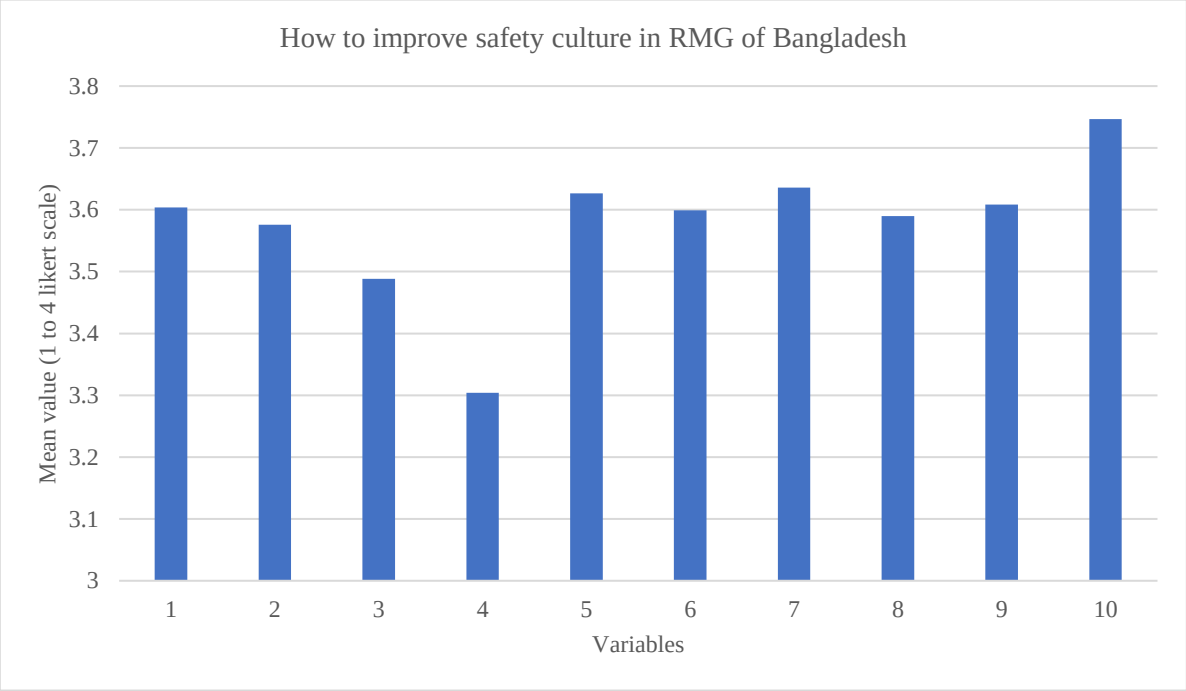


Figure 13: Respondent's view on how to improve safety culture.

[*1=Management should have commitment towards safety; 2=Workers should have commitment towards safety; 3=Decisions regarding safety should be taken by managers and workers together through strengthening safety committee; 4=There shouldn't be any other way about following safety rules; 5=Safety training should be arranged regularly for the workers; 6=Management should have competence in dealing with safety; 7=Good, competent and committed safety leader is essential; 8=Communication between managers and workers regarding safety should be improved; 9=There should be mutual trust and cooperation between workers and managers in workplace; 10=Along with the Bangladesh Labor Act, other laws concerned should be abided at workplace*]

Figure 13 depicts respondent's mean value opinion for the improvement of the safety culture in the factory. The items were formed in 4-point Likert scale (1= strongly disagree, 2= disagree, 3= agree, 4= strongly disagree). It is evident from the figure that every respondent thinks these 10 variables or steps are very important. The minimum average for these variables is 3.3 where the average mean is 2.5 for 4-point Likert scale. Variable 10 has the maximum average of 3.74

indicating the most important steps among 10 for the improvement of safety culture in the RMG sector of Bangladesh.

Table 12: Mean and standard deviation of the safety culture improvement variables.

Items	Mean	SD
Management should have commitment towards safety	3.60	0.621
Workers should have commitment towards safety	3.57	0.610
Decisions regarding safety should be taken by managers and workers together through strengthening safety committee	3.50	0.730
There shouldn't be any other way about following safety rules	3.31	0.838
Safety training should be arranged regularly for the workers	3.62	0.610
Management should have competence in dealing with safety	3.60	0.576
Good, competent and committed safety leader is essential	3.63	0.593
Communication between managers and workers regarding safety should be improved	3.59	0.545
There should be mutual trust and cooperation between workers and managers in workplace	3.60	0.575
Along with the Bangladesh Labor Act, other laws concerned should be abided at workplace	3.74	0.476

Table 12 describes that the respondents view and variation about their opinion. Standard deviation for every mean is significantly low depicting the respondent's score lies near the mean. The highest mean achieved in the variable 10 with lowest SD. 75% of the respondents answered 'strongly agree' with the fact that Laws should be abided by the employees at the workplace.

4.6 Stakeholder Analysis

The key stakeholders have been identified based on their levels of power and interest in improving safety culture in RMG sector of Bangladesh. This study found 11 groups of key stakeholders who can influence in the improvement of safety culture in the sector. Four of them has direct and seven of them has indirect influence on the project (see Figure 14). Stakeholder's level of power and interest are presented in Figure 15.

