MODELING TO INTEGRATE THE INTERNATIONAL STANDARDS WITH TOTAL QUALITY MANAGEMENT PHILOSOPHY

by

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Declaration

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Abstract

The aim of the present study is to develop an Integrated Management System (IMS) and its implementation framework for RMG industries of Bangladesh. RMG industries are using several management standards in their organizations to increase the performance of a firm in different business dimensions such as quality, occupational health & safety, environment, and social responsibility management. They are also using other management standards depending upon the requirement of customers. As a result, the number of individual management system is increasing day by day as the requirements of customer varies from one to another. RMG industries of Bangladesh are also facing difficulties to implement and operate these individual management systems separately. The key challenge of running of multiple management systems is to split the total budget and human resource of an organization into the multiple management systems. Each management system will get a little amount of budget and human resource, which is not sufficient to implement a management system effectively and efficiently. Consequently, many of the objectives of individual management systems are often left unachievable due to its poor implementation. In addition, the performance of RMG industries in Bangladesh is declining in four disciplines of management. These are quality, environment, occupational health & safety, and social responsibility. Consequently, RMG industries of Bangladesh are losing their values to the customer and in the long run they may not be able to survive in the competitive market. In this context, RMG industries of Bangladesh are forced to adopt an integrated management system in their organizations. A small number of RMG industries of Bangladesh have come forward to develop an Integrated Management System (IMS) for their organizations. As they have no model for integration of management systems, they have built their own IMS based on common elements present in different management standards. The RMG industries of Bangladesh are not getting the desired benefit from their own developed IMS due to lack of developing organizational culture. For successful implementation of any IMS, it is essential to bring change in culture within an organization. In order to bring change in culture within the organization, multiple management systems are to be integrated under a holistic management system. It is evident from the literature that, TQM is a holistic management system. This manifests the demand of developing a model that will be holistic in nature and can accommodate various management standards. In the present work, we have developed an IMS by integrating different management systems under the philosophy of TQM. The IMS has developed in this study is named as Integrated Total Quality Management (ITQM) system. While integrating multiple management systems in this way, several issues come up. Some of the most important issues are: i) identifying the scope and impact of integration, ii) identifying the factors that lead to success or failure of TQM implementation, and iii) developing

and validating an effective implementation framework for ITQM system. The following paragraphs will summarize how each of the above issues were addressed in the present study.

To define the scope of integration, it is important to know which management standards are to be integrated to formulate an IMS so that every RMG industry of Bangladesh can use this IMS. To do so, we have conducted a survey in RMG industries of Bangladesh. We have found that, RMG sector of Bangladesh are widely using four management standards such as ISO 9001: 2015, ISO 14001: 2015, OHSAS 18001: 2007, and SA 8000: 2014. Most of the RMG industries of Bangladesh have adopted these standards separately while a small number of industries have adopted two or three of those management standards in an integrated way. However, no industry has integrated four management standards so far. It is important to mention that, the management standards that have not yet been integrated are operating separately in the respective industries. Each RMG industry of Bangladesh will be able to use an IMS if it is composed of commonly used management standards in this sector. In this context, the present study has integrated these four management standards under the holistic management philosophy of TQM. Integration of these four management systems creates a single comprehensive management system. This management system addresses a wide-ranging area encompassing the individual and overlapping areas of these four management systems. After defining the scope, it is important to evaluate the impact of integration.

To evaluate the impact of management systems integration, it is important to assess the impact in terms of improving firm performance. An in-depth review of literature has been conducted to identify the areas where an IMS can improve firm performance. Several researchers pointed out that IMS may enhance the performance of a firm both in financial and operational areas of business. So far, our knowledge goes, very few empirical evidences have found in the literature in favor of this statement. IMS may increase the financial performance of a firm in many ways. Three most important ways of improving financial performance widely discussed in the literature are; improving cost efficiency, optimum use of resources, and increasing sales revenue. On the other hand, IMS may increase the operational performance of a firm in the field of quality, environment, occupational health & safety, and social responsibility. The most important ways to increase firm performance in these fields are; to reduce the production rate of defective product, air pollution level, number of occupational illness and to increase the employment opportunity for the community. The present study has conducted an empirical examination to confirm the impact of ITQM system on financial as well as operational performance of a firm. The outcome of empirical examination has showed that ITQM system can improve financial performance through increase of sales revenue. It can also improve operational performance by reducing the number of

defective products, level of air pollution, number of occupational accident or illness, and by creating new job opportunities for local people. After delineating the scope and assessing the impact of integration, it is necessary to recognize the factors that are critical to the implementation of ITQM system.

As we are trying to implement ITQM system using TQM framework, it is important to identify those factors that are critical to TQM implementation in RMG sector. Critical factors are of two kinds. Some factors enable TQM implementation while some others hinder TQM implementation. An in-depth review of literature has been conducted to identify the factors which are helpful for successful implementation of TQM in RMG sector. These factors are known as TQM enabling factor. Twenty-five of such factors have been identified from TQM literature. As these enabling factors are contextual, it has been empirically examined which of these factors are significant for the RMG industries of Bangladesh. The empirical study of identifying significant TQM enabling factors has been carried out in four steps. At first step, a conceptual model which consists of measurement model and structural model has been developed. In second step, the hypotheses have been developed. In third step, the validation of the measurement and structural model have been performed. And finally, the testing of hypothesis has been conducted. More specifically, the conceptual model consists of six constructs. Five of them have been formulated with five groups of TQM enabling factors such as human resources, contextual, procedural, strategic, and structural while the rest has been formulated with implementation of TQM. In addition, the measurement model has two measuring scales. The first scale is concerned with measuring the five groups of TQM enabling factors while the other scale is concerned with measuring the success of TQM implementation. Five groups of TQM enabling factor are measured in terms of degree to which enabling factors are contributing to implement TQM principles in an organization. The success of TQM implementation is measured in terms of improving financial and operational performance of a firm. A questionnaire has been then developed based on previous questions in the literature and expert opinion. This questionnaire has been pilot tested before conducting the survey. The reliability of questionnaire has been tested by Cronbach alpha value. The accuracy of the measurement model has been verified through convergent as well as divergent validity test. The structural model represents the causal relationship of five groups of TQM enabling factors with implementation of TQM. Fitness and correctness of structural model have been checked through model fit index and causality index respectively. All tested values have been found satisfactory. Finally, the hypotheses have been tested using structural equation modelling. The test results have suggested that, five TQM enabling factors in procedural group such as benchmarking of current processes, knowledge about cost of quality, regular monitoring of processes improvement, and degree of simplicity of a process are not significant for RMG

industries of Bangladesh. However, the enabling factors of the remaining four groups will assist in successful implementation of TQM in RMG sector.

To identify the factors that hinder the successful implementation of TQM in RMG sector, an in-depth review of literature has also been conducted. These factors are known as TQM barrier. Twenty-five of such barriers have been identified from the literature. All of these twenty-five barriers do not hinder TQM implementation in the same way. Some of the barriers may be more critical to TQM implementation while some others are less critical. In other words, hindrance level of these TQM barriers varies with the economic condition and cultural values of a country. To identify the hindrance level of these twenty-five TQM barriers in the context of RMG industries of Bangladesh, these barriers have been prioritized using FAHP technique. This study of prioritization of TQM barriers has been carried out in five steps. At first step, a hierarchical structure of TQM barriers has been developed. In second step, a fuzzy scale has been designed for measuring the expert's judgement. In third step, the consistency ratio has been estimated for checking the accuracy of expert opinion. In fourth step, the local and global weight of each barrier have been estimated. And finally, TQM barriers have been prioritized based on calculated global weights. Some of the important barriers identified by prioritizing of TQM barriers are; inappropriate planning for implementation, lack of financial support, lack of employee training, lack of empowerment of employees, lack of physical resources, lack of top management commitment, lack of practicing a quality management system, inappropriate organizational structure, lack of customer satisfaction, no benchmarking of current process, etc.

Finally, a framework for implementation of the ITQM system has been developed. The implementation framework has been empirically tested in order to decide if this framework would work properly in the RMG sector of Bangladesh. This empirical study has four hypotheses. First hypothesis is "quality management sub-system of IMS has a positive relation with firm performance". Second hypothesis is "environmental management sub-system of IMS has a positive relation with firm performance". Third hypothesis is "occupational health & safety management sub-system of IMS has a positive relation with firm performance". Fourth hypothesis is "Social responsibility management sub-system of IMS has a positive relation with firm performance". All hypotheses have been found statistically significant. It indicates that all four management sub-systems of ITQM system will help a firm to improve its performance. In other words, the proposed framework could be used to implement the ITQM system successfully in RMG sector of Bangladesh.

The outcome of this research possesses some originality. First, it has empirically examined the combined effect of several individual management systems on firm performance. Second, all

the IMS models that have been developed so far are only theoretical concepts, no information has been found in the literature on the practical use of these models. In this context, the present study has proposed a framework for implementation of ITQM system and at the same time, it has validated the proposed framework empirically.

This study has also some theoretical implications. First, it has successfully identified the linkage between IMS and TQM which will enrich the existing literature. Second, it has outlined the way to develop an IMS under the philosophy of TQM in order to create a continuous improvement culture within the organization for its (IMS) successful adoption. Third, it offers an important insight into the development of an instrument (survey tool) for measuring several aspects of an integrated management system. Fourth, it has outlined the way to share common resources of an organization by combining the operational processes of different management sub-systems of ITQM system or its parts.

This research outcome has some practical implications too. First, the outcome will help the manager to understand the combined role of four management standards on firm's performance improvement. Second, managers will get an opportunity for better utilization of the limited resources of their organizations through successful implementation of ITQM system. Third, this research has outlined a mechanism for handling the overlapping areas of the different management disciplines. Finally, this research provides an immense scope to RMG industries of Bangladesh to directly adopt this ITQM system in their organizations without any customization or modification.

At last but not least, this study has put forward some suggestions for future research. First, to generalize the findings of the present study, replication of this study is essential in different context, location, and culture. Second, this study could be replicated over longitudinal time frame to examine whether the finding of the current study change over time. Third, future study could identify the relationship among the management sub-system of ITQM system. Fourth, future study could incorporate different organizational theories in management system integration.

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Publications Associated with this Thesis

Journal articles

[1] Talapatra, S. and Uddin, M.K. (2019), "Prioritizing the barriers of TQM implementation from the perspective of garment sector in developing countries", Benchmarking: An International Journal, Vol. 26 No. 7, pp. 2205-2224. doi: 10.1108/BIJ-01-2019-0023

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List of Notations and Abbreviations

Multiple Management Systems	MMs
Small and Medium Enterprises	SMEs
Quality Management System	QMS
Environmental Management System	EMS
Occupational Health & Safety Management System	OHSMS
Corporate Social Responsibility Management System	CSRMS
Integrated Management System	IMS
Integrated Total Quality Management	ITQM
Ready Made Garments	RMG
Bangladesh Garment Manufacturers and Exporters Association	BGMEA
Personal Protective Equipment	PPE
World Health Organization	WHO
International Labor Organization	ILO
Financial Year	FY
Export Promotion Bureau of Bangladesh	EPB
Total Quality Management	TQM
Plan-Do-Check-Act	PDCA
Association of Southeast Asian Nations	ASEAN
Covariance Based Structural Equation Modeling	CB-SEM
Analysis of Variance	ANOVA
Structural Equation Modelling	SEM
Partial Least Squares Structural Equation Modeling	PLS-SEM
Publicly Available Specification	PAS
British Standards Institution	BSI
Danish Standard	DS
Management Systems	MSs
Average Variance Extracted	AVE
and Scale Composite Reliability	SCR
Variance Inflation Factors	VIF
Average Path Coefficient	APC
Average R-squared	ARS
Average Block VIF	AVIF
Simpson's Paradox Ratio	SPR
R-Squared Contribution Ratio	RSCR
Statistical Suppression Ratio	SSR
Random Index	RI
Consistency Ratio	CR
Quality Management Sub-System	QMSS
Environmental Management Sub-System	EMSS
Occupational Health & Safety Management Sub-System	OHSMSS
Social Responsibility Management Sub-System	SRMSS
Nonlinear Bivariate Causality Direction Ratio	NLBCDR
Firm Performance	FP
Human Resource Enabling Factors	HRE
Contextual Enabling Factors	CE
Procedural Enabling Factors	PE
Strategic Enabling Factors	StratEn
Structural Enabling Factors	StrucEn
TQM Implementation	TQMIMP

CHAPTER 1

Introduction

1.1 Background of the Study

World is changing faster than ever before. Every business organization in the world is performing their business in a competitive and uncertain business environment. There are three factors that are responsible to make the business environment turbulent [1-6]. They are: market competition, globalization, and financial crisis. In order to survive in the turbulent environment, a business organization has to fulfill the requirements of several stakeholders. In other words, a business organization has to work hard not only to satisfy customers by supplying quality product at competitive price but also to satisfy other stakeholders by ethical responsibility towards society and environment [1, 7-9]. If a business organization fails to satisfy any demand of their stakeholders, it will lose its market share. In order to meet the several demands of the stakeholders effectively and efficiently, organizations are using several management systems. The most widely used management systems in the business organization are: Quality Management System (QMS), Environment Management System (EMS), Occupational Health and Safety Management System (OHSMS), and Corporate Social Responsibility Management System (CSRMS). These management systems are known as function specific management system because they (management system) address a particular function of an organization and ensure continuous improvement of this function throughout the organization. Successful implementation of these function specific management systems completely depends on effective planning and better utilization of organizational resources [10-15]. The number of such management system is increasing day by day due to wider range of stakeholder's demand. Since these management systems are different from functional point of view, they (management system) are considered as a separate management system. Dealing with these management systems individually is really a difficult task [16-20]. During parallel implementation of different management systems, several business organizations around the world have faced a common problem in aligning individual goal of different management systems with organization's overall goal [18, 21, 22]. Organizational goal and individual management system's goal can easily be aligned by integrating individual management systems into the existing management framework of the organization [23-26]. Therefore, a large number of researchers have extended their supports toward the development of

integrated management system (IMS) [1, 27-29]. To integrate several management systems, researchers have proposed various techniques. Some of the important techniques for integration are: structural communalities among the systems: sequential adoption of different management systems, common management elements among the systems etc. [16, 30-32]. An overview of these three integration techniques is given in the subsequent paragraph.

Structural communality among the management systems: Multiple management systems can be integrated into one common system through structural communalities present in the multiple management systems. Structural communality means a common framework that is followed for managing activities in multiple management systems. For instance, a common management framework may consist of combining some managerial activities like leadership, planning, operation, performance evaluation, and improvement of different management system.

Sequential adoption of different management systems: Multiple management systems can be integrated by sequential adoption of individual management system. For instance, if three management systems QMS, EMS, and OHSMS are integrated, one possible sequence is to adopt QMS first, then EMS, and finally OHSMS.

Common management elements among the management systems: Management systems can be combined by integrating common management elements present in the multiple management systems. Some examples of common management elements are; policy, objectives, document control, monitoring and measurement, corrective and preventive action, auditing, management review, continuous improvement etc. These common elements can be integrated into one system. For instance, objectives of different management standards can be put into a single management system named IMS.

Based on these techniques researchers have developed many IMS models. In order to get benefits from integration, they (researchers) have tried to implement some of these IMS models in different industries. But it is reported that the result from IMS implementation is not satisfactory [1, 33-36]. The main reason behind this disappointing result was that the integration technique did not match with the purpose of integration [37-40]. In reality, the purpose of integration varies greatly among the industries. Therefore, a single IMS model cannot be equally suitable for all industries to serve the purpose of integration [30, 41-43]. In order to get satisfactory result from IMS implementation, it is important to consider two factors during management system integration. These are; characteristic of an organization and purpose of integration. Characteristic of an organization includes experience in management system integration, availability of budget, and resources. On the other hand, purpose of integration includes; reduction of duplication efforts,

unification of audit, and reduction of bureaucracy in managing the activities. For example, if an organization has a little experience in management system integration, it (organization) can select sequential adoption technique for integration [44-47]. Similarly, if an organization tries to integrate several management systems for the purpose of reduction of duplication efforts, it (organization) can select common elements technique for integration [48-51]. On the other hand, none of these two techniques (sequential adoption and common elements techniques) is suitable for management system integration in the case when an organization has a little experience in integration and also has a demand of reduction of duplication efforts. Therefore, a challenge may arise during selection of integration technique. To overcome the challenge, an organization has to look for a new technique for management system integration.

The purpose of the study is to develop a new technique for management system integration, where multiple management systems (MMSs) can be joined seamlessly under a common management philosophy. Seamless join of MMSs means individual management systems will lose their independency but their existence will never be lost in IMS. It is expected that, seamless integration of MMSs will ensure common shearing of resources and information within the organization [52-55]. Common shearing of resources and information will also provide better synergies among the management systems [56-58]. In addition, common management philosophy will create a unique platform for integration of different management standards. This platform will also be helpful for developing a positive culture within the organization [27, 59, 60]. Positive culture will encourage majority of the employees to participate in the integration process [58, 61, 62]. This new integration technique will cover a wide variety of organizational characteristic as well as integration purpose.

In order to get full benefits from integration, successful implementation of IMS is essential. To ensure successful implementation of IMS, an empirical validation of model is required to prove that the firm's performance has significantly improved after IMS implementation [63, 64]. For model development and validation, the present study has chosen Ready Made Garment (RMG) sector of Bangladesh. To validate the proposed IMS implementation model, a clear conception is very much essential about the importance of RMG sector in Bangladesh as well as their (RMG sector) demand for IMS. A brief discussion on importance of RMG industry in the context of Bangladesh and its demand for IMS is highlighted in the followings paragraph.