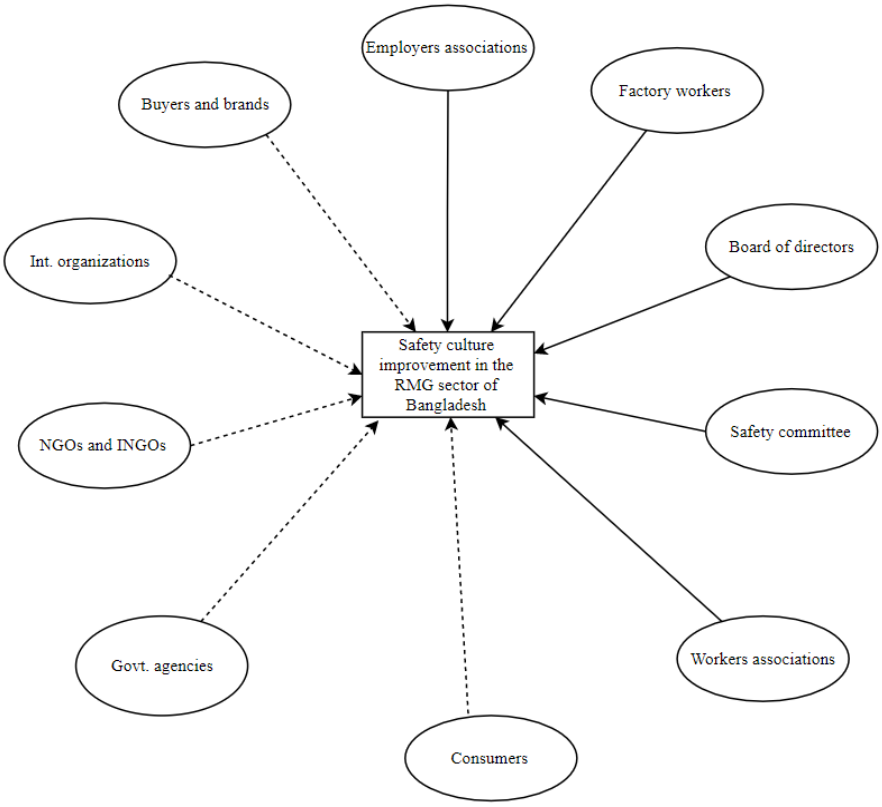


Figure 14: Stakeholder mapping for safety culture improvement in RMG of Bangladesh.

4.6.1 Players

According to the theory, this group of stakeholders has high power as well as high interest in the project. They have direct influence on the project activity and outcome.

As it is clear from the literature that the safety culture or climate is a concept regarding the perceptions of the employees of an enterprise towards safety. The workers of the factory, safety committee or participatory committee consists of both workers and management, and governing body of the factory have been identified as the *players* for improving safety culture in factory level of the RMG industry of Bangladesh.

4.6.2 Subjects

Subjects have low power but high interest regarding the project. National and international buyers are the most important stakeholders for the employers of RMG factories, but they don't have the direct power to influence safety climate of a factory. In the recent years, the buyers and brands groups e.g. the Accord and the Alliances have been showing huge interest in improving safety culture in the RMG sector of Bangladesh (Claeson, B. S., December 2015).

After the Rana plaza tragedy, not only the buyers but also national and international NGOs, international organizations e.g. ILO have shown keen interest in this sector and they took several initiatives with the government agencies for the betterment of safety in the sector (Claeson, B. S., December 2015).

The workers associations of this sector in Bangladesh has also keen interest in improving safety culture but they don't have much power to influence the project. In Bangladesh context, workers associations are not strong enough to influence the safety culture improvement. They are divided into many groups and due to this reason, they don't have much power as well as interest in this regard.

4.6.3 Context Setters

This group has high power but low interest in the project. As the government agencies ensure the implementation of laws and regulations regarding safety at workplaces, they have the power to make the workplace better by setting and monitoring the standard rules. But they are not directly involved in the business hence have the low interest. Government agencies like the DIFE, the FSCD etc. are to ensure the implementation of labor laws regarding safety, and ministry of labor and employment makes the arrangements for new laws or amendment of existing law.

Like the owners, the employer associations are also busy with profits and don't have much interest on safety culture improvement. But they have power to control the RMG business. Their guidelines or instructions need to follow by the member factories.

4.6.4 Crowd

The stakeholders with low interest and low power belongs to this group. Consumers worldwide are very important stakeholders for the RMG sector, but they don't have power as well as interest in improving safety culture in this sector. But recent incidents show that they can play vital role in this regard if necessary. For example, after the Rana plaza incident in Bangladesh, the consumers across the world voiced against the tragedy and they pressurized the authorities concerned or other stakeholders to make a safe workplace in Bangladesh (Claeson, B. S., December 2015).

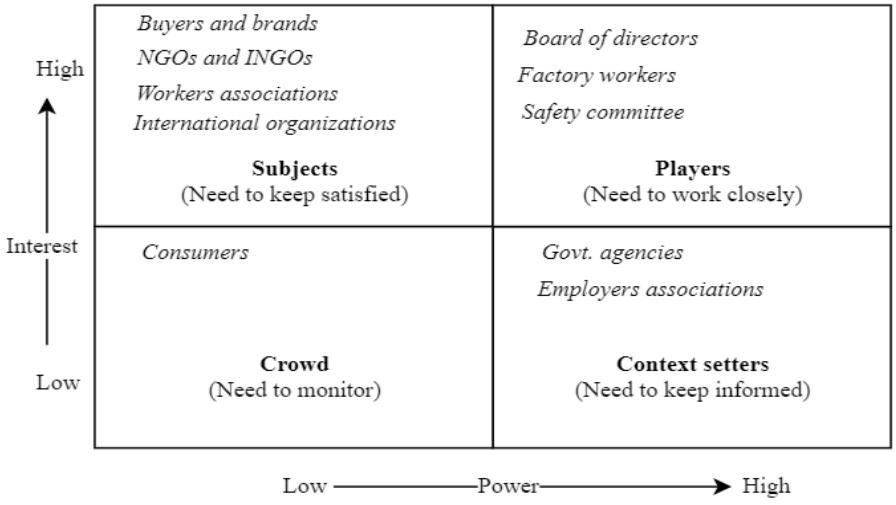


Figure 15: Stakeholder's power/interest matrix for safety culture improvement in RMG of Bangladesh.

To improve the safety culture in this industry, the employer's associations need to play the role as *players* with high power and interest instead of high power and low interest. Workers associations also need to play the role as *players* instead of *subjects*.

5 Discussion and Recommendations

Four research questions were posed in the commencement of this research study. In this section, research questions will be answered based on the results found in this study. Recommendations regarding the result will also be given in this section.

5.1 Safety Climate Level and Accident Reduction

In the developing countries like Bangladesh, the safety culture or climate concept is a new phenomenon. The NOSACQ-50 questionnaire is an in general questionnaire for all types of industry across the world but the perceptions regarding safety varies country to country as well as industry to industry.

The measured safety climate level in this study is highly positive compared to the NOSACQ benchmark database (NOSACQ database, 2019). Management of the case study factories informed that they haven't had any accident over the last few years. It justifies the fact made by Kim and Park (Kim, Y., Park, J., & Park, M. , 2016) that due to the positive safety climate in these factories, no accident has taken place over the last few years. In the case study factories, safety management system is efficient, management has safety priority and ability to deal with safety properly. Safety communication is also remarkable in these factories.