Bangladesh is the second largest textile manufacturing country in the world. Majority of export earning is coming from this sector in the last couple of years [65, 66]. For instance, export earnings in the previous fiscal year grew nearly US$ 36.18bn (Bangladesh Garment Manufacturers and Exporters Association (BGMEA), 2019). This export earning is equivalent to 78.3% of

collective export earnings. Contribution of RMG sector is about 9% in country's GDP. Growth rate of export earnings in the last decade was 17.5% per annum [67]. The growing economy of Bangladesh greatly depends upon the contribution of this sector. In addition, this sector is creating highest employment opportunity in Bangladesh. Roughly, 4.4 million people are working in this sector [67]. Therefore, it is an important sector of Bangladesh.

In order to maintain competitive position in the world, many RMG industries of Bangladesh are using four management systems in their organizations to increase firm performance. These management systems are; ISO 9001:2015 standard for Quality Management System (QMS), ISO 14001:2015 standard for Environment Management System (EMS), OHSAS 18001: 2014 for Occupational Health and Safety Management System (OHSMS), and SA 8001:2007 for Corporate Social Responsibility Management System (CSRMS). The OHSMS has been adopted to ensure worker's safety while CSRMS has been adopted for the protection of worker's rights. Most of the RMG industries of Bangladesh have adopted these management systems separately [65, 71, 72]. They are facing difficulties to implement and operate these individual management systems separately. The key challenge of running of multiple management systems separately is to split the total budget and human resource of an organization into the multiple management systems [71, 73]. Each management system will get a little amount of budget and human resource, which is not sufficient to implement a management system effectively and efficiently. Consequently, many of the objectives of individual management system are often left unachievable due to its poor implementation. In addition, the performance of RMG industries in Bangladesh is declining in four disciplines of management. These are quality, environment, occupational health & safety, and social responsibility [65, 68, 71, 72]. Consequently, RMG industries of Bangladesh are losing their values to the customer and in the long run they may not be able to survive in the competitive market. Realizing this challenge, RMG industries are trying to adopt an integrated management system in their organizations. A small number of RMG industries of Bangladesh have come forward to develop an Integrated Management System (IMS) for their organizations. Since they (RMG industries) have limited knowledge in management system integration, they are facing many challenges. As a result, they are not getting the desired benefit from their own developed IMS. However, most of the RMG industries have a strong demand of developing an IMS which will improve their performance in four in four disciplines of management such as quality, environment, health & safety, and social responsibility. The main motivation of the present study is to develop an IMS that will suit for Bangladeshi RMG industries.

1.2 Problem Statement

RMG industries in Bangladesh are facing several problems during parallel management of multiple management systems. At field visit, author has talked with several stakeholders and other concern people regarding the problem. Some of them have shared their experiences about the problems they are facing during parallel implementation of several management systems. According to them (concern people), most common problems are: duplication of effort, huge implementation and maintenance cost, bureaucracy in management and difficulties in decision making. These managerial problems result in decrease in operational efficiency of an RMG industry in five different areas such as environment, social responsibility, occupational health & safety, product quality, and decrease in financial performance.

Environment:

Decrease in environmental efficiency is a common issue in RMG sector in Bangladesh [73] (. There are several reasons for decreasing the environmental efficiency of a RMG industry. First and foremost reason for decreasing the environmental efficiency is littering of liquid waste. Liquid waste is mainly generated from processed water of a garment industry. Since RMG industry consumes a huge amount of water, it creates a high risk of producing liquid waste. The amount of consumed water varies greatly from industry to industry. Water consumption actually depends on type of equipment and processes used. A typical RMG industry in Bangladesh consumes 1500 billion liter of water per year [65]. Water is used almost in every processing step in RMG industries. It is mainly used for washing chemical, softener, phenol, resin, lubricant, detergent, and different types of reagents used for fabric. As a result, processed water becomes polluted. Process water need to be purified at certain level from oil, chemical, color before discharging to the nature. A limited number of RMG industries are practicing this rule. But, most of the RMG industries are discharging wastes directly to the river near by the industrial area [74]. Littering of waste into the river causes water pollution. As a result, color of water has been changed. This wastes water produces strong odd ware. A large number of people who are living nearby the river are being threatened by water pollution created by waste water. These people are suffering from various diseases. Table 1.1 shows the comparison among the different industrial sectors regarding the contribution in water pollution.

Table 1.1 Sources of industrial water pollution in Bangladesh

Type of industry	Measure of pollution in percentage	Pollution level
Textile/Garment	60	Extremely high
Lather	30	High
Sugar	6	Moderate
Paper	4	Moderate

Source: Hossain et al. (2018)

Another reason for decreasing the environmental performance of an RMG industry is CO_2 emission. In order to manufacture a T-shirt and a Jent Pant, nearly 27 and 108 liter of water is used respectively. It is equivalent to global CO_2 emission of 0.002%, global industrial wastage of 0.006%. Emission of CO_2 is causing air pollution [75]. Similarly, indoor air of an RMG industry is also polluted by fabric dust.

Occupational Health & Safety:

Everyday a huge amount of fabric dust is produced in garment sector during cutting and sewing operation. This huge dust is difficult to blow outside because of poor ventilation system at work. In many occasions, fabrics release chemicals in the surrounding air and causing pollution. As a result, breathing problem, allergic problems and eye irritation are commonly observed among the workers in cutting and sewing section. Moreover, some organic chemicals are used for cleaning purpose of fabric. These chemicals are injurious to human health. Exposure to these hazardous chemicals to human health is responsible for causing bad headache, dizziness, and several skin diseases. Inhaling dust and organic chemicals together cause cancer and different lung diseases. According to report published by World Health Organization (WHO) in 2019, more than 37,000 people die in Bangladesh per year due to occupational diseases. RMG industries are account for more than 65% of total death due to occupational diseases [77]. Probability of different types of occupational hazards in RMG industry is shown in the Figure 1.1.

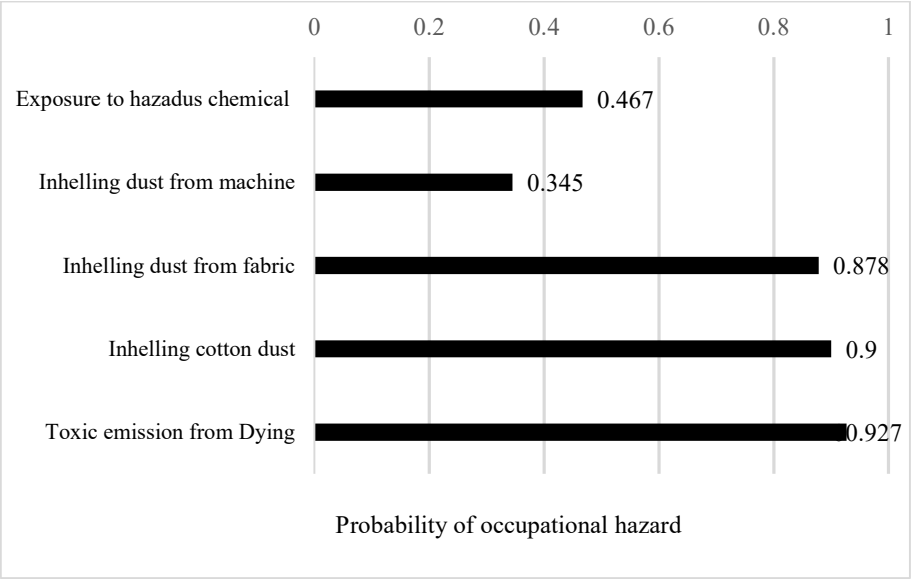

Figure 1.1 Occupational hazards in RMG sector in Bangladesh. Source: Kabir *et al.* (2019)

On the other hand, working condition in RMG sector is not up to the mark. Most of the time, workers have to work for a long hour (more than 8 hours) without any break. Some of them (worker) have to work hard in a hot and high humid workplace. Poor working condition increases the probability of accident [78]. According to International Labor Organization (ILO) [79], number of people die worldwide from occupational accidents and diseases is nearly 2.78 million per year. It is equivalent to almost 7700 people per day. Moreover, approximately 374 million people are affected from non-fatal occupational injuries or diseases. Causality of occupational health is large in number in South Asian countries like Bangladesh, Nepal, Pakistan, and India [44]. Business organizations in these areas have to pay huge amount of money as a compensation for occupational injuries and deaths. For example, RMG industries in Bangladesh are spending up to 20% of their total annual budget for medical treatment, rehabilitation and compensation [67]. Expenditure in the form of medical treatment and compensation ultimately generates a huge financial loss for a business organization. RMG industries are spending this money out of their responsibilities to the worker.

Social Responsibility:

These industries have also responsibility to maintain a high labor standard in their organizations because RMG industries are considered as a labor-intensive industry. Unfortunately, majority of these industries are not maintaining minimum labor standard of ILO [79]. Some common examples of poor labor practice found in these industries are: informal recruitment, irregular payment, wage penalties, sudden termination, child labor, long working hours without break, physical and verbal abuse [79]. In many occasions, even Personal Protective Equipment (PPE) is not supplied

sufficiently to the workers. Sometimes, workers are compelled to work in a dirty and hazardous environment which is a clear violation of international labor standard and current labor law.

Product Quality:

Decrease in product quality is another vital issue in RMG sector [68]. Quality is considered as a major issue because customer satisfaction largely depends on quality of the product. Therefore, quality of the product is inspected at each step in the production process in this sector. Although quality is inspected at each step, some lots of finished product are rejected during the audit from customer before shipment. Lots are rejected due to containing defective product more than the desired value. One of the vital reasons of rejecting the finished lot is that, quality of the product is ensured only by visual inspection [68, 80]. Identification of root cause of the defects are completely absent in visual inspection of quality. As a result, it is not possible to take corrective and preventive measure to reduce or eliminate defects. Similar defects repetitively occur in the production line, which increases the probability to overlook some defects at the time of visual inspection resulting increase in the number of defective products. In the finished lot, which will ultimately increase the probability of rejection of finished lot. Rejection of the finished lot causes huge loss in this sector. Every year, approximately USD 10.42 bn is lost due to rejection of the finished lot in RMG sector [67].

Financial Performance:

RMG sector is also account for huge financial loss due to poor compliance. Customers always highlight that, compliance issues are poorly maintained in RMG sector in Bangladesh [81, 82]. Among the several issues of compliance, customer is very much concern about the two issues. These are workplace safety and protection of worker's rights. According to the customer, despite of their (customer) strong recommendation, no significant attempt has been taken to improve the condition of these two compliance issues. Due to poor compliance, either some customers are withdrawing their orders from Bangladesh or some others are offering lower price for the product. For instance, price of the garment product offered by the brand customers decreased by 12% since 2014 [67]. Moreover, decline in garments export earnings is observed in Bangladesh in recent years due to poor compliance. For example, in the first quarter of current fiscal year (FY 2019-2020) export earnings from RMG sector in Bangladesh has been decreased. It is found 6.67% lower than the earlier value of same period in the previous fiscal year (FY 2018-2019) (Export Promotion Bureau of Bangladesh (EPB), 2019) [83].

Above discussion has described the impact of parallel implementation of management systems on functional abilities of an RMG industry in five different areas such as environmental, social, occupational health & safety, product quality, and economy. An RMG industry exhibits poor functional abilities in each of the five areas. The main reason behind these poor functional abilities is that when multiple management systems are implemented separately, a business organization is bound to distribute its total budget and manpower among the multiple management systems. Each management system will get a little amount of budget and manpower, which is not sufficient to implement a management system effectively and efficiently. Improper implementation of individual management systems deteriorates the functional performance of an organization. Poor functional ability will also cause negative impact on RMG industries in Bangladesh. Many objectives of individual management system remain unachievable. RMG industries will lose their values to the customer as well as to other stakeholders. As a result, RMG industries of Bangladesh will face more difficulty to survive in the competitive market.

1.3 Objectives of the Study

To survive in the competitive market, several RMG industries in Bangladesh are practicing various compliance standards in their organizations. They have limited facilities to manage several compliance standards at a time. As a result, they are facing several challenges during the parallel management of various compliance standards. This manifests the demand of developing a model that will be holistic in nature and can accommodate various international standards.

Therefore, the specific objectives of this thesis are:

i. To investigate the scope and impact of integration of international management standards with TQM in RMG sector in Bangladesh.
ii. To identify the enabling factors and key barriers in implementing of TQM framework and to develop scenarios upon resolving these barriers in the aforesaid sector.
iii. To develop an empirical model for implementation of the integrated TQM framework in RMG sector.

1.4 Scope of the Study

Main focus of this study is to develop a model that will accommodate different management standards from various disciplines (e.g., environmental, social, occupational health & safety etc.). This study has been performed with some selective issues.

First, there are several management standards around the world. This study has taken attempt to integrate four international standards commonly used in RMG sector of Bangladesh. These stan are: ISO 9001:2015, ISO 14001:2015, OHSAS 18001: 2007, SA 8000:2014. .

Second, this study is confined to accommodate four management standards (previously mentioned) under Total Quality Management (TQM) philosophy. TQM philosophy is selected because it (TQM) has an ability to establish cross-functional culture across the organization. It also encourages sharing of common resources and information of an organization.

Third, this study has been conducted in those Bangladeshi RMG industries that are facing numerous problems in managing multiple management standards separately. These industries have a demand to develop an Integrated Management System (IMS).

Fourth, this study has been conducted in those RMG industries that are practicing at least two management standards (among the four standards) in an integrated way. These RMG industries are situated in the region of Dhaka, Gazipur, and Savar.

1.5 Limitations of the Study

This study has some limitations. The important limitations of this study are listed below:

i. Due to time constrain, data has been collected in a single time frame. Therefore, it is not possible to examine whether the findings might have any impact on longitudinal time frame.
ii. All data have been collected from some selected RMG industries because numbers of industries practicing both IMS and TQM are limited in Bangladeshi RMG sector.
iii. This study has been carried out based on national context. Therefore, findings of this study cannot be generalized until some replications of this study are performed in other countries.

1.6 Research Contribution

Several studies have been performed to integrate different management standards around the world. Most of the studies have taken initiative to integrate quality and environmental management standard. Rests of the studies have tried to integrate quality, environmental, health & safety management standard. So far, the author's knowledge, no suitable study has been conducted to integrated quality, environmental, health & safety, and social responsibility management standard. Therefore, this study has both theoretical and practical significances. These are listed below:

Theoretical contributions of this study are:

i. This study can contribute to the existing literature by clear understanding of the role of TQM philosophy on management standard integration.
ii. This study can contribute towards the development of sustainable business practice because it (current study) has incorporated social responsibility management with other international standards (quality, environmental, occupational health & safety).
iii. This study has developed a TQM based integration model for Small and Medium Enterprises (SMEs) in developing country like Bangladesh.

Practical contributions of this study are :

i. Present study has shown a way how to integrate different management standards under TQM philosophy. Therefore, this study can be a guideline for those managers who like to integrate different management standards in their organizations.
ii. This study can also be a guideline for those managers who are looking for sustainable business practice in their organizations.
iii. This study provides an immense scope to adopt the current model in those business organizations that are already in practice of TQM philosophy.

1.7 Overview of the Research Methodology

According to the nature of research aim and objectives, quantitative research technique is the best suited for this study. A questionnaire survey has been conducted in this study among 256 respondents from five RMG industries those are using are using different management standards

(at least two) in an integrated way. To do so, a draft questionnaire has been prepared based on literature review. This draft questionnaire has been sent to five experts (three from academic people and two from industrial people) for finalization. Each of the expert members has at least five years of experience on IMS and TQM. A pilot survey was conducted to test the reliability of the measurement tools. To fulfill the research objective, an empirical framework has been developed for integrating different management standards under the philosophy of TQM. Research methodology has been discussed in details in chapter 5.

1.8 Organization of this Study

This thesis is organized into the following chapters. Synopsis of each chapter is as follows:

Chapter one represents the introduction of the present study. This chapter covers an overview of the study along with importance of the study. The last section of this chapter describes the subsequent arrangement of the present discussion in chapter wise.

Chapter two reviews the literature on TQM as well as IMS, definitions. The TQM literatures describes the relationship between TQM elements and business performance, enabling factors of TQM implementation, and TQM Barriers. On the other hand, the IMS literatures describes the basic understanding of integration of MMSs, different integration methods, available models and national standards on IMS. Finally, a summary of literature review has been provided at the end. This summary of literature will help to identify the research gaps and to set research objectives.

Chapter three shows the current status of management standards and IMS practice in RMG sector of Bangladesh. Challenges faced by this sector in managing multiple management standards are described in this chapter. Scope and impact of IMS are also included in this chapter.

Chapter four overviews the enabling factors of TQM implementation in RMG sector of Bangladesh. This chapter also includes, identification of important TQM barriers and their ranking from the perspective of Bangladeshi RMG industries.

Chapter five focuses on development of conceptual model for ITQM system, formulation of an implementation framework for ITQM system and also describes all steps of implementation process. This chapter will also describe the procedure to validate the effectiveness (i.e., success) of implementation framework of ITQM system.

Chapter six focuses on major findings obtained from the present study. It concludes with identifying research limitations and direction of future research.

CHAPTER 2

Literature Review

2.1 Introduction

Management systems integration has drawn a clear attention among the academia and standardization bodies throughout the world [1, 11, 25, 45, 84]. Many industries in Spain and Portugal have taken initiatives to adopt Integrated Management System (IMS) in their business organizations. Industries of these countries reported that they are not getting satisfactory result from management systems integration. Majority of the industries that are trying to adopt IMS have reported difficulties in IMS implementation due to the lack of awareness to change culture within the organization [16]. Many researchers suggested that continuous improvement philosophy of TQM may initiate cultural change within the organization which may yield success in IMS implementation [10-12, 85]. Researchers suggested that, it is wise to implement IMS using the TQM framework [1, 26]. In order to get clear understanding about the IMS implementation using TQM framework, this study has conducted literature review in two fields viz. TQM and IMS.