So, the employers as well as the government agencies should concentrate on creating a positive safety climate as well as in the safety management and employees' involvement; management safety priority, ability and justice; workers trust and safety communication in the RMG industry to prevent further accidents in the years to come.

5.2 Safety Climate Factors and Respondent's Demographics

Factor analysis revealed that three factors or dimensions (safety management and employees' involvement; management safety priority, ability and justice; workers trust and safety communication) represent the safety climate in the RMG industry of Bangladesh instead of seven dimensions of NOSACQ-50. For eigen value greater than one, 13 factors are identified in this study. But it was evident from the scree plot (Figure 10) that three factors are the best solution for measuring safety climate in the RMG industry of Bangladesh.

Coyle et al. noted that the same factors wouldn't be applicable for all enterprises (Coyle, I. R., Sleeman, S. D., & Adams, N., 1995). Inconsistencies regarding factors also depends on the questionnaire, methods used, sample size used by different researchers (Choudhry, R. M., Fang, D., & Lingard, H., 2009). The similar study in Bangladesh RMG industry found out seven factors for measuring safety climate (Arefin, M., Islam, N., & Bapi, A., 2017) and these factors vary from the NOSACQ seven factors. But the three factors of this study are in line with the seven factors extracted by Arefin et al.

A substantial number of safety climate studies identify that management commitment or priority towards safety is the core element for positive safety climate (Choudhry, R. M., Fang, D., & Lingard, H., 2009). This study also supports this fact that management commitment or priority is a core ingredient for positive safety culture. Factor 2 (management safety priority, ability and justice) also supports the finding of the previous study in the same sector in Bangladesh that managements' priority or commitment is reflected on the safety management process (Arefin, M., Islam, N., & Bapi, A., 2017).

Jaselskis et al. pointed out the importance on the involvement of employees on safety management systems towards the positive safety culture (Jaselskis, E. J., Anderson, S. D., & Russell, J. S., 1996). Factor 1 of this study (safety management and employees' involvement) also depicts the involvement of employees or workers in the safety management system where employees' opinions or suggestions regarding safety have impact on the system. This safety management system plays vital role regarding safety climate of an enterprise.

Workers trust in the safety system and communication (Factor3) have also given importance towards positive safety climate in any organization by different researchers (Pidgeon, N. F., 1991; O'Dea, A., Flin, R., 2001). So, it is evident that workers trust in the system and, communication between workers and managements as well as among the workers themselves are important factor for creating a positive safety climate in a factory or an organization.

The MANOVA shows the impacts of the demographic characteristics on the safety climate level and its factors (safety management and employees' involvement; management safety priority, ability and justice; workers trust and safety communication). A possible explanation of the result is that, the RMG factories in Bangladesh have a different environment themselves and the employees working in these factories need to follow the safety instructions strictly nevertheless of their age, gender, experience etc. Another important fact might be the understanding of the safety culture concept. As the safety culture or climate is about perceptions, the employees may not have the correct perceptions towards safety climate or culture.

Employee hierarchy (designation) has no influence on the overall safety climate of a factory, but it has influence when it comes to the workers trust in the safety systems and their communication (Factor 3). This study finds this factor important for a positive safety climate in a factory.
As mentioned earlier that the safety climate and its factors are different from organization to organization, this study also reveals the same result showing different safety climate level for three factories.

MANOVA identifies if there is any significant differences or impact of the demographics on the factors but it doesn't identify how much impact the demographics have on the safety climate level or its factors. OLS differentiates the findings from the MANOVA.

The respondents aged under 25 have a positive impact on the workers trust in the safety systems and their communication (Factor 3) compared to who aged more than 25. It's because of the working experience in the industry. For a younger person everything is new, and they can't differentiate how the safety system should be and how the communication should be between workers and managers, among the coworkers. That's why they are more concerned on this factor where the experienced ones are less concerned on this factor. May be the experienced workers pay less attention to the safety factors as they have been working for a long time in this industry. But even a near-miss can be ended-up with a serious accident and therefore a regular campaigning on safety climate is very important.

Another interesting finding from this study is that female workers have negative view on the safety management and employee's involvement (Factor 1) compared to that of male respondents. It's because the female workers aren't happy with the existing safety system and they aren't being involved in the system or their opinion regarding safety isn't being valued by the managements. So, the women workers need to be engaged in the safety dealings along with the male workers to make them feel that they are also a vital part of the safety management system in the organization.

The respondents with postgraduate degree are believed to be aware of the safety systems, safety climate etc. and their expectations from the management or the system would be higher. This study shows that they have negative view or perception on the overall safety climate, Factor 2 and Factor 3 but have positive view on the Factor 1. It could be because of their educational backgrounds. The logic is that they are being involved in the safety systems due to their educational background. As they are capable enough to differentiate good from bad, they aren't happy with workplace more specifically with the management's safety priority, ability and justice, and safety communication. On the other hand, the respondents with lower educational background are happy with the existing safety management system. This is also justified by the OLS result for the designation as it is believed that the managers are more educated than the workers in Bangladeshi context. Occupational health and safety should be added to the secondary level curriculum so that the people with lower educational background can have idea about the health and safety at workplace. Not only the curriculum, but also the print and electronic media can be the potential means in popularizing the health and safety concept to everyone.

Another interesting finding is that the respondents, who heard the term safety culture or knew what safety culture is, have negative perceptions on the safety climate level and its factors. The possible explanation is that respondents with higher educational qualification have a greater chance of hearing or knowing the safety culture concept. There is a possibility that people who knew about the safety culture, had participated in awareness or training programs or they have idea about the occupational health and safety concepts from other sources like media or social activist's group or worker's welfare associations. Therefore, the social activity regarding workplace safety should be increased in the society for improving safety climate in the industry. Proper understanding regarding labor rights, workplace accidents, occupational health and safety, safety committee and active participation to it etc. is necessary for the employees for improving safety climate in this industry.

5.3 Respondents' Suggestions on Improvement of Safety Climate

The suggestions from the respondents regarding safety culture improvement in the factories also point out the relationships of the safety climate and demographic characteristics. Not only management's commitment but also workers commitment is a must for a positive safety climate in an organization. Along with commitment, workers should be engaged in the safety management system, and their opinion should be valued accordingly.

Management should have the ability to tackle risk and safety. Moreover, competent and committed safety leader is needed for the betterment of workplace safety as well as safety climate in the RMG industry.

Other than the safety climate factors extracted by this study, another important factor came up from the respondent's suggestion. They feel that safety training is important in improving safety climate in the industry. So, there should be enough training for the workers as well as managers about safety at workplace.

Mutual trust or trust in the safety system and communication regarding safety are also necessary for a positive safety climate. Finally, they emphasized on the laws and regulations, where all the safety climate factors are present, should be followed thoroughly to improve safety climate in the RMG industry of Bangladesh.

5.4 Role of Stakeholders in Improving Safety Climate

From the stakeholder power-interest matrix, it can be said that the workers association should be in the *players* instead of *subjects*. On that note, unity among the worker's and leaders is a must to improve safety climate in the industry. Every factory has safety committee or worker's participation committee but due to the lack of proper understanding or knowledge about safety, most of the workers don't even know what decisions are being made, they just agree with the management's decisions. From the five years of my experience in this industry, I noticed that sometimes the workers (members of these committees) don't even know what the agenda of the last meeting was. The members of these safety committees should be well known about the safety and they must play active role in this regard.

Along with the workers association, the employer's association should be in the *players* instead of *context setters* to improve safety climate in the industry. To do so, the employer's association needs to give more attention on the workplace safety. As it was mentioned earlier that employers are always busy with making profits, they should think about the working conditions they are providing to the workers. Employers' associations can pressurize the factory owners to make positive safety climate in the respective organizations by arranging workshops or awareness programs regarding business ethics, corporate social responsibility etc.

6 Conclusion

As the RMG industry has been boosting up in Bangladesh, the accident rate has also been increasing in that industry over the last decade. To explain the relationship, safety climate was measured in three RMG factories in Bangladesh using the NOSACQ-50 questionnaire survey. The result revealed that these factories had a highly positive safety climate, and it can be said that these factories hadn't have any accidents due to the positive safety climate.

Three factors namely 'safety management and employee's involvement', 'management safety priority, ability and justice', and 'worker's trust and safety communication' represent the safety climate in the RMG industry of Bangladesh. Educational qualification has a significant impact on the perceptions of the respondents. The study also found that employee hierarchy, gender of respondents have impact on the safety climate perception specially for different factors.

The younger people have a positive impact on the workers trust in the safety systems and their communication compared to older people. May be the experienced workers pay less attention to the safety factors as they have been working for a long time in this industry. The female workers aren't happy with the existing safety system and they aren't being involved in the system or their opinion regarding safety isn't being valued by the managements. This study shows that the people with higher educational background have negative safety climate perception. They have also negative perceptions on the 'management safety priority, ability and justice' and 'worker's trust and safety communication' but they have positive perception on 'safety management and employee's involvement' as they are involved in the safety management systems. As they are capable enough to differentiate good from bad, they aren't happy with workplace more specifically with the management's safety priority, ability and justice, and safety communication. On the other hand, the respondents with lower educational background are happy with the existing safety management system. Another interesting finding is that the respondents, who heard the term safety culture or knew what safety culture is, have negative perceptions on the safety climate level and its factors. It may be because of the respondents with higher educational qualification have a greater chance of hearing or knowing the safety culture concept.

The people believe that if the management follows the existing laws and regulations, safety climate in this industry can be improved. Managements need to engage the employees in the decision-making process regarding safety. Along with leadership, management ability is also an important factor in improving the safety climate in the sector. Commitment from both workers and managers is required to improve safety climate in the industry.

Stakeholders always play vital role in projects. To improve the safety climate in the RMG sector of Bangladesh, workers association and employer's association need to be more active in this regard. Workers as an individual or a group need to understand the occupational health and safety issues to take part actively in the safety committees or participatory committees. They can't play any sustainable role if they don't have knowledge regarding the safety.

It is very important for the government not only setting up safety laws or regulations, rather making the target population understand the importance of the regulations are crucial. Employees and the workers of this sector need to understand the essence of the safety rules and procedures. They need to feel that the safety procedures are for their betterment and they must follow these. And, they should also inspire others to follow the safety instructions provided by the concerned authorities. For this to happen, the workers and managers must participate to the decision-making process regarding safety in organizational level as well as national level.

7 Future Research Scope

The sample size of the study is too small compared to the population of the industry. The same study can be carried out with large sample size which is statistically significant and reflective of the whole RMG industry of Bangladesh.

Only demographic characteristics of the respondents have been considered in this study but there are other features that might be related to the safety climate e.g. production, health of the respondents, number of inspections made by buyers or labor inspectorate. Factory size could be of a matter of interest for the safety climate. Buyers and brands e.g. European or American buyers can also be considered to see the difference in the safety climate. There are many small third-party factories or subcontractors that take orders from another factory instead of buyers directly. This study can further be extended to see if there is any safety climate difference exists between 100% export-oriented factories and subcontractor factories. More variables can be considered like whether the factory is in a rented building or in a shared building etc.

The survey can be carried out in a place where the respondents are totally fear free from the management. If the survey or interview takes place in the factory premises, there is a tendency of the respondents that they try to answer positively. So, to be free from this bias, a time consuming and independent place is important for survey or interview.

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Appendixes

Appendix A: NOSACQ-50 (English)

NOSACQ-50-English

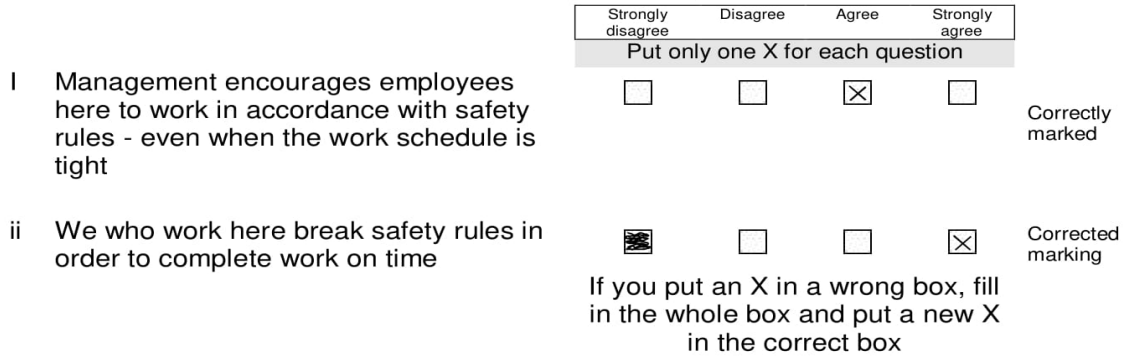
Nordic occupational safety climate questionnaire

The purpose of this questionnaire is to get your view on safety at this workplace. Your answers will be processed on a computer and will be dealt with confidentially. No individual results will be presented in any way. Although we want you to answer each and every question, you have the right to refrain from answering any one particular question, a group of questions, or the entire questionnaire.