This chapter is organized as follows. Review of literature on TQM is presented in Section 2, whereas section 3 describes review of literature on IMS. Section 4, section 5 and section 6 describes the literatures on research method, data collection techniques and data analysis tools respectively. Finally, summary of the literature review is presented in section 7. This summary of literature will help to identify the research gaps. Furthermore, it can assist in setting research objectives.

2.2 Literature Review on Total Quality Management (TQM)

TQM is a holistic concept for managing quality of products or services through development of continuous improvement culture within the business organization. A lot of researches have been carried out on TQM. These literatures can broadly be classified in three major areas. These are (i) identification of relationship between various elements of TQM and business performance, (ii) identification of various enabling factors of TQM implementation, and (iii) identification of different barriers of TQM implementation. The following subsections present a comprehensive review of these literatures.

2.2.1 Literature Review on Relationship between TQM Elements and Business Performance

A considerable amount of TQM literatures has empirically examined the relationship between the elements of TQM practice and business performance. Douglas and Judge [86] conducted a questionnaire survey in 68 manufacturing industries in USA to investigate the relationship between TQM elements and business performance. They measured business performance as financial performance. They found that, TQM elements are positively related to financial performance. For better understanding the relationship between TQM elements and business performance, Kaynak [87] pointed out that, business performance should be measured in multiple dimensions rather than single dimension. In his research, he measured the business performance in three dimensions viz. inventory management performance, quality performance, and financial performance. He found that, TQM elements have a positive relationship with each of the three business performance measures. Similarly, many researchers had examined the relationship of TQM elements with various dimensions of business performance. Macinati [88] measured business performance in four dimensions. These are financial performance, operational performance, outcome subjective performance, outcome objective performance. He found that, TQM elements have no relation with financial performance. Corredor and Goni [89] measured business performance in three dimensions. These are profitability performance, productivity performance, and future investment performance. They found that, TQM elements have no relation with any of these three performances. Sadikoglu and Olcay [90] measured business performance in seven dimensions. These are operational performance, employee performance, inventory management performance, innovation performance, social performance, customer satisfaction performance, and market share performance. They reported that process management which is one of the TQM elements has a positive relationship with four performance measures such as inventory management, innovation, social and financial performance. Psomas and Jaca [91] measured business performance in four dimensions. These are financial performance, operational performance, customer satisfaction performance, quality performance. They reported that, operational performance is affected by two TQM elements such as product quality improvement and employee knowledge; whereas financial performance is affected by only one TQM element that is quality management of the employee. Bouranta et al. [92] measured business performance in three dimensions. These are financial performance, service quality performance, and customer focused performance. They found that, financial performance is affected by four TQM elements such as quality management of the employee, quality practice of the top management, employee training, and customer focus. They also pointed out that all of these four TQM elements do not have direct impact on financial

performance. Some of those elements have indirect impact. They suggested to further examine the direct and indirect impact of these TQM elements on financial performance.

To examine direct and indirect impact of TQM elements on business performance, Rahman and Bullock [93] introduced a new concept of grouping the TQM elements from various perspectives. They divided TQM elements into two major groups one is hard element and another is soft element. Hard elements of TQM are tangible elements that are related to quality tools and technique. On the other hand, soft elements of TQM are intangible elements that are related to quality improvement culture. In their study, they considered workforce commitment, vision statement, customer focus, teamwork, personal training, and supplier relation as soft elements of TQM; whereas computer-based technology, just in time, technology utilization, and flexible manufacturing system considered as hard elements of TQM. They investigated the impact of hard and soft elements of TQM on business performance at 261 manufacturing industries in Australia. This study revealed that, hard elements of TQM have a direct effect on organizational performance; whereas soft elements of TQM have indirect effect. Bernal and Aleson [94] divided TQM elements into another two groups namely (i) level of TQM implementation such as process management, leadership, and strategic planning and (ii) intensity of TQM use such as use of TQM principles, use of quality tools, use of business excellent principles, and use of ethical principles. To investigate the impact of these two groups on business performance, they conducted a questionnaire survey at 208 manufacturing industries in Spain. They reported that, level of TQM implementation has direct impact on operational performance while intensity of TQM use has indirect impact. O'Neill et al. [95] classified the TQM elements as quality assurance, just-in-time management, and process engineering. In order to observe the impact of these three groups on financial performance, they conducted a survey at 158 manufacturing industries in Australia. They found that, quality assurance has direct impact on financial performance.

To examine the impact of TQM elements on business performance, Zeng et al. [96] introduced a new concept of mediator factor on the relationship between TQM elements and business performance. They divided TQM elements into two groups namely (i) soft element such as employee training, employee suggestion, and teamwork and (ii) hard element such as process management and quality information. To investigate the role of hard elements of TQM as mediator between soft elements of TQM and business performance, they conducted a questionnaire survey at 238 manufacturing industries in eight different countries in the world viz. USA, Japan, Italy, Sweden, Australia, Korea, Germany, and Finland. This study revealed that, soft elements of TQM promote innovation performance through hard elements. On the other hand, Rafailidis et al. [97] investigated the role of TQM as mediator between organizational culture and business

performance. They conducted a questionnaire survey on 38 manufacturing industries in Greece. They reported that, organizational culture affects firm's innovation performance via TQM practices (employee training and continuous quality improvement). Albuhisi and Abdallah [98] examined the mediating role of customer perspective on relationship between soft elements of TQM and business performance. In their study, reputation of a firm in the eye of customer had been considered as customer perspective. They also considered top management commitment, employee enrolment, employee training, and customer focus as soft elements of TQM. They conducted a questionnaire survey at 78 manufacturing industries in Jordan. Result of their study showed that, customer perspective acts as a mediator on relationship between soft elements of TQM and financial performance. Findings of several studies that have examined the relationship between the elements of TQM practice and business performance are summarized in Table 2.1.It is found from the summarized Table 2.1 that, there are twelve TQM elements. Among them, eight elements such as leadership, customer needs, partnership and resources, human resource focus, employee empowerment, employee training, communication, quality culture are most frequently used in different studies on TQM. On the other hand, organization performance has been measured in seven different dimensions such as operational performance, employee performance, inventory management performance, innovation performance, social performance, customer satisfaction performance, and market share performance. Majority of the researchers have found positive relationship between TQM elements and business performance. Another important insight is that, the impact of TQM elements on business performance depends on different mediator factors such as reputation of the firm, quality information, process management etc.

2.2.2 Literature Review on Enabling Factors of TQM Implementation

This is the second largest area of research in TQM field. Over the last two decades, several researchers have identified several enabling factors of TQM implementation. A comprehensive list of enabling factors of TQM implementation has been prepared from the existing literatures. This comprehensive list of TQM enabling factors is presented in Table 2.2. These TQM enabling factors are classified into five major groups such as human resource enabling factor, strategic enabling factor, contextual enabling factor, structural enabling factor, and procedural enabling factor. The following paragraphs present a comprehensive review of each group of TQM enabling factor.

Zhang et al. [99] reported that, success of TQM implementation depends on human resource-oriented factors such as employee empowerment, employee training, employee's acceptance to change culture, teamwork to solve problems and effective appraisal system. Researchers examined the impact of these human resource enabling factors on TQM

implementation. Yusof and Aspinwall [100] conducted an empirical study on 194 manufacturing companies in UK. They suggested that, employee's participation in decision making process will yield better decision to solve problems which in turn increases the success rate of TQM implementation. Employee's participation in decision making process is also known as employee empowerment. In a similar study conducted in Italy, Motwani [101] pointed out that, employee's participation in decision making process increases employee's acceptance to change culture which will accelerate better TQM implementation.

Based on response collected from 17 manufacturing companies in Russia, Khoo and Tan [109] reported that training helps employees to build awareness about TQM implementation. It also helps employee to equip with tools and techniques for quality practice improvement which in turn will facilitate TQM implementation. Li et al. [110] reported for manufacturing companies in China that teamwork provides collective efforts of investigating and solving industrial problems which results in successful implementation of TQM. Issac et al. [111] reported that success of TQM implementation mostly depends on the performance of the employee. Therefore, regular arrangement of performance appraisal can help the organization to assess the need of further development of employee's skill. Development of employee's skill will improve the performance of the employee which is important for TQM implementation. Sila and Ebrahimpour [102] reported that, success of TQM implementation depends on those factors that are strongly related to strategic decision making of an organization. These factors are known as strategic enabling factors. Some common examples of these strategic enabling factors are top management commitment, good leadership, appropriate planning, no management turnover, customer satisfaction etc. The influences of these strategic factors on TQM implementation had been examined by several researchers. These are discussed below.

Demirbag et al. [112] conducted an empirical study at 141 manufacturing companies in Turkey. They reported that if top management is committed to quality improvement, a positive culture will be developed throughout the organization which will increase the success rate of TQM implementation. In a similar study conducted in Turkey, Bayazit and Karpak [113] pointed out that a good leadership of top management positively changes employee's attitude which will ensure effective implementation of TQM. They also pointed out that, enabling factors of TQM implementation are not universal for all business organizations. These factors are contingent and vary with three contextual factors such as origin of the country (developed or developing or underdeveloped country), size of the organization (i.e., SMEs or large enterprise), and type of an organization (manufacturing or service industry).

Table 2.1 Relationship between elements of TQM and firm performance

Author (s)	Independent variable (Elements of TQM)	Dependent variable (Firm performance)	Country	Method and Technique	Findings
Douglas and Judge [86]	Employee involvement Quality philosophy TQM-oriented training Customer driven Continuous improvement Management by fact Total quality methods	Financial performance	USA	Questionnaire survey, Regression analysis	TQM practices positively affect financial performance
Kaynak [87]	Management leadership Employee training Employee relations Quality data and reporting Supplier quality management Product quality design Process management	Inventory management performance Quality performance Financial performance	USA	Questionnaire survey, SEM	Elements of TQM practice have direct effect on firm performance
Rahman and Bullock [93]	**Soft elements of TQM** Workforce commitment Vision and strategy development Customer focus Teamwork Personal training Supplier relation **Hard elements of TQM** Computer based technology Just in time Technology utilization Flexible manufacturing system	Organizational performance	Australia	Questionnaire survey, Regression analysis	The hard and soft elements of TQM are positively associated with each other. However, hard elements have a direct effect on organisational performance, whereas soft elements of TQM can affect performance indirectly, through hard TQM elements
Sila and Ebrahimpour [102]	Leadership Strategic planning Customer focus Information analysis Human resource management Process management Supplier management	Business result/performance	USA	Questionnaire survey, SEM	Among different constructs of TQM, only leadership and process management have a direct positive relationship with business results

Table 2.1 Relationship between elements of TQM and firm performance (continued)

Author (s)	Independent variable (Elements of TQM)	Dependent variable (Firm performance)	Country	Method and Technique	Findings
Feng et al. [103]	Leadership Strategic planning Customer focus Information and analysis People management Product quality Product innovation	Quality performance Innovation performance	Australia and Singapore	Questionnaire survey, SEM	TQM dimensions such as leadership and people management are more related to innovation, whereas customer satisfaction and process management are more related to quality performance
Tarí et al. [104]	Leadership Quality planning Human resource management Supplier management Customer focus Quality tools and techniques Organization learning culture Process management Continuous improvement	Organisational performance Quality outcomes	Spain	Questionnaire survey, SEM	TQM practices have a direct and indirect effect on organisational performance
Macinati [88]	Top management commitment Strategic planning Personal development Employee participation Information about quality Co-ordination Process management Supplier management	Financial performance Operational performance **Outcome subjective performance** Hospital reputation Patient satisfaction **Outcome objective performance** Mortality rate Number of patients discharged	Italy	Questionnaire survey, Factor analysis	There is no significant relationship between financial results and quality management practices. However, quality management practices are positively associated with subjective performance
Llusar et al. [105]	Leadership Policy and strategy development People learning Partnership and resources Processes management	Customer result People result Society result Key performance result Process result	Spain	Questionnaire survey, SEM	The excellence of enablers has a strong positive effect on results excellence. Both MBNQA and EFQM Excellence Model are the best models of TQM
Corredor and Goni [89]	Leadership Customer focus Product quality improvement Employee participation Quality award	Profitability performance Productivity performance Future investment performance	Spain	Analysis of secondary data	Earlier adopters of quality awards can get more benefit as compared to late adopters. There was no significant difference in the performance of TQM and non-TQM firms

Table 2.1 Relationship between elements of TQM and firm performance (continued)

Author (s)	Independent variable (Elements of TQM)	Dependent variable (Firm performance)	Country	Method and Technique	Findings
Tan [106]	Leadership Strategic planning Customer focus Human resource management Process management Information and analysis	Operational performance Employee satisfaction performance Customer satisfaction performance Product quality performance Strategic business performance	Malaysia	Questionnaire survey, SEM	Positive relation between TQM principles and Operational performance
Sadikoglu and Olcacy [90]	Leadership Process management Employee training Supplier quality management Customer focus Strategic quality planning	Operational performance Inventory management performance Employee performance Innovation performance Market and financial performance Customer satisfaction performance Social performance	Turkey	Questionnaire survey, Regression analysis	Process management has an positive impact on both innovation and inventory management performance
Bernal and Aleson [94]	**Level of TQM implementation** Leadership Process management Strategic planning **Level of intensity of TQM use** Use of TQM principles Use of quality tools, Use of business excellent principles Use of ethical principles	Financial performance Customer satisfaction performance Other stakeholders' performance	Spain	Questionnaire survey, SEM	TQM implementation does not have a positive and direct impact financial performance
Zeng et al. [96]	Process Management Quality information Problem solving through group Employee suggestion Employee training	Quality performance Innovation performance	Japan, Italy, Sweden, Australia, Korea, Germany,	Questionnaire survey, Regression analysis	Soft elements of TQM practice affect firm's quality performance through hard elements of TQM.
O'Neill et al. [95]	Quality assurance Just-in-time management Process engineering	Financial performance	Australia	Longitudinal study	TQM practices have a positive impact on firm's financial performance.
Psomas and Jaca [91]	Top management commitment Autonomy of the employee Employee quality management Employee motivation Employee knowledge Product quality improvement	Financial performance Operational performance Customer satisfaction performance Quality performance	Spain	Questionnaire Survey	Operational performance is affected by two factors such as product quality and employee knowledge. Financial performance is affected by one factor that is employee quality management.

Table 2.1 Relationship between elements of TQM and firm performance (continued)

Author (s)	Independent variable (Elements of TQM)	Dependent variable (Firm performance)	Country	Method and Technique	Findings
Bouranta et al. [92]	Employee quality management Top management's quality practices Employee training Customer focus Strategic quality planning	Financial performance Service quality performance Customer focused performance	Greece	Questionnaire survey, Regression analysis	Financial performance is affected by all TQM elements except strategic quality planning.
Rafailidis et al. [97]	**Explorative (innovation oriented) culture** Creativity Innovation External hiring **Exploitive (goal oriented) culture** Standardization Documentation	Innovation performance	Greece	Questionnaire Survey	Both dimension of culture have positive impact on firm's innovation performance through TQM practice
Albuhisi and Abdallah [98]	Top management commitment Customer focus Employee involvement Employee training Customer perspective Innovation Internal business process	Financial performance	Jordan	Questionnaire survey, SEM	Customer perspective has a mediating effect on relationship between soft TQM and firm's financial performance
Wei et al. [107]	Quality training Automation of the process Customer relationship Customer satisfaction Team performance Employee satisfaction	Financial performance Quality performance Inventory management performance	Taiwan	Questionnaire survey, SEM	Performance management system (PMS) has a significant impact on TQM implementation
Durairatnam et al. [108]	Quality training Automation of the process Customer relationship Customer satisfaction Team performance Employee satisfaction	Financial performance Quality performance Inventory management performance	Taiwan	Questionnaire survey, SEM	Performance management system (PMS) has a significant impact on TQM implementation

Based on response collected from 122 manufacturing companies in Malaysia, Arumugam et al. [114] reported that an appropriate plan is essential to arrange necessary human and financial resources to execute TQM implementation plan. Deros et al. [115] reported for manufacturing companies in Malaysia that a continuous support is essential from top management to cultivate the continuous improvement culture inside the organization. Frequent turnover in management level will interrupt building the culture. Fotopoulos and Psomas [116] reported that ultimate goal of TQM implementation is to increase customer satisfaction. It is possible to achieve this goal through fulfillment of customer requirements or expectation.

Zakuan et al. [117] reported that, success of TQM implementation depends on culture-oriented factors that enhance TQM implementation. These factors are known as contextual enabling factors. Some common examples of these contextual enabling factors are continuous quality improvement culture, formation of cross-functional teams, acceptance to change organizational culture between departments, practicing quality management system and strong communication. Researchers have investigated the impact of these contextual enabling factors on TQM implementation. Al-Shobaki et al. [118] conducted an empirical study at 52 manufacturing companies in Jordan. They suggested that, practice of continuous improvement culture leads to quality conformance and customer satisfaction which are helpful for effective implementation of TQM. In a similar study conducted in Australia, Baird et al. [119] pointed out that cross functional teamwork ensures participation of all employees in TQM implementation process which results in successful implementation of TQM. Based on response collected from 49 manufacturing companies in Indonesia, Ciptono et al. [120] reported that when all employees at different levels will work together and learn from each other, everybody will accept the change of culture easily which is important for successful implementation of TQM. Oakland [121] reported for manufacturing companies in Malaysia that a quality management system can help management to perform and review the activities that are related to quality of the product. Effective management of these quality related activities will help the organization to adopt TQM successfully. Ooi [122] stated that, communication is an effective means of shearing ideas and creating common understanding throughout the organization. Strong communication plays an important role in problem solving and employee motivation which are helpful for TQM implementation.