I have read the above introduction to the questionnaire and agree to complete the questionnaire under the stated conditions	☐ Yes

The questionnaire is developed by a Nordic working group of work environment specialists with financial support from the Nordic Council of Ministers

Examples of how to register your answers



Background information

A Year of birth? 19 |___|___| 20 |___|___|

B Are you ☐ Male ☐ Female

C Do you have a managerial position, e.g. manager, supervisor? ☐ No ☐ Yes. Which? _____

In the following section please describe how you perceive that the managers and supervisors at this workplace deal with safety. Although some questions may appear very similar, please answer each one of them.

	Strongly disagree	Disagree	Agree	Strongly agree
	Put only one X for each question			
1. Management encourages employees here to work in accordance with safety rules - even when the work schedule is tight	☐	☐	☐	☐
2. Management ensures that everyone receives the necessary information on safety	☐	☐	☐	☐
3. Management looks the other way when someone is careless with safety	☐	☐	☐	☐
4. Management places safety before production	☐	☐	☐	☐
5. Management accepts employees here taking risks when the work schedule is tight	☐	☐	☐	☐
6. We who work here have confidence in the management's ability to deal with safety	☐	☐	☐	☐
7. Management ensures that safety problems discovered during safety rounds/evaluations are corrected immediately	☐	☐	☐	☐
8. When a risk is detected, management ignores it without action	☐	☐	☐	☐
9. Management lacks the ability to deal with safety properly	☐	☐	☐	☐

Although some questions may appear very similar, please answer each one of them

		Strongly disagree	Disagree	Agree	Strongly agree
		Put only one X for each question			
10.	Management strives to design safety routines that are meaningful and actually work	☐	☐	☐	☐
11.	Management makes sure that everyone can influence safety in their work environment	☐	☐	☐	☐
12.	Management encourages employees here to participate in decisions which affect their safety	☐	☐	☐	☐
13.	Management never considers employees' suggestions regarding safety	☐	☐	☐	☐
14.	Management strives for everybody at the worksite to have high competence concerning safety and risks	☐	☐	☐	☐
15.	Management never asks employees for their opinions before making decisions regarding safety	☐	☐	☐	☐
16.	Management involves employees in decisions regarding safety	☐	☐	☐	☐
17.	Management collects accurate information in accident investigations	☐	☐	☐	☐
18.	Fear of sanctions (negative consequences) from management discourages employees here from reporting near-miss accidents	☐	☐	☐	☐
19.	Management listens carefully to all who have been involved in an accident	☐	☐	☐	☐

Although some questions may appear very similar, please answer each one of them

		Strongly disagree	Disagree	Agree	Strongly agree
		Put only one X for each question			
20.	Management looks for causes, not guilty persons, when an accident occurs	☐	☐	☐	☐
21.	Management always blames employees for accidents	☐	☐	☐	☐
22.	Management treats employees involved in an accident fairly	☐	☐	☐	☐

In the following section please describe how you perceive that employees at this workplace deal with safety

23.	We who work here try hard together to achieve a high level of safety	☐	☐	☐	☐
24.	We who work here take joint responsibility to ensure that the workplace is always kept tidy	☐	☐	☐	☐
25.	We who work here do not care about each others' safety	☐	☐	☐	☐
26.	We who work here avoid tackling risks that are discovered	☐	☐	☐	☐
27.	We who work here help each other to work safely	☐	☐	☐	☐
28.	We who work here take no responsibility for each others' safety	☐	☐	☐	☐

Although some questions may appear very similar, please answer each one of them

		Strongly disagree	Disagree	Agree	Strongly agree
		Put only one X for each question			
29.	We who work here regard risks as unavoidable	☐	☐	☐	☐
30.	We who work here consider minor accidents to be a normal part of our daily work	☐	☐	☐	☐
31.	We who work here accept dangerous behaviour as long as there are no accidents	☐	☐	☐	☐
32.	We who work here break safety rules in order to complete work on time	☐	☐	☐	☐
33.	We who work here never accept risk-taking even if the work schedule is tight	☐	☐	☐	☐
34.	We who work here consider that our work is unsuitable for cowards	☐	☐	☐	☐
35.	We who work here accept risk-taking at work	☐	☐	☐	☐
36.	We who work here try to find a solution if someone points out a safety problem	☐	☐	☐	☐
37.	We who work here feel safe when working together	☐	☐	☐	☐
38.	We who work here have great trust in each others' ability to ensure safety	☐	☐	☐	☐

Although some questions may appear very similar, please answer each one of them

		Strongly disagree	Disagree	Agree	Strongly agree
		Put only one X for each question			
39.	We who work here learn from our experiences in order to prevent accidents	☐	☐	☐	☐
40.	We who work here take each others' opinions and suggestions concerning safety seriously	☐	☐	☐	☐
41.	We who work here seldom talk about safety	☐	☐	☐	☐
42.	We who work here always discuss safety issues when such issues come up	☐	☐	☐	☐
43.	We who work here can talk freely and openly about safety	☐	☐	☐	☐
44.	We who work here consider that a good safety representative plays an important role in preventing accidents	☐	☐	☐	☐
45.	We who work here consider that safety rounds/evaluations have no effect on safety	☐	☐	☐	☐
46.	We who work here consider that safety training to be good for preventing accidents	☐	☐	☐	☐
47.	We who work here consider early planning for safety as meaningless	☐	☐	☐	☐
48.	We who work here consider that safety rounds/evaluations help find serious hazards	☐	☐	☐	☐
49.	We who work here consider safety training to be meaningless	☐	☐	☐	☐
50.	We who work here consider it important to have clear-cut goals for safety	☐	☐	☐	☐

If you wish to elaborate on some of your answers, or if you have any comments regarding the study, you are welcome to write them here.

Comments:

_____

_____

_____

☺ Thank you for filling in the questionnaire. Please ensure you have checked off the box on the front page showing that you have given your informed consent to participate in the study ☺

nfa.dk/NOSACQ

Appendix B: Modified NOSACQ (Bangla)

আমি , আবদুল কাইউম, ডেনমার্কের আলবর্গ বিশ্ববিদ্যালয়ে 'রিস্ক এন্ড সেইফটি' বিষয়ে অধ্যয়নরত। আমার মাস্টার্স থিসিসের অংশ হিসেবে এই জরিপ করা হচ্ছে। এই জরিপের উদ্দেশ্য হলো কর্মস্থলের সেইফটি কালচার ও তার প্রতিকার সম্পর্কে আপনার মতামত নেয়া। এখানে সঠিক বা ভুল উত্তর বলতে কিছু নেই বরং আপনার মতামতই মূখ্য। আপনার উত্তরগুলো কম্পিউটারের মাধ্যমে গোপনীয়তার সাথে পরবর্তী এনালাইসিসে ব্যবহৃত হবে। আপনার সম্পর্কে বা আপনার দেওয়া কোন তথ্য (উত্তর) এমনভাবে ব্যবহার করা হবে যাতে আপনাকে সনাক্ত করা সম্ভব না হয়। এই জরিপের সাথে কোন সরকারি দপ্তর বা প্রতিষ্ঠানের কোন সম্পর্ক নেই। এটা সম্পুর্ণ আমার ব্যক্তিগত পড়াশোনার অংশ হিসেবে করা হচ্ছে। এছাড়াও এই জরিপ বিষয়ে কোন প্রশ্ন বা জিজ্ঞাসা থাকলে নিম্নোক্ত মোবাইল ও ইমেইলে যোগাযোগ করার জন্য অনুরোধ করা হলো।

ধন্যবাদান্তে,

আবদুল কাইউম
মোবাইল নং- ০১৯১৫৫৬৮৪৬৩
ইমেইল- akaium.du@gmail.com

ম্যানেজার ও সুপারভাইজরগণ কর্মস্থলে সেইফটিকে কিভাবে ডিল করে সে ব্যাপারে নিচের অংশে দয়া করে আপনার মতামত দিন। যদিও কিছু প্রশ্ন একরকম মনে হতে পারে কিন্তু অনুগ্রহপূর্বক সবগুলোর উত্তর দিন।

	কোনভাবেই একমত নই	একমত নই	একমত	সম্পূর্ণ একমত
	প্রত্যেক প্রশ্নের উত্তরে শুধু একটি টিক (√) চিহ্ন দিন			
1. কাজের চাপ বেশি হলেও আমাদের ফ্যাক্টরিতে ম্যানেজমেন্ট শ্রমিকদের সেইফটি আইনানুযায়ী কাজ করতে বলেন	☐	☐	☐	☐
2. প্রত্যেকেই সেইফটি বিষয়ে প্রয়োজনীয় তথ্য পেলো কিনা তা ম্যানেজমেন্ট নিশ্চিত করে	☐	☐	☐	☐
3. কেউ সেইফটি বিষয়ে উদাসীন থাকলেও ম্যানেজমেন্ট তা খেয়াল করে না	☐	☐	☐	☐
4. ম্যানেজমেন্ট প্রোডাকশনের চেয়ে সেইফটিকে বেশি গুরুত্ব দেয়	☐	☐	☐	☐
5. যখন কাজের চাপ বেশি থাকে, তখন শ্রমিকরা রিস্ক বা ঝুঁকি নিয়ে কাজ করলেও ম্যানেজমেন্ট তা মেনে নেয়	☐	☐	☐	☐
6. এই ফ্যাক্টরিতে আমরা যারা কাজ করি, ম্যানেজমেন্টের সেইফটি বিশয়ে ডিল করার দক্ষতার ব্যাপারে আমাদের আস্থা আছে	☐	☐	☐	☐
7. সেইফটি রাউন্ড বা পরিদর্শনের সময় সেইফটি সংক্রান্ত কোন সমস্যা চিহ্নিত হলে ম্যানেজমেন্ট তাঁর দ্রুত সমাধান নিশ্চিত করে	☐	☐	☐	☐
8. কোন রিস্ক বা ঝুঁকি বা সমস্যা খুজে পাওয়া গেলে, ম্যানেজমেন্ট তা পাত্তা দেয় না (আমলে নেয় না)	☐	☐	☐	☐
9. সেইফটি বিশয়ে সঠিক সিদ্বান্ত নেয়ার ব্যাপারে ম্যানেজমেন্টের দক্ষতার অভাব রয়েছে	☐	☐	☐	☐

		কোনভাবেই একমত নই	একমত নই	একমত	সম্পূর্ণ একমত
		প্রত্যেক প্রশ্নের উত্তরে শুধু একটি টিক (√) চিহ্ন দিন			
10.	অর্থবহ ও ফলপ্রসূ সেইফটি রুটিন তৈরিতে ম্যানেজমেন্ট সচেষ্ট থাকে	☐	☐	☐	☐
11.	সবাই যেন স্ব স্ব কর্মপরিবেশে সেইফটি বিষয়ে ভূমিকা রাখতে পারে ম্যানেজমেন্ট তা নিশ্চিত করে	☐	☐	☐	☐
12.	ম্যানেজমেন্ট কর্মচারিদের সেইফটি সম্পর্কিত সিদ্বান্ত গ্রহণে তাদের অংশগ্রহণকে উৎসাহিত করে	☐	☐	☐	☐
13.	সেইফটি বিষয়ে কর্মচারিদের সুপারিশ ম্যানেজমেন্ট কখোনই বিবেচনায় নেয় না	☐	☐	☐	☐
14.	ম্যানেজমেন্ট আশা করে যে, কর্মস্থলে সবার রিস্ক এবং সেইফটি বিষয়ে ভালো দক্ষতা থাকবে	☐	☐	☐	☐
15.	সেইফটি বিষয়ে কোন সিদ্ধান্ত নেয়ার আগে ম্যানেজমেন্ট কখনোই কর্মচারিদের মতামত নেয় না	☐	☐	☐	☐
16.	ম্যানেজমেন্ট কর্মচারিদের সংগে নিয়ে সেইফটি বিষয়ে সিদ্ধান্ত নেয়	☐	☐	☐	☐
17.	দূর্ঘটনার তদন্তের ক্ষেত্রে ম্যানেজমেন্ট প্রকৃত তথ্য বের করে	☐	☐	☐	☐
18.	ম্যানেজমেন্ট কর্তৃক হয়রানির ভয়ের কারণে কর্মচারিরা প্রায়/দূর্ঘটনাগুলো প্রকাশ করতে চায় না	☐	☐	☐	☐
19.	দূর্ঘটনায় জড়িত সবার কথা ম্যানেজমেন্ট মনোযোগ/গুরুত্ব দিয়ে শুনে	☐	☐	☐	☐