Gulbarga et al. [123] reported that, success of TQM implementation depends on those factors that are strongly related to structure of the organization, physical and financial resources of the organization. These factors are known as structural enabling factors. Some common examples of these structural enabling factors are: appropriate organizational structure, sufficient organizational resources, appropriate information system, strong financial assistance, ample time

spend on productivity improvement. Several researchers had investigated the impacts of these structural enabling factors on TQM implementation. Wiengarten et al. [124] conducted an empirical study at 64 manufacturing companies in Italy. They found that organizational structure with few management levels is more flexible and responsive to dynamic business environment. This organizational structure is known as flat structure. Flat structure is suitable for effective communication in both horizontal and vertical dimension of an organization. Therefore, flat organization structure is helpful for effective implementation of TQM. In a similar study conducted in UK, Nwabueze [125] pointed out that effective execution of TQM implementation plan depends on availability of physical resources of an organization. Similarly, Mitreva and Taskov [126] stated that strong financial support is essential for effective execution of TQM implementation plan. Magd [127] reported for Egyptian manufacturing companies that an appropriate information system provides necessary information to support decision making process which is important for successful TQM implementation. Mbithi and Shale [128] reported that spending more time on productivity improvement results in successful implementation of TQM.

Jaeger and Adair [129] reported that, success of TQM implementation depends on those factors that are helpful to bring change in organizational process. These factors are known as procedural enabling factors. Some common examples of these procedural enabling factors are simplicity of processes, regular monitoring of process improvement, effective control of manufacturing processes, knowledge about quality cost and benchmarking of current processes. Researchers had investigated the impacts of these procedural enabling factors on TQM implementation. Aamer et al. [130] conducted an empirical study at 87 manufacturing companies in Yemen. They reported that a simple process is flexible and more responsive to dynamic business environment. Therefore, simplification of existing procedures is helpful for TQM implementation. In a similar study conducted in Italy, Aquilani et al. [131] reported that, knowledge about the cost of quality is helpful to prepare an effective plan to reduce quality related problems which results in successful implementation of TQM. Baidoun et al. [132] reported for manufacturing companies in Palestine that benchmarking of current process is an effective means of improving the existing process. McAdam *et al.* [133] stated out that, process control is an effective means of measuring and controlling a process. Process control investigates whether the processes are operating efficiently to manufacture conforming product and takes controlling measure to rectify the process if necessary. Therefore, process control is important for successful implementation of TQM. Based on response collected from 91 manufacturing companies in Portugal, Zhang [137] pointed out that monitoring of process improvement is an effective means of ensuring product quality which is important for successful implementation of TQM.

In summary, it is evident from the above discussion that there are five categories of TQM enabling factors. These are: (i) human resource enabling factors: employee empowerment, employee training, employee's acceptance to change culture, teamwork to solve problems, effective appraisal system. (ii) strategic enabling factors: top management commitment, good leadership, appropriate planning, no management turnover, customer satisfaction. (iii) contextual enabling factors: continuous practice of quality improvement culture, cross-functional teamwork, acceptance to change organizational culture between departments, practicing quality management system, strong communication. (iv) structural enabling factors: appropriate organizational structure, sufficient organizational resources, appropriate information system, strong financial assistance, ample time spend on productivity improvement. Finally, (v) procedural enabling factors: simplicity of processes, regular monitoring of process improvement, effective control of manufacturing processes, knowledge about quality cost, benchmarking of current processes. Although these factors are helpful for TQM implementation, they are not universal for all business organizations. These factors are contingent and vary with three contextual factors such as origin of the country (developed or developing or underdeveloped country), size of the organization (i.e., SMEs or large enterprise), and type of an organization (manufacturing or service industry). Therefore, a wide and varying range of factors are identified from the literatures that enable the TQM implementation.

2.2.3 Literature Review on TQM Barriers

This is the third largest area of research in TQM field. In this area, researchers identified several factors that are responsible for TQM failure. Over the last two decades, several researchers have identified several barriers of TQM implementation. A comprehensive list of TQM barriers has been prepared from the existing literatures. This comprehensive list of TQM enabling factors is presented in Table 2.3. For better understanding, these TQM barriers can be classified into five major groups. These are human resource barrier, strategic barrier, contextual barrier, structural barrier, and procedural barrier. The following paragraphs present a comprehensive review of each group of TQM barriers.

Matta [138] reported that, TQM implementation is often interrupted due to those factors that are strongly related to strategic decision making of an organization. Some common examples of these strategic barriers are lack of top management commitment, poor leadership, inappropriate planning, huge management turnover, lack of customer satisfaction. The influence of these strategic factors on TQM implementation had examined by several researchers. Dow et al. [139] conducted an empirical study in manufacturing companies in Australia. He reported that lack of commitment of top management to improve quality will halt TQM implementation process.

Table 2.2 Enabling factors of TQM implementation

References	TQM enablers																									Total	Country	Method and Technique
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25			
Black [134]	X									X	X	X	X		X											7	UK	QS, FA
Ahire and Golhar [135]		X	X	X	X	X				X				X												7	USA	QS, EFA
Terziovski and Samson [136]	X			X																X	X					4	Australia	QS,ANOVA
Zhang et al. [99]	X	X	X	X					X	X		X					X		X				X			10	China	QS, EFA
Yusof and Aspinwall [100]		X	X	X			X		X			X							X						X	8	UK	QS, FA
Motwani [101]	X	X	X		X					X				X					X				X			8	Italy	QS, EFA
Khoo and Tan [109]			X	X			X								X					X					X	6	Russia	QS, SEM
Li et al. [110]	X	X	X				X					X					X		X					X		8	China	QS, CA
Issac et al. [111]	X	X		X	X			X	X			X	X	X			X			X			X		X	13	India	QS, CFA
Sila and Ebrahimpour [102]	X			X	X		X		X	X	X														X	8	USA	QS, SEM
Demirbag et al. [112]		X	X	X	X	X						X							X							7	Turkey	QS, CFA
Bayazit and Karpak [113]				X	X		X			X						X										5	Turkey	QS, ANP
Arumugam et al. [114]	X	X		X		X	X	X		X	X												X			9	Malaysia	QS, RA
Deros et al. [115]	X		X		X											X									X	5	Malaysia	QS, ANOVA
Fotopoulos and Psomas [116]	X	X		X	X	X									X										X	7	Greece	QS, SEM
Zakuan et al. [117]	X					X		X	X	X			X		X	X			X	X						8	Malaysia	QS, SEM
Al-Shobaki et al. [118]			X			X		X					X	X												5	Jordan	QS, ANOVA
Baird et al. [119]		X				X				X						X										4	Australia	QS, RA
Ciptono et al. [120]			X		X		X			X		X					X									6	Indonesia	QS, SEM
Okland [121]		X							X						X			X		X						5	Malaysia	QS, SEM

Nomenclature of the TQM enabling factors: 1=Customer satisfaction, 2=Effective process control, 3=Proper training and education, 4=Empowerment of employee, 5=Top management commitment, 6=Appropriate information system, 7=Good leadership, 8=Continuous improvement culture, 9=Effective appraisal system, 10=Acceptance to change culture between departments, 11=Appropriate planning, 12=Teamwork to solve problem, 13=Strong communication, 14=Benchmarking of current process, 15=Utilizing quality management system, 16=Cross-functional teamwork, 17=Knowledge about quality cost, 18=Strong financial support, 19=Sufficient physical resources, 20=Regular monitoring of process improvement, 21= Flexible organization structure, 22=Ample time, 23=Employee's acceptance to change culture, 24=Simplicity of process, 25=No turnover at management level. **Nomenclature of research methods and techniques:** QS=Questionnaires survey, CS=Case study, FA=Factor Analysis, CFA= Confirmatory factor analysis, EFA=Exploratory factor analysis, ANOVA= Analysis of variance, SEM= Structural equation modelling, RA= Regression Analysis, CA=Correlation analysis, AHP=Analytic hierarchy process, ANP= Analytic network process.

Table 2.2 Enabling factors of TQM implementation (continued)

References	TQM enablers																								Total	Country	Method and Technique
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25			
Ooi [122]	X	X				X	X		X				X													6	Malaysia	QS, SEM
Gulbarga et al. [123]		X				X	X		X		X							X	X		X	X				9	India	QS,ANOVA
Wiengarten et al. [124]	X	X		X			X	X													X					6	Italy	QS, CFA
Nwabueze [125]	X			X								X							X							3	UK	QS, SEM
Mitreva and Taskov [126]			X	X		X		X										X								5	Greece	QS, CFA
Magd [127]	X	X	X	X	X	X	X		X	X	X															10	Egypt	QS, EFA
Mbithi and Shale [128]			X		X	X									X							X			X	6	Kenya	QS, SEM
Jaeger and Adaire [129]	X	X		X	X									X			X			X				X		8	Kuwait	QS, SEM
Aamer et al. [130]				X	X			X	X	X														X		6	Yemen	QS, SEM
Aquilani et al. [131]	X	X	X	X		X	X		X	X	X						X									10	Italy	QS, SEM
Baidoun et al. [132]	X	X	X			X	X		X		X			X												8	Palestine	QS, FA
McAdam et al. [133]		X						X			X					X						X			5	UK	QS, SEM
Zhang et al. [137]		X		X	X									X			X			X				X		7	Portugal	QS, SEM

Nomenclature of the TQM enabling factors: 1=Customer satisfaction, 2=Effective process control, 3=Proper training and education, 4=Empowerment of employee, 5=Top management commitment, 6=Appropriate information system, 7=Good leadership, 8=Continuous improvement culture, 9=Effective appraisal system, 10=Acceptance to change culture between departments, 11=Appropriate planning, 12=Teamwork to solve problem, 13=Strong communication, 14=Benchmarking of current process, 15=Utilizing quality management system, 16=Cross-functional teamwork, 17=Knowledge about quality cost, 18=Strong financial support, 19=Sufficient physical resources, 20=Regular monitoring of process improvement, 21= Flexible organization structure, 22=Ample time, 23=Employee's acceptance to change culture, 24=Simplicity of process, 25=No turnover at management level. **Nomenclature of research methods and techniques:** QS=Questionnaires survey, CS=Case study, FA=Factor Analysis, CFA= Confirmatory factor analysis, EFA=Exploratory factor analysis, ANOVA= Analysis of variance, SEM= Structural equation modelling, RA= Regression Analysis, CA=Correlation analysis, AHP=Analytic hierarchy process, ANP= Analytic network process,

In a similar study conducted in Italian manufacturing companies, Motwani [101] pointed out that effective implementation of TQM will be interrupted due to poor leadership. Based on response collected from 48 manufacturing companies in China, Chin and Pun [140] stated that an inappropriate plan can make TQM implementation process unsuccessful. Sebastianelli and Tamimi [141] reported for manufacturing companies in USA that frequent turnover in management level interrupts TQM implementation process. Lorente and Costa [142] reported that customer dissatisfaction is not helpful for TQM implementation.

Prajogo and McDermott [143] reported that, TQM implementation is often interrupted due to the factors that are not helpful to bring change in organizational process. These factors are known as procedural barriers. Some common examples of these procedural barriers are complexity of processes, lack of regular monitoring of process improvement, ineffective control of manufacturing processes, lack of knowledge about quality cost and lack of benchmarking of current processes. Researchers had examined the impact of these procedural factors on TQM implementation. Ooi *et al.* [144] conducted an empirical study at 35 manufacturing companies in Malaysia. They reported that sometimes TQM implementation is interrupted due to complexity of operational processes of a business organization. In a similar study conducted in Tunisia, Lakhal et al. [145] pointed out that poor monitoring of process improvement results in poor implementation of TQM. Based on survey conducted in 124 Spanish manufacturing companies, Vijande and Gonzalez [146] reported that lack of knowledge about the cost of quality results in improper implementation of TQM. Joiner [147] reported for manufacturing companies in Australia that absence of benchmarking of current process will retard TQM implementation process. Bayraktar et al. [148] stated that TQM implementation sometime fails due to poor control of manufacturing process.

Hill [149] reported that TQM implementation is often halted due to the factors that are strongly related to structure of an organization, physical and financial resources of the organization. These factors are known as structural barriers. Some common examples of these structural barriers are inappropriate organizational structure, insufficient organizational resources, inappropriate information system, lack of financial assistance, limited time spend on productivity improvement. Several researchers had examined the impact of these structural factors on TQM implementation. Toremen et al. [150] conducted an empirical study at 78 manufacturing companies in Turkey. They reported that an organizational structure with higher number of management levels is less suitable for TQM implementation. Based on empirical study conducted in manufacturing companies in ASEAN countries, Punnakitikashem et al. [151] pointed out that TQM implementation is usually halted due to unavailability of physical resources of an organization. In a similar study conducted in Iran, Valmohammadi [152] also stated that TQM implementation is often interrupted due to poor

financial support. Gulbarga et al. [123] reported for manufacturing companies in India that an inappropriate information system results in poor implementation of TQM. Nwabueze [125] stated that spending less time on productivity improvement results in improper implementation of TQM.

Sadikoglu and Olcay [90] reported that, TQM implementation is often halted due to human resource-oriented factors such as lack of empowerment of employee, lack of employee training, employee's resistance to change culture, lack of teamwork to solve problems and lack of effective appraisal system. These factors are known as human recourses barriers. Researchers had examined the impact of these human recourses factors on TQM implementation. Sweis et al. [153] conducted an empirical study at 52 manufacturing companies in Jordan and found that, absence of employee's participation in decision making process retards TQM implementation process. In a similar study conducted in Spain, Mora et al. [154] pointed out that employee's resistance to change of culture will initiate improper implementation of TQM. Based on response collected from 21 manufacturing companies in Yemen, Aamer [155] reported that sometimes TQM implementation is interrupted due to lack of employee training. Teixeira et al. [156] reported for manufacturing companies in Portugal that absence of teamwork among the employee can make TQM implementation more difficult. Aquilani et al. [131] reported that TQM implementation is often halted due to absence of performance appraisal system in the organization.

Jaeger and Adair [129] reported that, TQM implementation is often interrupted due to culture-oriented factors. These factors are known as contextual barriers. Some common examples of these contextual barriers are lack of continuous quality improvement culture, lack of formation of cross-functional teams, resistance to change organizational culture between departments, lack of practice of quality management system and poor communication system. Several researchers had investigated the impact of these contextual factors on TQM implementation. Aamer et al. [130] conducted an empirical study at 85 manufacturing companies in Yemen. They suggested that, absence of continuous improvement culture inside the organization hampers TQM implementation process. In a similar study conducted in Palestine, Baidoun et al. [132] pointed out that TQM implementation process is interrupted due to lack of formation of cross-functional teams. They also pointed out that the rank of importance of TQM barriers is not universal for all business organizations. Ranking of these barriers is contingent and vary with two contextual factors such as cultural value of a country and economic condition of a country. Based on response collected from 61 manufacturing companies in Greece, Tsironis [157] stated that resistance to change of culture between departments results in improper implementation of TQM. Saleh et al. [80] reported for manufacturing companies in Jordan that sometimes TQM implementation is halted due to improper

management of quality related activities. Cho and Linderman [56] stated that, poor communication system within the organization halts TQM implementation.

In summary, it is evident from the above discussion that there are five categories of TQM barriers. These are: (i) human resource barriers: lack of empowerment of employee, lack of employee training, employee's resistance to change culture, lack of teamwork to solve problems, lack of effective appraisal system. (ii) strategic barriers: lack of top management commitment, poor leadership, inappropriate planning, high turnover at management level, customer dissatisfaction. (iii) contextual barriers: lack of continuous quality improvement culture, lack of cross-functional teamwork, resistance to change organizational culture between departments, lack of practicing quality management system, poor communication. (iv) structural barriers: inappropriate organizational structure, insufficient organizational resources, inappropriate information system, poor financial support, less time spend on productivity improvement. Finally, (v) procedural barriers: complexity of processes, irregular monitoring of process improvement, ineffective control of manufacturing processes, poor knowledge about quality cost, lack of benchmarking of current processes. A close look at both TQM enabler and TQM barriers reveals that, factors that influence the TQM implementation are common. Only difference is that, TQM barriers negatively affect on TQM implementation, whereas TQM enabling factors positively affect on TQM implementation. Another important insight is that, rank of importance of TQM barriers is not universal for all business organizations. Ranking of these barriers is contingent and vary with two contextual factors such as cultural value of a country and economic condition of a country where TQM is going to be implemented.

2.3 Literature Review on Integrated Management System (IMS)

IMS is a great means of promoting sustainable success in business organization. A lot of researches have been carried out on IMS. These literatures can be broadly classified into three major areas. These are (i) use of different strategies in management systems integration process. (ii) use of different methodologies in integration process, and (iii) assessment of levels of integration of management systems. Inter relationships among strategy, methodology and level of integration are presented in Figure 2.1. The following subsections present a comprehensive review on these literatures.