		কোনভাবেই একমত নই	একমত নই	একমত	সম্পূর্ণ একমত
		প্রত্যেক প্রশ্নের উত্তরে শুধু একটি টিক (√) চিহ্ন দিন			
20.	কোন দুর্ঘটনা ঘটলে ম্যানেজমেন্ট কে করলো তাঁর চেয়ে কেন ঘটলো সেটা দেখে	☐	☐	☐	☐
21.	ম্যানেজমেন্ট সবসময় দূর্ঘটনার জন্য কর্মচারিদের দায়ি করে	☐	☐	☐	☐
22.	ম্যানেজমেন্ট দূর্ঘটনায় কবলিত/জড়িত কর্মচারিদের সাথে ন্যায় আচরণ করে	☐	☐	☐	☐

কর্মচারি বা শ্রমিকগণ কর্মস্থলে সেইফটি কে কিভাবে ডিল করে সে ব্যাপারে নিচের অংশে দয়া করে আপনার মতামত দিন।

23.	আমরা (যারা এখানে কাজ করি) সবাই মিলে সেইফটির উচ্চমান অর্জন বজায় রাখতে সর্বোচ্চ চেষ্টা করি	☐	☐	☐	☐
24.	কর্মস্থল যাতে সবসময় ভালো থাকে সেজন্য আমরা যৌথভাবে দায়িত্ব নেই	☐	☐	☐	☐
25.	আমরা কেউ অন্যের সেইফটির ব্যাপারে পাত্তা দেই না	☐	☐	☐	☐
26.	কোন রিস্ক বা ঝুঁকি দেখা দিলে তা সমাধান করা এড়িয়ে চলি।	☐	☐	☐	☐
27.	কাজ নিরাপদে করার জন্য আমরা একে অপরকে সাহায্য করি	☐	☐	☐	☐
28.	আমরা একজন আরেকজনের সেইফটির ব্যাপারে কোন দায়িত্ব বা জিম্মাদারি নেই না	☐	☐	☐	☐

	কোনভাবেই একমত নই	একমত নই	একমত	সম্পূর্ণ একমত
	প্রত্যেক প্রশ্নের উত্তরে শুধু একটি টিক (√) চিহ্ন দিন			
29. আমরা মনে করি রিস্ক বা ঝুঁকি পরিহারযোগ্য নয়	☐	☐	☐	☐
30. আমরা ছোট-খাটো দূর্ঘটনাগুলোকে আমাদের দৈনন্দিন কাজের স্বাভাবিক ব্যাপার বলে বিবেচনা করি	☐	☐	☐	☐
31. যতক্ষন না পর্যন্ত কোন দূর্ঘটনা ঘটে ততক্ষন পর্যন্ত যেকোন বিপজ্জনক ঘটনাকে আমরা গ্রহণ করি বা স্বাভাবিক বলে ধরে নেই	☐	☐	☐	☐
32. কাজ সময়মতো শেষ করার জন্য আমরা সেইফটির নিয়ম ভঙ্গ করি	☐	☐	☐	☐
33. আমরা কখনোই রিস্ক নেই না এমনকি কাজের চাপ বেশি থাকলেও	☐	☐	☐	☐
34. আমরা মনে করি যারা কাপুরুষ বা ভীতু তারা এই কাজের জন্য যোগ্য নয়	☐	☐	☐	☐
35. কাজের সময় রিস্ক বা ঝুঁকি নেয়াকে আমরা স্বাভাবিক মনে করি	☐	☐	☐	☐
36. কেউ যদি সেইফটি সংক্রান্ত কোন সমস্যা চিহ্নিত করে সেক্ষেত্রে আমরা তার একটা সমাধান খুজে বের করার চেষ্টা করি	☐	☐	☐	☐
37. আমরা যারা এখানে কাজ করি নিজেদেরকে নিরাপদ অনুভব করি যখন একসাথে কাজ করি	☐	☐	☐	☐
38. আমরা বিশ্বাস করি যে, সেইফটি নিশ্চিত করার ব্যাপারে সবার দক্ষতা রয়েছে	☐	☐	☐	☐

		কোনভাবেই একমত নই	একমত নই	একমত	সম্পূর্ণ একমত
		প্রত্যেক প্রশ্নের উত্তরে শুধু একটি টিক (√) চিহ্ন দিন			
39.	দূর্ঘটনা প্রতিরোধ করার জন্য আমরা আমাদের অভিজ্ঞতা থেকে শিখি	☐	☐	☐	☐
40.	সেইফটি বিষয়ে আমরা একে অপরের মতামত ও সুপারিশ গুরুত্ব সহকারে নেই	☐	☐	☐	☐
41.	আমাদের মধ্যে সেইফটি বিষয়ে কদাচিৎ আলাপ হয়	☐	☐	☐	☐
42.	আমরা সবসময় সেইফটি বিষয় নিয়ে আলোচনা করি যখনই এ বিষয়টা সামনে আসে	☐	☐	☐	☐
43.	আমরা সেইফটি বিষয়ে প্রকাশ্যে ও মুক্তভাবে কথা বলতে পারি	☐	☐	☐	☐
44.	আমাদের মতে একজন ভালো সেইফটি প্রতিনিধি দুর্ঘটনা প্রতিরোধে গুরুত্বপূর্ণ ভুমিকা পালন করে	☐	☐	☐	☐
45.	আমাদের মতে সেইফটি রাউন্ড বা মূল্যায়ন কর্মপরিবেশের সেইফটিতে কোন ভূমিকা পালন করে না	☐	☐	☐	☐
46.	আমাদের মতে সেইফটি বিষয়ে প্রশিক্ষণ দুর্ঘটনা প্রতিরোধের জন্য ভালো হবে।	☐	☐	☐	☐
47.	আমরা মনে করি সেইফটি বিষয়ে পূর্ব-পরিকল্পনা অর্থহীন	☐	☐	☐	☐
48.	আমাদের মতে, সেইফটি রাউন্ড বা মূল্যায়ন মারাত্মক ঝুঁকি বা সিরিয়াস হ্যাজার্ড শনাক্তকরণে সাহায্য করে	☐	☐	☐	☐
49.	আমাদের মতে সেইফটি বিষয়ক ট্রেনিং অর্থহীন বা কোন কাজে আসে না	☐	☐	☐	☐
50.	আমাদের মতে, সেইফটি বিষয়ে ক্লিয়ার-কাট বা পরিস্কার লক্ষ্য থাকাটা গুরুত্বপুর্ণ	☐	☐	☐	☐