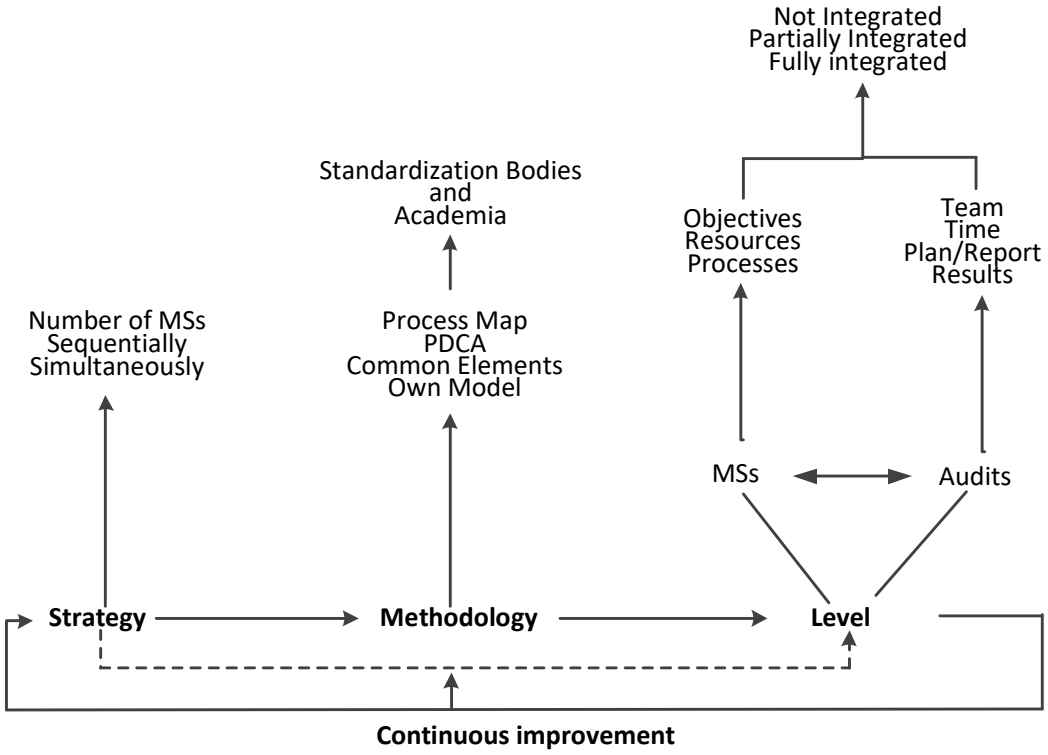

Figure 2.1 Inter relationships among strategy, methodology, and level of integration

2.3.1 Literature Review on Integration Strategy

The first aspect of integration process is integration strategy. Several authors referred integration strategy as an implementation order of multiple management systems (MMSs) [5, 13, 45]. In case of integrating two most common management standards QMS and EMS, three implementation orders are possible. These are: first implement QMS and then EMS or first implement EMS and then QMS or implement QMS and EMS simultaneously. A detail analysis of available literature on IMS has revealed that, the first implementation order (implementing QMS first then EMS) is most commonly used in several business organizations [5]. Many researchers have pointed out that, this implementation order is most common due to the fact that ISO has published quality management standard before environmental standard [45, 53]. While some other researchers have pointed out that, second implementation order is also chosen due to the compatibility among the EMS with QMS [13]. Recent studies [1, 16, 41, 52, 59, 84] have recommended to implement QMS and EMS simultaneously for those business organizations who did not implement any of these two management systems in their organizations.

Table 2.3 Barriers of TQM implementation

References	TQM barriers																								Total	Country	Method and Technique
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25			
Matta et al. [138]	X				X		X				X														X	5	USA	QS, FA
Dow et al. [139]	X				X									X		X	X		X					X		7	Australia	QS, CFA
Motwani [101]	X	X	X				X					X		X			X		X							8	Italy	QS, EFA
Chin and Pun [140]				X	X						X								X							4	China	QS, CA
Sebastianelli and Tamimi [141]	X			X	X						X														X	5	USA	QS, RA
Lorente and Costa [142]	X					X				X			X					X		X		X				7	Spain	QS, ANOVA
Prajogo and McDermott [143]		X												X			X			X				X		5	Greece	QS, SEM
Lakhal et al. [145]		X	X		X	X			X	X										X						7	Tunisia	QS, SEM
Ooi et al. [144]	X			X																				X		3	Malaysia	QS, RA
Vijande and Gonzalez [146]		X					X		X		X						X									5	Spain	QS, CFA
Joiner [147]								X						X							X		X		X	5	Australia	QS, RA
Bayazit and Karpak [113]		X		X	X					X						X										5	Turkey	QS, ANP
Hill [149]						X												X	X		X	X				5	USA	QS, FA
Toremen et al. [150]			X		X	X			X	X							X				X					7	Turkey	QS, CFA
Punnakitikashem et al. [151]	X	X				X	X			X	X								X							7	ASEAN	QS,ANOVA
Valmohammadi [152]	X	X				X	X		X	X			X					X								8	Iran	QS, RA
Gulbarga et al. [123]		X				X	X		X		X							X	X		X	X				9	India	QS,ANOVA
Nwabueze [125]	X			X																		X				3	UK	QS, SEM

Nomenclature of the TQM barriers: 1= Lack of customer focus, 2=Ineffective process control, 3= Lack of proper training, 4= Lack of empowerment of employee, 5= Lack of top management commitment, 6=Inappropriate information system, 7=Poor leadership, 8= Lack of continuous improvement culture, 9= Lack of effective appraisal system, 10= Resistance to change organizational culture between departments, 11=Inappropriate planning, 12= Lack of teamwork to solve problem, 13= Poor communication, 14= No benchmarking of current process, 15=Poor utilization of quality management system, 16=Lack of cross-functional teamwork, 17= Lack of knowledge about quality cost, 18= Lack of financial support, 19= Lack of sufficient physical resources, 20= Lack of regular monitoring of process improvement, 21= Inappropriate organizational structure, 22=Shortage of time, 23= Employee's resistance to change culture, 24= Complexity of process, 25=Huge turnover at management level. **Nomenclature of research methods and techniques:** QS=Questionnaires survey, CS=Case study, FA=Factor Analysis, CFA= Confirmatory factor analysis, EFA=Exploratory factor analysis, ANOVA= Analysis of variance, SEM= Structural equation modelling, RA= Regression Analysis, CA=Correlation analysis, AHP=Analytic hierarchy process, ANP= Analytic network process.

Table 2.3 Barriers of TQM implementation (continued)

References	TQM barriers																								Total	Country	Method and Technique
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25			
Sadikoglu and Olcay [90]			X	X					X			X							X				X			6	Turkey	QS, RA
Aamer [155]			X					X		X		X					X									5	Yemen	QS, EFA
Sweis et al. [153]				X									X												X	3	Jordan	QS, EFA
Calvo-Mora et al. [154]	X															X							X			3	Spain	QS, FA
Teixeira et al. [156]		X				X	X		X	X		X			X						X					8	Portugal	QS, ANOVA
Jaeger and Adair [129]	X							X		X			X		X	X				X				X		8	Kuwait	QS, SEM
Aamer et al. [130]		X				X		X	X		X							X	X		X	X				9	Yemen	QS, SEM
Aquilani et al. [131]		X							X						X		X	X		X					X	7	Italy	QS, SEM
Baidoun et al. [132]		X	X							X	X					X							X	X		7	Palestine	QS, FA
Tsironis [157]			X				X	X		X	X			X		X						X				8	Greece	QS, CA
Saleh et al. [80]	X		X											X	X		X		X					X		7	Jordan	QS, CFA
Cho and Linderman [56]	X	X					X						X					X			X				X	7	USA	QS, FA
Kumar *et al.* [158]		X		X											X		X	X		X					X	7	Taiwan	QS, SEM

Nomenclature of the TQM barriers: 1= Lack of customer focus, 2=Ineffective process control, 3= Lack of proper training, 4= Lack of empowerment of employee, 5= Lack of top management commitment, 6=Inappropriate information system, 7=Poor leadership, 8= Lack of continuous improvement culture, 9= Lack of effective appraisal system, 10= Resistance to change organizational culture between departments, 11=Inappropriate planning, 12= Lack of teamwork to solve problem, 13= Poor communication, 14= No benchmarking of current process, 15=Poor utilization of quality management system, 16=Lack of cross-functional teamwork, 17= Lack of knowledge about quality cost, 18= Lack of financial support, 19= Lack of sufficient physical resources, 20= Lack of regular monitoring of process improvement, 21= Inappropriate organizational structure, 22=Shortage of time, 23= Employee's resistance to change culture, 24= Complexity of process, 25=Huge turnover at management level. **Nomenclature of research methods and techniques:** QS=Questionnaires survey, CS=Case study, FA=Factor Analysis, CFA= Confirmatory factor analysis, EFA=Exploratory factor analysis, ANOVA= Analysis of variance, SEM= Structural equation modelling, RA= Regression Analysis, CA=Correlation analysis, AHP=Analytic hierarchy process, ANP= Analytic network process.

It is evident from the above discussion that, when the number of management systems is more than two, such combination of implementation order of MMSs will increase significantly. Management systems present in each combination will have to be implemented sequentially. As a result, more time will be needed to complete such implementation order. Integration strategy based on such sequential adoption of MMSs will become more complex and time consuming. Therefore, this strategy of integration is limited by number of management systems. Development of a new methodology is therefore essential to integrate a large number of management systems.

2.3.2 Literature Review on Integration Methodologies

The second aspect of integration process is development of methodology. Integration methods cover various approaches, models and national standards adopted to formulate an IMS. The methodology varies with the characteristic of an organization and its intention for integration [1]. Therefore, no unique strategy or methodology is suitable for all organizations. As a result, a great number of methodologies have been developed by academician and certification bodies. An up-to-date review of important approaches, model and national standards of integration are discussed in subsequent subsections.

2.3.2.1 Literature Review on Approaches of Integration

Integration approaches describe how to integrate different management systems into the existing management system of a business organization. A brief review of different approaches of integration is given in the following paragraphs.

Process approach is a most popular approach for management system integration. This approach is first introduced by Wright [159]. In this approach, organization is viewed as a collection of processes. These processes are designed based on customer requirements and integration is made by preparing a common procedure to manage similar activities among the Multiple Management Systems (MMSs). Activities are performed according to Plan-Do-Check-Act (PDCA) cycle. As a result, process performance is continuously improved which will ensure better achievement of organizational overall objectives. This approach works with several popular management standards like ISO 9001, ISO 14001, OHSAS 18001. Main limitation of this approach is that, MMSs that are to be integrated must be compatible with PDCA cycle.

System approach is another approach for management system integration. This approach is first proposed by Karapetrovic and Willborn [160]. In this approach, organization is viewed as a

system, since all processes are executed individually to achieve objectives. Integration is made based on system. All tasks are fully coordinated and put into one system. Therefore, a single open system is generated through this integration approach. This approach allows the system not to stick to any standard. As a result, several standards are being used to manage different processes.

System of systems approach is an improved version of system approach. Here, a set of interconnected systems is integrated into a single system. It constitutes a new system in the sense that several parallel functional processes are running under the support of core management system. In this new system, parallel functional processes have lost their independency but have not sacrificed their identity. Therefore, this approach is considered as combination of two approaches (process and system). Karapetrovic [161] has pointed out that this approach suffers from clear definition of boundaries of parallel functional processes.

Multi-level approach is another kind of approach for management systems integration. In this approach, integration takes place at four levels. At first level, several management systems are implemented individually in an organization. At second level, possible structural similarities among the various management systems are identified. Integration is made based on the identified structural similarities among the systems. At third level, some selected parts of different management systems are integrated. As a result, a separate management system is developed to handle each common element. At fourth level, integration is made by aligning individual policy and objectives with overall organizational goal. Rebelo et al. [64] has mentioned that multi-level approach of integration will miss the full integration since this approach has given emphasis to integrate only the common elements among the various elements of management system.

Risk assessment approach is most recent approach for management systems integration. The main goal of this integration approach is to mitigate the risks of achieving objectives of an organization jointly. A combined risk management policy is therefore possible to develop using this integration approach. A combined risk management policy includes: first, identifying all potential risks present in different management standards; second, monitoring and controlling these potential risks in an integrated way so that number of risks can be minimized; finally, achievement of objectives through minimization of risks to achieve it (objectives). This approach also works on PDCA cycle. It is helpful for strategic risk management. Major limitation of this approach is difficulties in alignment of identified risks in the mitigation plan.

It is evident from the above discussion that, all approaches of integration is not suitable for all purposes. Therefore, different approaches have been developed to integrate MMSs under different situations. Table 2.4 has shown the criteria of selection of integration approach. From

Table 2.4, it is observed that selection of an integration approach involves subjective judgment of different criteria. Therefore, success of integration depends on careful selection of integration approach. One serious problem with every integration approach is that, it (approach) suffers from clear cut procedure describing various steps of integrating multiple management systems with the existing system. To describe more detail procedure of integrating different management systems, some researchers have taken initiative to develop IMS models. In the next sub-section, different models on IMS are discussed.

Table 2.4 Selection criteria of different integration approaches

Sl. No.	Approach	Criteria of selection
1.	Process Approach	It is suitable to integrate those management systems that are designed based on customer requirements. All processes must be compatible with PDCA cycle.
2.	System Approach	This approach is used only when the management systems (that are going to be integrated) are less compatible with each other.
3.	System of systems Approach	It is suitable to integrate different task–oriented management systems.
4.	Multi-level Approach	This approach is used to integrate several management systems, when the organization needs a common sharing of limited resources.
5.	Risk assessment Approach	This approach is used when an organization is under a great risk to achieve stakeholder's demand.

2.3.2.2 Literature Review on IMS Models

Several IMS models have been developed by the researchers to integrate different management systems. A brief and up-to-date review of core themes of most popular IMS models is presented below:

Zeng et al. [162] developed an IMS model named synergetic model. In his model, integration is made through synergies among MMSs at three different management levels. These levels are: strategic, tactical, and operational. At strategic level, synergy is achieved from proper alignment of various strategic actions of individual management system. At tactical level, synergy is obtained from effective utilization of organizational structure, resources, and culture. Structural synergy means good co-ordination from top to bottom management. Synergy of resource means effective utilization of human and financial resources. Cultural synergy means developing a continuous improvement of culture throughout the organization. At operational level, synergy is achieved from integrated use of common document, work instructions, forms, and records. Among these three synergies, strategic synergy is at the top priority. Other two synergies (tactical and operational) are mutually supported by each other. Visual representation of this model is shown in Figure 2.2.

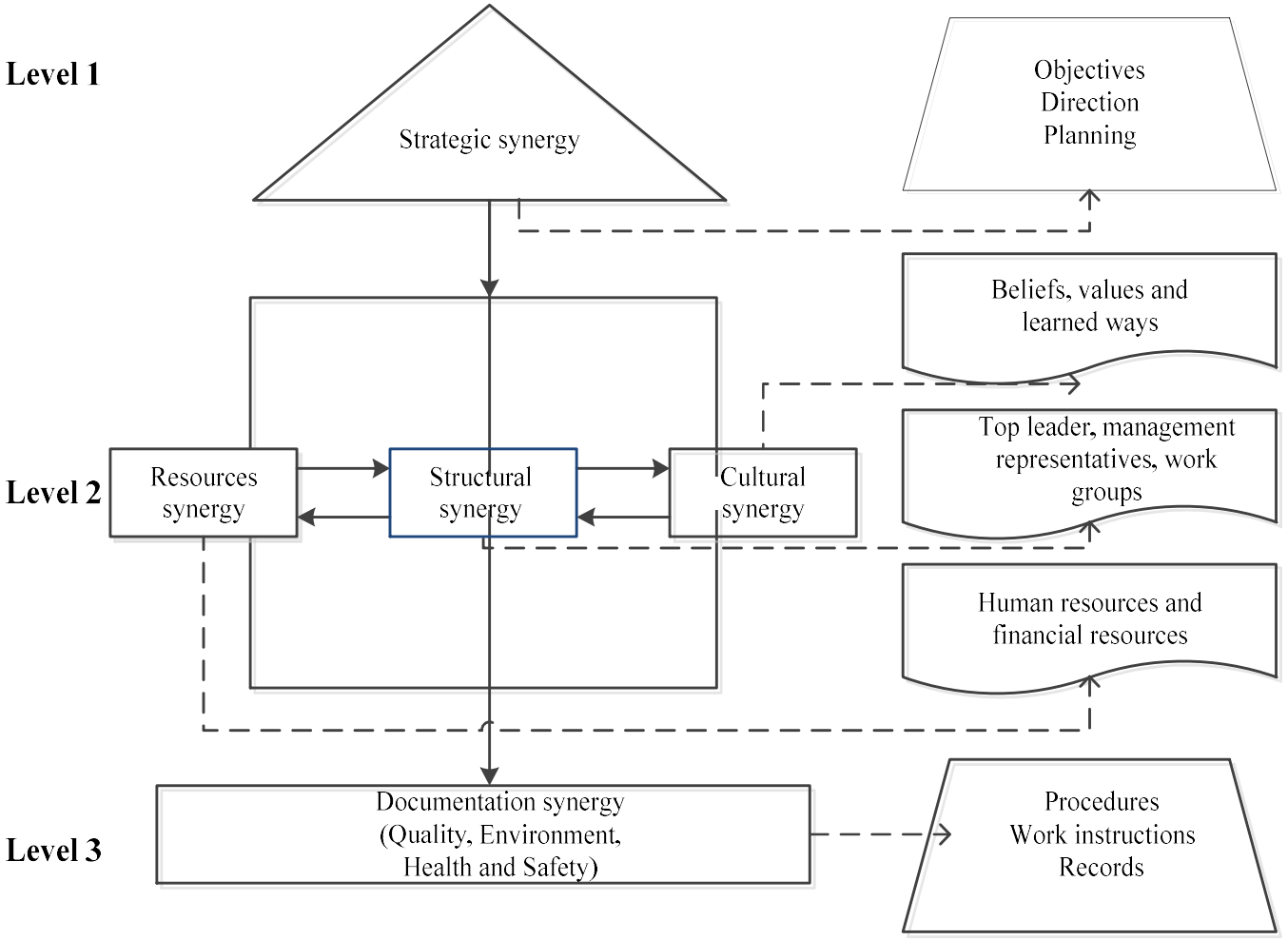

Figure 2.2 Overview of a synergetic model of IMS. Source: Proposed by Zeng et al. (2007, p. 1765)

Asif et al. [43] developed Meta-management model. It is called meta-management because integration is made in various areas such as stakeholder's requirements, policy, objectives, operations, and management procedures across the organization. This model has adopted system approach to design an IMS. In this model, integration has been done based on common elements of different management systems. This model starts integration from combining stakeholder's requirements. Policy and objectives of an organization are to be set in-line with the stakeholder's requirements. After that, organization will prepare a unified operation manual. Organization will also prepare a common procedure to perform similar management activities (process) of different management standards in an integrated fashion. It must be ensured that, all stakeholders' requirements are focused coherently on daily operational activities. Graphical representation of this model is shown in the Figure 2.3.

Bekcic et al. [163] developed Sun model. It works on PDCA cycle and specially designed for pharmaceutical business organization. This model includes several requirements of pharmaceutical organization including Good Distribution Practices (GDP) and Good Manufacturing Practices (GMP). Inclusion of wide variety of requirements has made this integration model more robust. Figure 2.4 represents main theme of this model.

Rebelo et al. [64] developed Lean model. This model is designed based on lean philosophy (eliminating or reducing non-value adding activities in the existing process) and implementation of this lean model will be a great means of achieving full integration. The seven guiding principles of this model are shown in Figure 2.5. They developed their IMS model based on common element method. They have chosen this method to bring uniformity among the management systems and to align the common procedures among the systems. Similarly, Asif et al. [43] also developed their IMS model based on common element method to reduce bureaucracy and to bring simplicity in the management procedure of a system. Although this method (common element) of integration has gained wide popularity, it has some drawbacks also. These are: first, it is difficult to achieve full integration with the help of common elements method. This method only integrates the common processes of different management system standards. Rest of the processes remains separate [42].

As a result, partial integration is achieved instead of full integration.

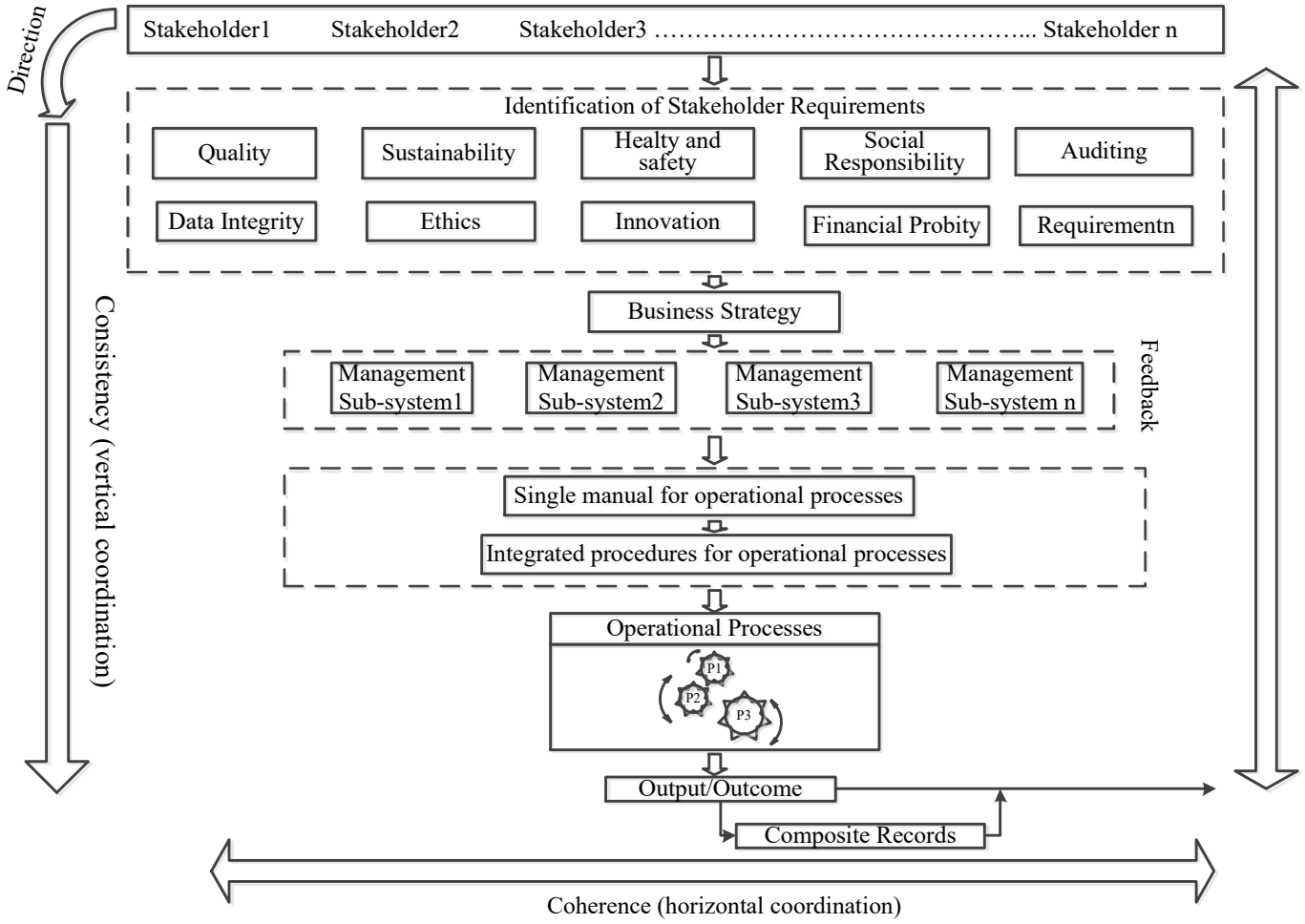

Figure 2.3 Overview of Meta-management model. Source: Proposed by Asif et al. (2010, p. 575)

Second, different management standards cannot be merged into one standard with the help of this common element method. In this method, integration is made with the help of common elements among the different management standards. But the common elements are similar but not identical [45]. For example, “monitoring and measurement” is a common element for ISO 9001:2015, ISO 14001:2015, and OHSAS 18001:2007 standards. This element has different meanings in three different standards. ISO 9001:2015 addresses tolerance in production by “monitoring and measurement” whereas ISO 14001:2015 and OHSAS 18001:2007 address minimization of resource consumption and minimization of accident respectively. Therefore, this integration method can only enhance compatibility among the different management standards [1, 19, 28, 42, 45]. Third, this common element method does not ensure successful implementation of IMS. Researchers have opined that, for successful implementation of IMS, it is essential to build up a continuous improvement culture within the organization. This change in culture will help the employee to actively participate in the integration process [1, 2, 11, 18, 53]. So, change in organizational culture is an important factor for successful implementation of IMS. But unfortunately, change in organizational culture is not considered in common elements method of integration [2, 5, 13, 84]. Fourth, this integration approach is not suitable for those management standards that are incompatible with each other [1, 8, 16, 45]. Fifth, the management standards that are not working on PDCA cycle cannot be integrated with this approach [2, 5, 18, 52, 64].

It is evident from the above discussion that, wrapping multiple management standards with common elements of management standard may fail to bring actual benefits from integration. Therefore, development of a new IMS still exists. In this connection, several standardization bodies in the world are trying to develop their own guideline for integration process. For example, Dansk standard, SAI Global, and AENOR have already developed their own standard of IMS.

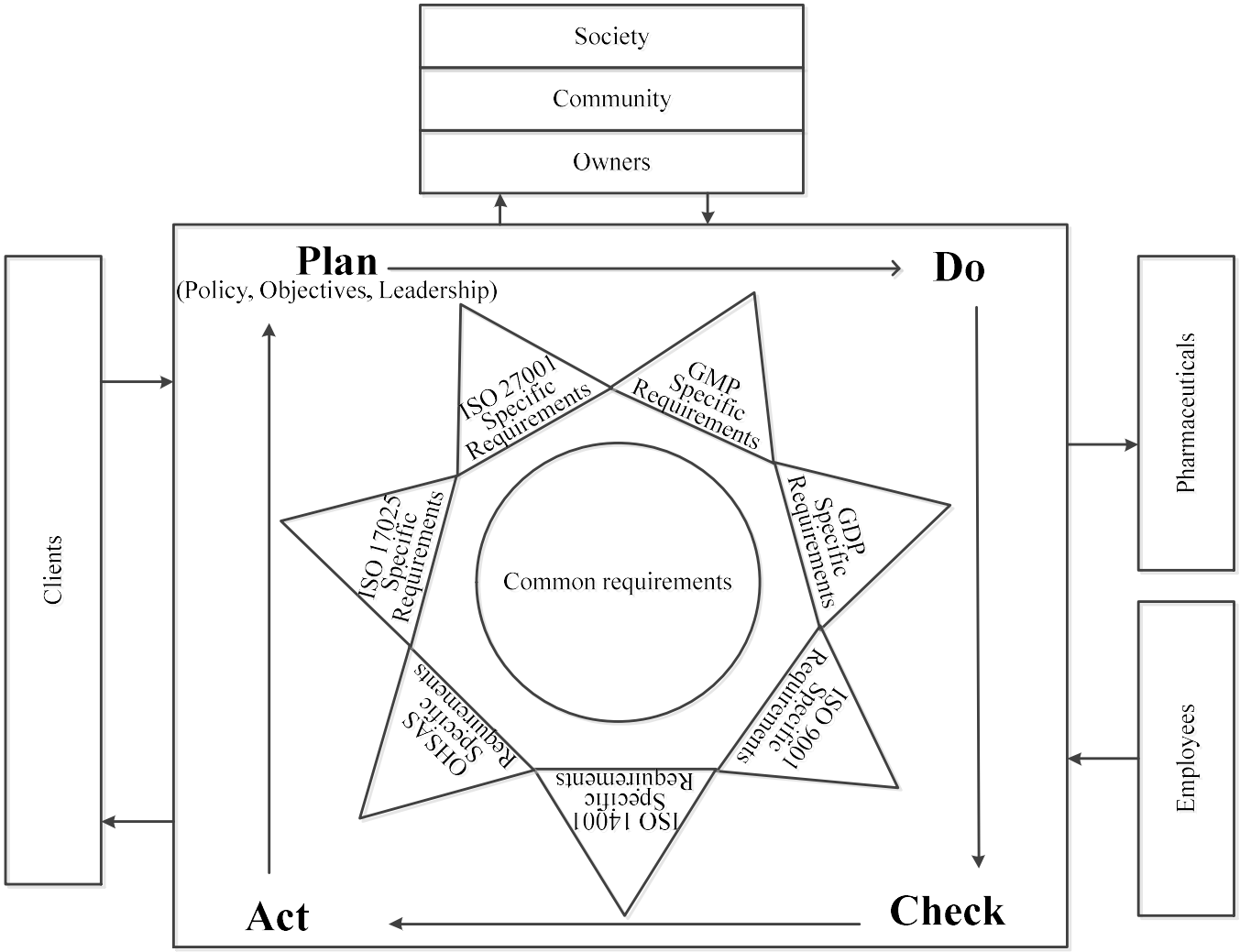

Figure 2.4 Overview of Sun model of IMS. Source: Proposed by Bekcic et al. (2013, p. 22)

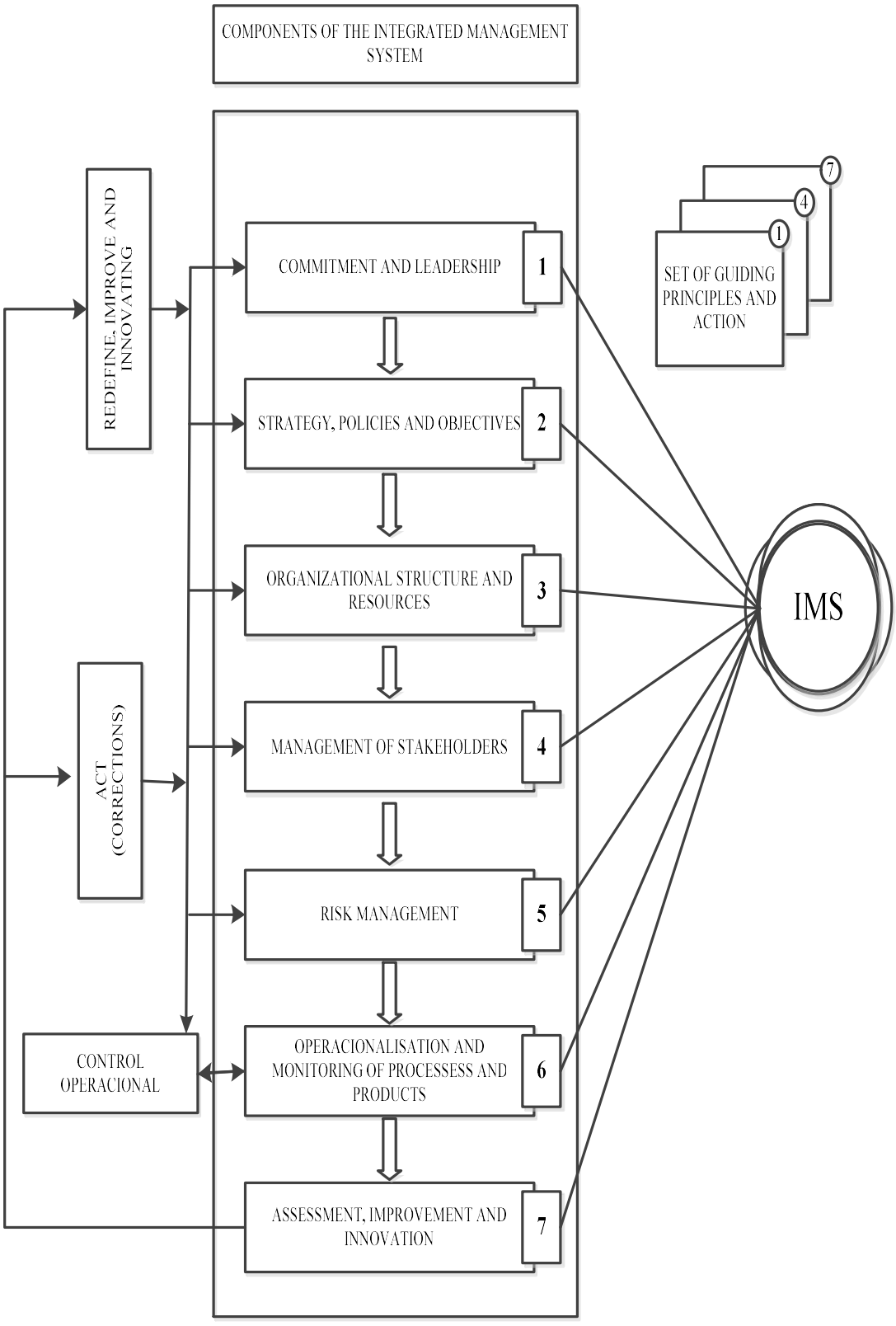

Figure 2.5 Overview of a Lean model of IMS. Source: Proposed by Rebelo et al. (2014a, p. 696)

2.3.2.3 Literature Review on National Standards of IMS

There is no accepted international standard on IMS, Therefore, many countries in the world have come forward to prepare guidelines to construct IMS based on their national need. A brief and up-to-date review of different national standards of IMS is given in the following paragraphs.

Standardization body of Australia and New Zealand has developed AS/NZS 4581:1999 standard. In this standard, there are nine components. These nine components actually cover the areas such as leadership, management responsibility, identification of requirements, system review, and finally improvement plans. This standard is particularly designed to avoid duplication of efforts [164]. It (standard) provides a common guideline for management systems integration. This standard is particularly designed to integrate common requirements of quality, health & safety, and environmental management system.

Standardization and certification body of Spain developed UNE 66177: 2005 standard. This standard works on PDCA cycle. The main motivation of this standard is to integrate individual management system for increasing profit and managerial efficacy [165]. This standard is composed of three stages. First stage covers development of an integration plan. Second stage covers assigning responsibilities among the employees to execute integration plan. Third stage covers review and continuous improvement of integration plan. This standard is particularly suitable for integrating quality, health & safety, and environmental management system together.

British Standards Institution (BSI) developed Publicly Available Specification (PAS 99: 2006) standard. This standard has particularly designed for promoting business. This standard suggests that integration must be done in a structured way so that common requirements of different management systems can be achieved combinedly [166]. An overview of PAS 99:2006 standard is shown in Figure 2.6.

Danish standard Association (DS) developed DS 8001:2008 standard. The main motivation of this standard is to design single management system for all business organization. This standard is suitable to integrate quality management and environmental management system [167]. It is composed of three sections. First section covers the characterization of an ideal management system. Second section covers identification of common elements among the individual management systems. Third section covers integration facilities.

A close look at the different national standards of IMS presented in this subsection reveals that, these IMS national standards are not certifiable. It means these national standards do not have any requirement which needs to be followed strictly.