কারখানায় সেইফটি কালচার কিভাবে উন্নতি (ইমপ্রোভ) করা যায় সে বিষয়ে দয়া করে আপনার মতামত দিন

	কোনভাবেই একমত নই	একমত নই	একমত	সম্পূর্ণ একমত
	প্রত্যেক প্রশ্নের উত্তরে শুধু একটি টিক (√) চিহ্ন দিন			
৫১। ম্যানেজমেন্টের সেইফটি কমিটমেন্ট থাকতে হবে	☐	☐	☐	☐
৫২। শ্রমিকদের সেইফটি কমিটমেন্ট থাকতে হবে	☐	☐	☐	☐
৫৩। সেইফটি কমিটিকে শক্তিশালী বা অর্থবহ করে সেইফটি সম্পর্কিত যেকোন বিষয়ে শ্রমিক-মালিক মিলে সিদ্ধান্ত নেয়া।	☐	☐	☐	☐
৫৪। সেইফটি নিয়ম-নীতি পালন করার ক্ষেত্রে কোন ছাড় না দেয়া।	☐	☐	☐	☐
৫৫। শ্রমিকদের জন্য নিয়মিত সেইফটি ট্রেনিং এর ব্যবস্থা করা।	☐	☐	☐	☐
৫৬। ম্যানেজমেন্টের সেইফটি বিষয়ে ডিল করার ক্ষেত্রে যথেষ্ঠ দক্ষতা থাকা।	☐	☐	☐	☐
৫৭। ভালো, দক্ষ এবং কমিটেড সেইফটি লিডার থাকা জরুরি	☐	☐	☐	☐
৫৮। সেইফটি বিষয়ে ম্যানেজমেন্ট-শ্রমিক কমিউনিকেশন উন্নত করা।	☐	☐	☐	☐
৫৯। কর্মস্থলে শ্রমিক-শ্রমিক এবং শ্রমিক-ম্যানেজমেন্ট পারস্পারিক আস্থা ও সহযোগিতা থাকা।	☐	☐	☐	☐

আপনি যদি আপনার কোন উত্তর ব্যাখ্যা করতে চান, অথবা আপনি যদি এই জরিপ সম্পর্কে কোন মন্তব্য করতে চান, এখানে করতে পারেন।

মন্তব্য:

_____

_____

_____

আপনার সম্পর্কে তথ্য (সম্পূর্ণ গোপন থাকবে)

A আপনার বয়স : _____বছর

B আপনি ☐ পুরুষ ☐ নারী

C আপনার শিক্ষাগত যোগ্যতা

প্রাইমারি	
এস এস সি/দাখিল	
এইচ এস সি/আলিম	
স্নাতক/বিএ/সম্মান/ফাযিল	
স্নাতকোত্তর/মাস্টার্স/কামিল	

D আপনি কি ম্যানেজারিয়াল পদে আছেন যেমন সুপারভাইজার, ম্যানেজার (ব্যবস্থাপক) ইত্যাদি ☐ না ☐ হাঁ হলে পদের নাম লিখুন

E আপনি এই ফ্যাক্টরিতে কত দিন ধরে চাকরি করছেন
☐ ০-৫ বছর ☐ ৬-১৫ বছর ☐ ১৫ বছরের অধিক

F আপনি কোন শিফটে চাকরি করেন
☐ দিন ☐ রাত

G এখানে কাজ শুরু করার আগে কতগুলো ফ্যাক্টরিতে আপনি কাজ করেছেন

☐ ০ ☐ ১-২ ☐ ৩-৫ ☐ ৫ এর অধিক

H আপনি কি 'সেইফটি কালচার (সংস্কৃতি)' শব্দটি কখনো শুনেছেন ☐ না ☐ হ্যাঁ?

I আপনি কি জানেন 'সেইফটি কালচার' কি ☐ না ☐ হ্যাঁ (নিচে লিখুন)

Appendix C: Positively and Reversely Formulated Questions.

	Positively formulated items	Reversed formulated items
Dimension 1 - Management safety priority and ability (9 items):	A1, A2, A4, A6, A7	A3, A5, A8, A9
Dimension 2 - Management safety empowerment (7 items):	A10, A11, A12, A14, A16	A13, A15
Dimension 3 – Management safety justice (6 items):	A17, A19, A20, A22	A18, A21
Dimension 4 – Workers' safety commitment (6 items):	A23, A24, A27	A25, A26, A28
Dimension 5 - Workers' safety priority and risk non-acceptance (7 items):	A33	A29, A30, A31, A32, A34, A35
Dimension 6 – Peer safety communication learning, and trust in safety ability (8 items):	A36, A37, A38, A39, A40, A42, A43	A41
Dimension 7 – workers' trust in efficacy of safety systems (7 items):	A44, A46, A48, A50	A45, A47, A49

Appendix D: Interview Questions

[**Introduction and confidentiality about the interview.**]

[The interview questions were based on the questionnaire items. There are 10 main questions and they were followed by some other complementary questions based on the survey questionnaire.]

Question 1: What did you understand by the term management in the questionnaire?

Question 2: Can you give some examples of how the management deals with production and safety in the factory?

Question 3: How do you understand management's ability to manage safety?

Question 4: Can you tell me where you personally involved in safety-related decisions?

Question 5: Can you give some examples of how management manages the employees to work safely?

Question 6: What do you think about communication with coworkers as well as with senior managers?

Question 7: Do you have faith in the safety systems as well as in your bosses?

Question 8: What do you think about the overall safety in your factory?

Question 9: How can you improve the safety climate in your factory?

Question 10: What is your opinion about this survey regarding safety climate?