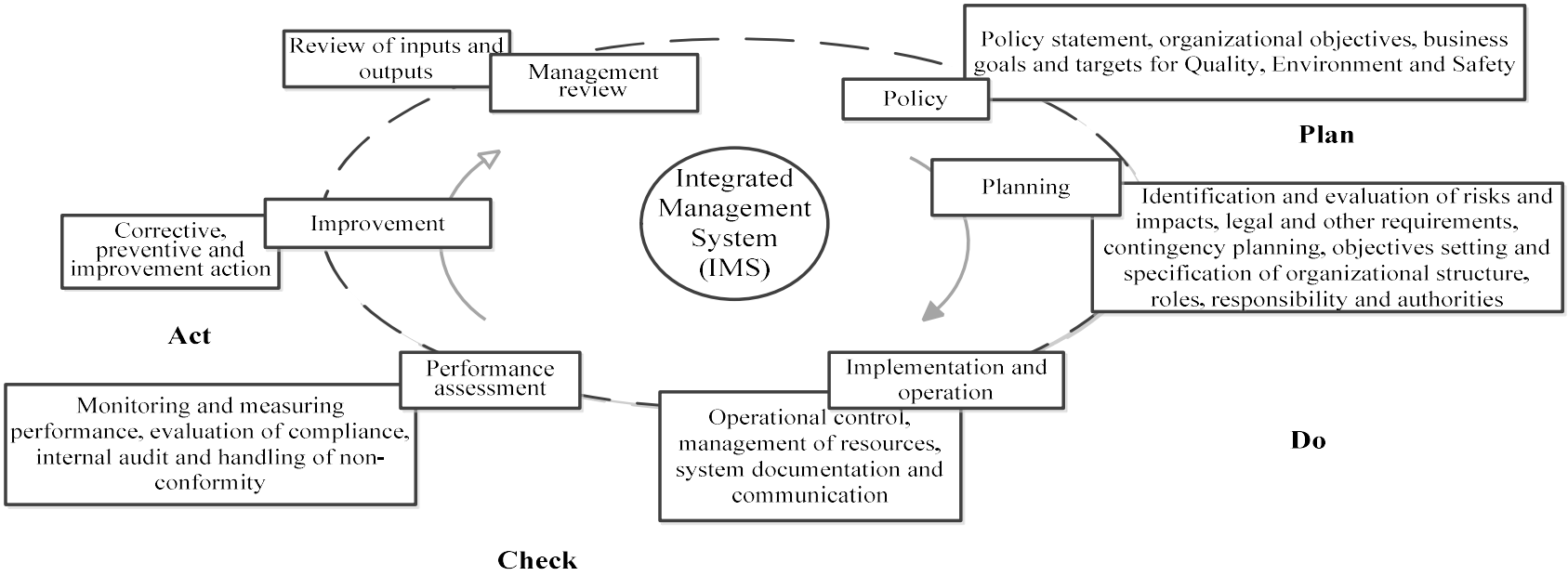

Figure 2.6 Overview of a PAS 99: 2006 Standard

These standards have been designed as a guideline or reference only. This guideline or reference may help a business organization to yield more benefits from adoption of IMS national standard. Moreover, these national standards have been developed as per the requirements of those countries (Australia, New Zealand, Spain, UK, Denmark) that are trying to implement the IMS standard. Therefore, none of these IMS national standards discussed in this subsection will be able to develop a general framework for integrating several management standards, which will serve the purpose of integration of all countries in the world.

2.3.3 Literature Review on Levels of Integration

This is the third aspect of integration process. Integration level refers to the degree of integration obtained from IMS implementation [2, 18, 30, 31]. Different levels of integration can be obtained from implementation of different IMS models [1, 14, 59, 169, 170]. Researchers proposed several scales to measure the degree of integration. For example, Karapetrovic [161] proposed two levels scale. These two levels are full integration and partial integration. Again, Bernardo et al. [171] proposed three levels scale. These three levels are full integration, partial integration, and no integration. Asif et al. [43] also proposed a three levels scale. These three levels are operational level, tactical level, and strategic level. Recently, Sampaio et al. [170] proposed a four-level measurement scale. They proposed this scale based on the degree to which management tools, organizational structure, policies and documentation are integrated within the organization. Different levels of integration and their explanation found in the literature are summarized in Table 2.5.

Table 2.5 Different levels of integration as mentioned in the literature

Author(Year)	Description and interpretation of levels
Karapetrovic [161]	Partial : Alignment of objectives with organizational goal Full : Complete amalgamation of policy and objectives into single system.
Griffith [172]	Partial : Homogenous documentation Full : Complete integration of common procedures and objectives.
Epstein and Roy [173]	Alignment : Integration of documents Combination : Integration of common procedures Full : Complete integration of both document and process into one system.
Kirkby [174]	Separate : Documents and processes are separately maintained for each system. Aligned : Co-ordination of common procedures and documents. Integrated : Common procedures and documents are integrated into one system.

Author(Year)	Description and interpretation of levels
Bernardo et al. [171]	No : Management systems are operated separately. Partial : Some parts of the documents and procedures are integrated. Full : Integrating all documents, procedures into single system and sharing of common organizational resources.
Sampaio et al. [170]	1st Level : Documents of individual management system are integrated 2nd Level : Tools of different management systems are integrated. 3rd Level : Amalgamation of policies and objectives of different management systems 4th Level : Common organizational structure for managing all systems

A close look at different integration levels of IMS presented in this subsection reveals that, there is no clear guideline where and when these scales will be used to measure the levels of integration. Therefore, some researchers such as Gianni et al. [31], Siva et al. [182] have suggested to evaluate the level of integration based on the impact of IMS on firm's performance.

2.3.4 Literature Review on Impact of IMS on Firm's Performance

Improvement of firm performance depends on the effective operation of IMS. An IMS will operate effectively only when all Management Systems (MSs) under an IMS will operate properly. Therefore, management needs a guideline to assess how effectively different management systems are operating in an IMS to improve firm performance. In order to do that, a limited number of researchers have developed guidelines to measure how effectively various management systems within an IMS are managed to improve firm performance. These guidelines are discussed in the following paragraphs.

Domingues et al. [18] reported that an IMS will operate efficiently only when all management systems under an IMS are integrated properly. They developed an assessment model to determine the integration level of IMS. Their assessment model consists of three dimensions: Key Process Agents (KPAs), excellence management pillars, and external factors. The integration level of MSs is evaluated by the combination of these three dimensions. The following paragraphs will discuss each of these three dimensions.

The key process agent is one kind of variable that is used to evaluate the integration level of IMS. They identified 21 KPAs from the literature. These KPAs are: (1) integration of policy, (2) integration of management procedure, (3) integration of document, (4) adoption of integrated

objectives, (5) adoption of integrated indicators, (6) integration of audit, (7) integration of strategy, (8) integrated vision of top management, (9) top management training on system integration, (10) better alignment among objectives, methodologies, and organizational tools, (11) organizational interactions, (12) declaration of integration concept, (13) system bureaucratization, (14) organizational structure contains a post of IMS manager, (15) regular monitoring of the process, (16) good correlation between integrated organizational structure and integration level perception, (17) MSs performance perceived better in an integrated context, (18) integration of all organization features, (19) value addition by IMS, (20) non-residual authority by managers of the individual management system, and (21) implementation guideline of IMS. Each KPA is used to measure a particular concept about management systems integration. An IMS is considered to have a higher level of integration if IMS complies with the concepts assessed by KPAs.

Excellence management pillars are defined as management practices commonly present in different MSs that constitute an IMS. They identified 8 common management practices from the literature. These management practices are: (1) leadership, (2) focus of management system on stakeholder's requirements, (3) employee involvement, (4) adoption of integration approach, (5) adoption of the process approach, (6) continuous performance improvement of MSs, (7) decision making based on evidence, and (8) good stakeholders relationship, An IMS is considered to have a higher level of integration if all of these management practices are evident in each MS of IMS.

External factors are defined as externalities that have an impact on the integration level of IMS. Externalities are used to address some common external features of an IMS. From the literature, they identified 4 common external features of IMS. These common features are: management of (1) employee's occupational health and safety practice, (2) environmental practice, (3) sustainability practice, and (4) social responsibility practice. Each of these external features is measured by a single factor. For example, macro-ergonomics factor is used to measure excellence in employee's occupational health and safety practice. Similarly, factors such as life cycle analysis, sustainability, and social accountability are used to measure excellence in environmental practice, sustainability practice, and social responsibility practice respectively. They arranged these single factors in ascending order considering their impact on integration level. Such type of order is macro-ergonomics, life cycle analysis, sustainability, social accountability. The higher the impact the higher the integration level among the Management Systems (MSs).

Poltronieri et al. [38] developed another tool for assessing the integration level of IMS. This tool determines how effectively different management systems are operating in an IMS to improve firm performance. An assessment tool consists of set of questionnaires. This tool is divided into two parts. Questionnaires in first part were designed for assessing the effectiveness of different

MSs operating in an IMS. First part contains 19 questionnaires. These questionnaires were taken from four management aspects such as policy, planning, implementation, and verification. Within four management aspects, several management issues were addressed. Different management issues of each aspect are mentioned in the following paragraphs.

The policy aspect addresses five management issues such as (1) existence of single policy integrating all standards, (2) top management actively participates in policy integration, (3) integrated policy is updated regularly, (4) all policies of a company are circulated in an integrated fashion, and (5) indicators are set jointly to verify the awareness about the policies.

The planning aspect addresses five management issues such as (1) company carried out a joint plan, (2) objectives, goal and requirements are integrated and aligned, (3) a single manual is prepared encompassing all standards, and (4) planning is carried out by a single team involving people at both strategic and operational level, (5) management procedures, work instructions, and records are well integrated and encompassing all standards

The implementation aspect addresses five management issues such as (1) authority and responsibility of the employee are assigned combinedly and well communicated, (2) company fulfills the training needs of different management standards in an integrated way, (3) assessment of different MSs (monitoring, measurement and analysis) is done in an integrated way, (4) operational control is done jointly fulfilling the requirements of different MSs, and (5) information is communicated under a single structure.

The verification aspect addresses four management issues such as (1) a single team conducts internal audits at a single time and generates a single report, (2) a single external audit team will audit all the integrated standards and will generate a single report, (3) nonconformities are treated in an integrated fashion fulfilling the requirements of all MSs, and (4) management review is done in an integrated manner recommending a suggestion for further improvement if necessary, Each management issues were evaluated by 5 point Likert scale. On the other hand, questionnaires in second part were selected for assessing the firm performance from various perspectives. Second part contains 22 questionnaires. These questionnaires were taken from three perspectives of firm performance such as economic, environmental, and social. Within three perspectives of firm performance, several indicators were used to measure the firm performance. Different indicators of each perspective of firm performance are mentioned in the following paragraphs.

The economic perspectives of firm performance addresses five performance measurement indicators such as (1) difference between profit generated and company expenditure, (2) amount of

dissimilarity between the lowest salary of organization and the local minimum wage, (3) percentage of investments in building public infrastructure such as public transport network, sport-centers, health-center etc., and (4) percentage of purchases from local suppliers.

The environmental perspectives of firm performance addresses six performance measurement indicators such as (1) level of efficiency in raw material use, (2) level of efficiency in energy consumption, (3) level of efficiency in water consumption, (4) level of efficiency in reducing atmospheric emissions, (5) level of efficiency in reducing the waste, and (6) investment in environmental protection,

The social perspectives of firm performance addresses twelve performance measurement indicators such as (1) retention rate of employees, (2) level of efficiency in prevention of occupational injuries, (3) average training hour per year, (4) level of discrimination between man and woman wage, (5) number of actions taken in reducing forced labor, (6) percentage of investment for development of local communities, (7) percentage of workers trained in anti-corruption policies, (8) Level of concern about political parties, (9) number of actions taken against unfair competition, (10) level of concern about compliance with regulations, (11) number of supplier selection based on social impact, and (12) level of efficiency in reducing stakeholders complain

In summary, it is evident from the above discussion that, two models are available to assess how the different management systems that constitute an IMS play an important role in improving firm performance. In the first model, assessment is made by a combination of three dimensions such as Key Process Agents (KPAs), excellence management pillars, and external factors. In the second model, assessment is made by questionnaire survey. The latter model is more convenient since the concept of this model can easily be used in another research work by modifying the questionnaire as per the research objective.

2.4 Selection of Research Method

Selection of research method is an important step for successful research. It is evident from the TQM literature that, there are two types of research method widely used by researchers. They are case study method and hypothesis driven study method. The following paragraph will describe the purpose of selection of these two methods of study.

Kaynak [87] carried out a case study method for in-depth analysis of TQM enabling factors in the context of manufacturing industries in Australia. He pointed out that, this method is ideal for a detailed analysis of a particular problem in a specific context since this type of method collects

data from direct observation. He found that, leadership, top management commitment and customer satisfaction enhance the TQM implementation process.

Macinati [88] conducted a case study method to compare the similarities of TQM barriers identified in USA and Australia. He noted that, this method is suitable for comparing the results of two similar studies conducted in two different geographic locations since this method allows an in-depth analysis of a particular problem based on real time data. He found that, the TQM barriers identified in these two countries are somewhat different from each other.

Psomas and Jaca [91] said that, result obtained from a case study method can not be generalized for other cases with similar circumstances since data is collected from a single entity. To overcome this difficulty, they suggested to carry out hypothesis driven study method instead of case study method because hypothesis driven study method can generalize the research result. Moreover, hypothesis driven study method is less expensive and requires less amount of time compared to case study method. They employed this method to identify TQM enabling factors in the context of manufacturing industries in developed countries like Spain. They found that, continuous improvement, leadership, customer satisfaction are significant for manufacturing industries in developed countries.

Bouranta et al [92] used hypothesis driven study method to investigate the impact of three factors such as strategic planning, customer satisfaction, employee empowerment on improving the financial performance of a firm. They pointed out that, this method is ideal for identifying the relationship between a set of variables. They found that, customer satisfaction has a positive impact on firm's financial performance.

Albuhisi and Abdallah [98] employed hypothesis driven study method to identify the role of firm's reputation on the relationship between customer satisfaction and firm's financial performance. They noted that, this method of study is effective for identifying the role of a third variable on the relationship between two variables. They found that, firm's reputation act as a moderator on the relationship between customer satisfaction and firm's financial performance.

In summary, it is evident from the above discussion that case study method is suitable for following reasons: i) to gather in-depth understanding on a particular problem in a specific context, ii) to compare results of two similar studies conducted in two different geographic locations. On the other hand, hypothesis driven study method is ideal for the following purposes: i) to generalized the research result for other cases with similar circumstances, ii) to identify the relationship between a set of variables, iii) to investigate the role of a third variable on the relationship between

two variables. It can be concluded that, selection of right type of method depends on objective of a research. Data collection and data analysis are the two important steps of a research method.

2.5 Selection of Data Collection Method

Acceptability of research result depends on data collection accuracy. For this reason, there should be a standard procedure for collecting data which will ensure the accuracy of data collection. There are two popular methods for data collection. They are interviewing and questionnaire survey. The following paragraph will describe the purpose of selection of these two types of data collection methods.

Zhang et al. [99] employed interviewing method in their study to gather a clear understanding about the factors that are helpful for TQM implementation in manufacturing industries in UK. They pointed out that, interviewing method is suitable for collecting a complete and useable set of data to gather a complete idea about a research problem. They found that, factors such as leadership, employee empowerment, employee motivation are helpful for TQM implementation in automobile industries in UK.

Deros et al. [115] used interviewing method to identify the causes of improper implementation of TQM in Australian manufacturing industry. They opined that in this method, data is collected by sharing the respondent's experience, so this method is appropriate for investigating the causes of a research problem. They observed that, the main obstacles to implement TQM in the Australian manufacturing industry are resistance to change culture, inappropriate plan, lack of training.

Aamer et al. [130] noted that, accuracy of data depends on accuracy of questionnaire used for data collection. In the interviewing method, there is no opportunity to pre-test the validity and reliability of the questions used for conducting an interview. To overcome this difficulty, they proposed to use questionnaire survey method where accuracy and reliability of questionnaire are pre-tested. They also employed this questionnaire survey method in their study for identifying the factors that are helpful for TQM implementation in manufacturing industries in China. They found that, leadership, customer satisfaction, employee empowerment plays a positive role on TQM implementation.

Aquilani et al. [131] employed questionnaire survey method for collecting bias free data to investigate the role of quality information on relationship between customer satisfaction and firm's financial performance. They mentioned that, there is a possibility to receive factious opinion from the respondents in interviewing method, as majority of the questions are open-ended. As a result,

risk of biasness in data will also increase. However, in interviewing method, there is no opportunity to test the biasness of a data set. Hence, this method is not preferred for collecting data to investigate the role of the third variable on the relationship between two variables. To overcome this problem, they recommended to use questionnaire survey method where biasness in data is tested before analysis. As the data is free from bias, it can easily be used to investigate the role of third variable on relationship between two variables. Hence, they chose questionnaire survey method in their study. They found that, quality information act as a mediator to influence relationship between employee involvement and firm's financial performance.

Baidoun et al. [132] used questionnaire survey method to collect data from 320 respondents to investigate the important barriers that hinder TQM implementation in Palestinian manufacturing industries. They pointed out that, questionnaire survey method is best suited for collecting large number of data compared to the interviewing method. Data analysis is more reliable and accurate in questionnaire survey method rather than interview method. Hence, they chose questionnaire survey method in their study. They observed that, lack of training, lack of financial support, employee's resistance to change are the important factors that hinder TQM implementation in Palestinian manufacturing industries. the higher the number of sample data the higher accuracy in analyzing the data

In summary, it is evident from the above discussion that, interviewing and questionnaire survey are the two common methods for data collection. Interviewing method is suitable for the following purposes: i) to gather a complete idea about the research problem, ii) to investigate the causes of a particular research problem. Major limitation of this method is that it cannot be used to collect large number of data. On the other hand, for data collection, most of the researchers preferred the questionnaire survey method over the interview method for the following reasons: i) data collection is cheap and requires less time, ii) data is free from bias, iii) pre-test of questionnaire is possible to investigate the accuracy and reliability. It can be concluded that, accuracy of data analysis depends on right selection of data collection method. Therefore, choice of data collection method is very important. It depends on type of data (quantitative and qualitative), size of data (large or small), and purpose to use data.

2.6 Selection of Data Analysis Method

Acceptability of a research result depends on accuracy of data analysis. Selection of data analysis method is vital for any research work. It is evident from the TQM literature that, researchers used several methods for data analysis. Among the several data analysis method, three of them are most widely used. They are Analysis of Variance (ANOVA), regression analysis, Structural Equation

Modelling (SEM). The following paragraph will describe the purpose of selection of these three types of data analysis methods.

Dow et al. [139] employed ANOVA method to analyze the relationship of leadership and employee motivation with firm's financial performance. They selected ANOVA method since this method allows to identify common mean between variables of several groups. Therefore, ANOVA method is preferred for identifying the relationship between variables.

Chin and Pun [140] employed regression analysis method to investigate the impact of three factors such as customer relationship, customer satisfaction, and leadership on firm's financial performance. They pointed out that, regression analysis method is suitable for estimating the impact of one or more independent variables on dependent variable. Hence, they chose this method in their study. They found that, only customer satisfaction has a positive impact on firm's financial performance.

Teixeira et al. [156] said that, regression method can not analyze all variables of a model simultaneously. Therefore, this method become tedious and time consuming for analyzing a complex model. They suggested that, for a complex model it would be wise to use Covariance Based Structural Equation Modeling (CB-SEM) rather than regression method. Hence, they employed CB-SEM method to analyze a complex model that they had developed in their research work. In this complex model, the impact of five TQM elements on the firm's financial and operational performance was estimated. These five TQM elements are customer satisfaction, employee empowerment, employee motivation, employee training, and top management commitment. They found that, employee motivation has a positive impact on firm's operational performance while customer satisfaction has a positive impact on firm's financial performance.

Sweis et al. [153] noted that, CB-SEM cannot work with small sample size, missing data, outlier, and skewed data which Partial Least Squares Structural Equation Modeling (PLS-SEM) can do. For this reason, they suggested to use PLS-SEM to examine the role of a third variable on the relationship between two variables. Accordingly, they employed PLS-SEM method in their study to analyze the role of process management on relationship between product quality and firm's operational performance. They found that, process management act as a mediator to influence relationship between product quality and firm's operational performance.

In summary, it is evident from the above discussion that, ANOVA, regression analysis, and SEM are the three common methods for data analysis. ANOVA method is suitable to analyze the relationship among a set of variables. Regression analysis method is appropriate to estimate the

impact of all independent variables on dependent variable. On the other hand, structural equation modeling (SEM) is ideal to analyze all variables of a model simultaneously. There are two types of structural equation modeling. One is covariance based other is partial least squares based. Researchers prefer the PLS-SEM method over the CB-SEM method for the following reasons: PLS-SEM method can work with i) missing data, outlier, and skewed data, ii) few numbers of data, iii) more complex model having great number of variables. It can be concluded that, accuracy of data analysis depends on right selection of data analysis method. Choice of data analysis method depends on type of data and purpose of data analysis.

2.7 Summary of Literatures Review

Summary of the literature review provides the current state of knowledge on a particular issue. This knowledge gives useful guidelines for the future research work. The critical summary drawn from the review of literature on TQM and IMS are as follows:

i. Many industries in the world are trying to implement TQM in their organizations. Successful implementation of TQM depends on several factors. These factors are known as TQM enabling factor. Clear understanding of these enabling factors can make the TQM implementation process easier. Therefore, researchers are trying to identify the all possible enabling factors of TQM. In the meantime, a great number of enabling factors has been identified. But these enabling factors are not universal for all business organizations. These factors are contingent and depend on social, culture, and economic condition of a country. Majority of these enabling factors have been identified in the context of developed countries such as USA, Japan, Germany, UK, Italy, Portugal rather than developing countries like Bangladesh. But there is a huge difference in cultural values between developed and developing countries. Therefore, it is necessary to empirically examine the factors that are contingent to TQM implementation in the context of developing countries like Bangladesh.
ii. Industries are facing difficulties during TQM implementation in their organizations. These difficulties are known as TQM barriers that are causing TQM failure. A great number of TQM barriers have already been identified by several researchers. But all barriers are not equally contributing to TQM failure. Some of the barriers are more critical to TQM failure, while some are less critical. To overcome TQM failure, it is important to identify those TQM barriers that are more critical to TQM failure. Prioritizing the TQM barrier is therefore essential to identify their (barriers) contribution to TQM failure. Prioritization of different TQM barriers is not universal for all business organizations. It also depends on social, culture, and economic condition of a country. No studies are found in the TQM literature that

has prioritized the TQM barriers in the context of developing country like Bangladesh. Prioritizing the TQM barriers in the context of developing country is another interesting area for future research.

iii. Industries are using multiple management systems (MMSs) according to the requirement of stakeholders. They are facing difficulties to implement and operate of MMSs at a time, as the number of management system is increasing significantly day by day. Therefore, industries are showing their interest in management systems integration. In order to integrate MMSs, they are following two integration strategies. One is sequential adoption of MMSs and other is simultaneous adoption of MMSs. These two strategies are very simple for integrating less number of management systems. But, they (strategies) become more complex and time consuming when the number of management systems increases. For this reason, academia and standardization bodies throughout the world have come forward to develop a new method to integrate a great number of management systems into a single system. For example, many standardization bodies in the world have developed their own standards to formulate an IMS. But, these IMS standards are not able to serve the purpose of all business organizations in the world as these standards have been developed as per the requirement of a particular country. No international standard of IMS has been developed yet. On the other hand, academia has developed several integration models of IMS. These integration models show theoretical concept to formulate an IMS rather than proposing a framework to implement the IMS. Therefore, developing an implementation framework for IMS model could be another research avenue.

iv. TQM elements help to improve firm performance. For this reason, several researchers have studied the relationship between TQM element and firm performance. In order to identify the relationship, they have measured firm performance in several dimensions such as operational performance, employee performance, inventory management performance, innovation performance, social performance, customer satisfaction performance, and market share performance. It is evident from the literature that, there is a lack of study to decide whether TQM elements can help to improve firm performance in other two dimensions such as environmental and occupational safety. So, there is a great opportunity to explore the relationship (between TQM element and firm performance) in those two dimensions which is another interesting area for future research.

v. From TQM literature it is found that, effect of all TQM elements on firm performance is not equal. Some elements have direct impact on firm performance while some others have indirect effect. For example, quality tools utilization, process management, and computer-based data management have direct impact on firm performance while workforce

commitment, customer focus, teamwork, training, and supplier relation have indirect effect. It is evident from the literature that, there are some other TQM elements that have not yet been studied to decide whether those TQM elements have direct or indirect impact on firm performance. Some examples of these TQM elements are top management commitment, employee empowerment, benchmarking of current process, flow of information within the organization, supplier relationship etc. So, there is a great opportunity to explore the direct or indirect effect of these TQM elements on firm performance which will guide the feature research in a new direction.

vi. The impact of TQM element on business performance depends on different mediator factors. Some examples of these mediating factors evident in the literature are reputation of the firm, quality information, and process management. There are a few other factors that may act as a mediator. Top management initiative is one of them. Several researchers have pointed out that, top management initiative has a strong influence on TQM implementation. Since top management initiative varies from one organization to another, the outcome of TQM implementation also differs from one organization to another. Consequently, change in firm performance improvement is observed at various magnitudes in different organizations. Therefore, researchers are putting emphasis on exploring the role of top management initiative on relationship between TQM element and firm performance which will open a new research window.

vii. Management system integration increases firm performance. One of the ways to verify the firm performance improvement would be analyzing the relationship between IMS and firm performance. Therefore, it is necessary to develop a tool that will analyze the relationship. This tool can also evaluate how the integrated adoption of various management strategies can improve firm performance. It is evident from the literature that, little study is available to investigate the relationship between IMS and firm performance. Poltronieri et al. [38] has developed a tool to analyze the relationship. This tool can measure firm performance only in three dimensions such as financial, social, and environmental. This tool is not capable to measure firm performance in other two dimensions such as quality and occupational safety. So, there is a great opportunity for developing a tool by which the performance of a firm can easily be measured at any dimension. Development of such tool will pave the path for future research to identify the dimension in which firm's performance will increase through management systems integration.

viii. A research method describes the procedure to collect data and scientific analysis of these data. Therefore, selection of research method is an important step for successful research. It is evident from the literature that, data can be collected in two ways. They are interviewing

and questionnaire survey. Interviewing method is suitable for the following purposes: a) to gather a complete idea about the research problem, b) to investigate the causes of a particular research problem. Major limitation of this method is that it cannot be used to collect large number of data. Similarly, the questionnaire survey method is suitable for the following reasons: a) data collection is cheap and requires less time, b) data is free from bias, c) pre-test of questionnaire is possible to investigate the accuracy and reliability. For data collection, most of the researchers preferred the questionnaire survey method over the interviewing method. . On the other hand, data can be analyzed scientifically by three statistical methods. They are Analysis of variance (ANOVA), regression analysis, and structural equation modeling (SEM). ANOVA method is suitable to analyze the relationship among a set of variables. Regression analysis method is appropriate to estimate the impact of all independent variables on dependent variable. On the other hand, structural equation modeling (SEM) is ideal to analyze all variables of a model simultaneously. There are two types of structural equation modeling. One is covariance based other is partial least squares based. Researchers prefer the least squares structural equation modeling (PLS-SEM) method over the covariance based structural equation modeling (CB-SEM) method for the following reasons: PLS-SEM method can work with a) missing data, outlier, and skewed data, b) few number of data, c) more complex model having great number of variables.

CHAPTER 3

Practice of Management Standards in RMG Sector in Bangladesh

3.1 Overview of RMG Sector in Bangladesh

Bangladesh is one of largest apparel product exporters in the world. Geographic location of Bangladesh has provided an extra benefit to expand foreign business. Currently, Bangladesh has secured second position in apparel exporting next to China [67]. RMG Sector is an important sector in Bangladesh because it (RMG Sector) is playing a critical role in generating employment. For instant, RMG Sector has generated employment nearly 45 lake people in Bangladesh [67]. This Sector is growing very fast in Bangladesh. Export promotion Bureau (EPB) has reported that, during the last fiscal year (2018-2019) total export earnings from this Sector was 84.21% contributing $ 40.53 billion [83]. But, in comparison to world's market share, Bangladesh possesses only 6.4% whereas main compotator of Bangladesh (i.e., China) possesses 36.4%. It is a pleasure to know that, market share of Bangladesh is increasing in every year. Market share of Bangladesh RMG sector during the last three consecutive years were 5.1%, 5.9% and 6.4% respectively [67]. China has loser its market share from 39.3% (in FY 2015-2016) to 36.4% (in FY 2016-2017) [66]. The main reason behind this decrease in market share is high production cost in China. Therefore, Bangladesh has a great opportunity to increase its market share. Bangladesh Government has set a target to expand its market in Japan, Korea, and Australia by 2030 [67].

In the last two decades, Bangladeshi RMG Sector has focused more on product quality for improvement [68, 176]. For this reason, many industries in this sector have adopted ISO 9001 quality standard in their organizations. This standard is a process standard rather than product standard. This standard is a most popular and widely used quality standard in the world. ISO 9001 Certification is a pre-requisite for exporting products in the international market. This certificate provides a quality assurance to the customers. ISO 9001 standard focuses on continual improvement of product quality through improvement in process performance [68]. In order to introduce ISO 9001 standard, an organization has to set a clear scientific procedure to perform all processes critical to quality. Monitoring of these processes is performed in order to ensure that these processes are performed according to the document procedures. A deviation from the expected quality is measured scientifically. Preventive and corrective actions are usually taken to

overcome product defects. Hence, a cycle of continuous quality improvement is completed. In order to achieve full benefits from quality management practice, many RMG industries are using several quality tools (like Six sigma, Parato chart etc.) in their organizations. In order to inspect the quality of finished product garment industries are using sampling technique. Finally, the buyers are requested to perform final inspection. With the progress of time, business environment has changed a lot, modern business practice is focusing on harmonizing all activities related to product quality, protection of health & safety of the employee, and protection of environment. Therefore, an organization has to make several strategic decisions considering the impact of their activities on society and environment. This new perception of modern business practice tries to accumulate all requirements of stakeholders under single business practices. To keep pace with changing competitive business environment, many industries in RMG sector are trying to adopt different management standards in order to fulfill the requirements of all stake holders. The management standard that are commonly using in the RMG industries are: ISO 9001: 2015, ISO 14001: 2015, OHSAS 18001: 2007, and SA 8000: 2014.

The current business environment is motivating the business organization towards sustainable business practices. Organization those who are economically competent and responsible to society and environment, will occupy more suitable position in the competitive market. They will be able to build confidence among their stakeholders. RMG sector in Bangladesh need to make themselves capable for sustainable business practices in their organizations.

This chapter is organized as follows. Current practice of different management standards in RMG sector of Bangladesh is presented in Section 2, whereas section 3 describes the impact of parallel operation of individual management standards in this sector. Section 4 and section 5 describes the scope and impact of integration of multiple management systems respectively.

3.2 Current Practice of Different Management Standards

In order to sustain in the competitive global market, several RMG industries in Bangladesh are using several management standards according to the requirement of the foreign buyers. Number of certificates of different international management standards that are used in this sector is shown in Table 3.1. In addition, evolution of total number of certificates in Bangladeshi RMG sector from 20017-2019 is presented in Figure 3.1.

Table 3.1 Statistics on major certificates that are used in Bangladeshi RMG sector

Standards	Number of Certificates in Bangladeshi RMG sector						Evolution (2017/2019)	
	2017	%	2018	%	2019	%	Number	%
ISO 9001	346	63.60	453	64.81	470	62.42	124	35.84
ISO 14001	101	18.57	119	17.02	137	18.19	36	35.64
OHSAS 18001	82	15.07	108	15.45	121	16.07	39	47.56
SA 8000	15	2.76	19	2.72	25	3.32	10	66.67
Total	544		699		753		209	

Source: *Data from BGMEA survey (BGMEA, 2019)* [67]

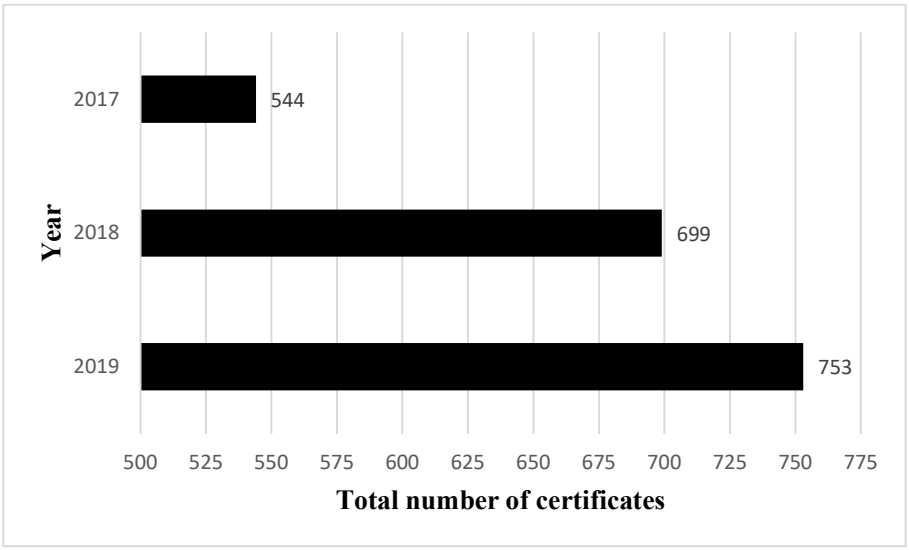

Figure 3.1 Evolution of management certificates in Bangladeshi RMG sector from 20017-2019

It is obvious that, number of certificates have gradually increased form the period 2015 to 2017. It indicates that, RMG industries are trying to fulfill the requirements of their potential buyers and have adopted several standards in their organizations. According to the number of users of various

standards, ISO 9001 has got the highest position followed by ISO 14001, OHSAS 18001 and SA 8000. Number of certificates of ISO 9001 is higher since this standard has been published earlier than any other standards mentioned in the Table 3.1. ISO 14001 standard possesses the second highest number since majority of the customers have a clear fascination on greener production. Therefore, many RMG industries have adopted ISO 14001 standard in their organizations. Safety and labor right become the major issue in Bangladeshi RMG sector just after the disaster of Rana Plaza in 2013. Many industries in this sector have begun to adopt OHSAS 18001 and SA 8001 [69]. OHSAS 18001 has been adopted to ensure worker's safety while SA 8000 has been adopted for the protection of worker's rights. These two standards are adopted as per customer requirements.

It is obvious that the number of management standards is increasing day by day due to wider range of customer requirements. Parallel execution of individual management standards, is therefore becoming difficult for a business organization. In many occasions, individual management of MMSs fails to fulfill the desired result because of their (MMSs) ineffective implementation [81, 177]. Moreover, a business organization has to perform some duplication of efforts while organizing several management standards. Duplication of efforts always charges extra resources (financial, manpower, physical) to an organization.

To overcome the situation, limited numbers of industries in this sector are migrating from individual management to integrated management system. For instance, some RMG industries are trying to achieve the common requirements of different management standards in an integrand manner. Therefore, they are trying to identify and combine the common requirements of different management standards together. Similarly, they are trying to share common information (WI, Records, checklist etc.) within the organization.

According to the survey of BGMEA performed in 2018, nearly 11 RMG industries are using IMS in their organizations. Most of them have implemented ISO 9001 and ISO 14001 standards sequentially. First implement ISO 9001 then ISO 14001. Some of organizations have adopted two standards either in the form of ISO 9001+ OHSAS 18001 or ISO 14001+OHSAS 18001. But in both cases OHSAS has been adopted lastly. Few of them have followed a new sequence that is ISO 9001+ ISO 14001 simultaneously then OHSAS 18001. Evaluation of IMS practice in Bangladesh RMG sector is shown in Table 3.2. In addition, the number of RMG industries in Bangladesh that are using IMS from 20017-2019 are presented Figure 3.2.

Table 3.2 Statistics on IMS adoption in Bangladeshi RMG sector

Standards	Number of RMG industries			Evolution (2017/2019)
	2017	2018	2019	Number
ISO 9001+ ISO 14001	4	5	6	2
ISO 9001+OHSAS 18001	1	1	2	1
ISO 14001+ OHSAS 18001	1	1	2	1
ISO 9001+ ISO 14001+ OHSAS 18001	-	1	1	1
Total	6	8	11	5

Source: *Data from BGMEA survey (BGMEA, 2019)* [67]

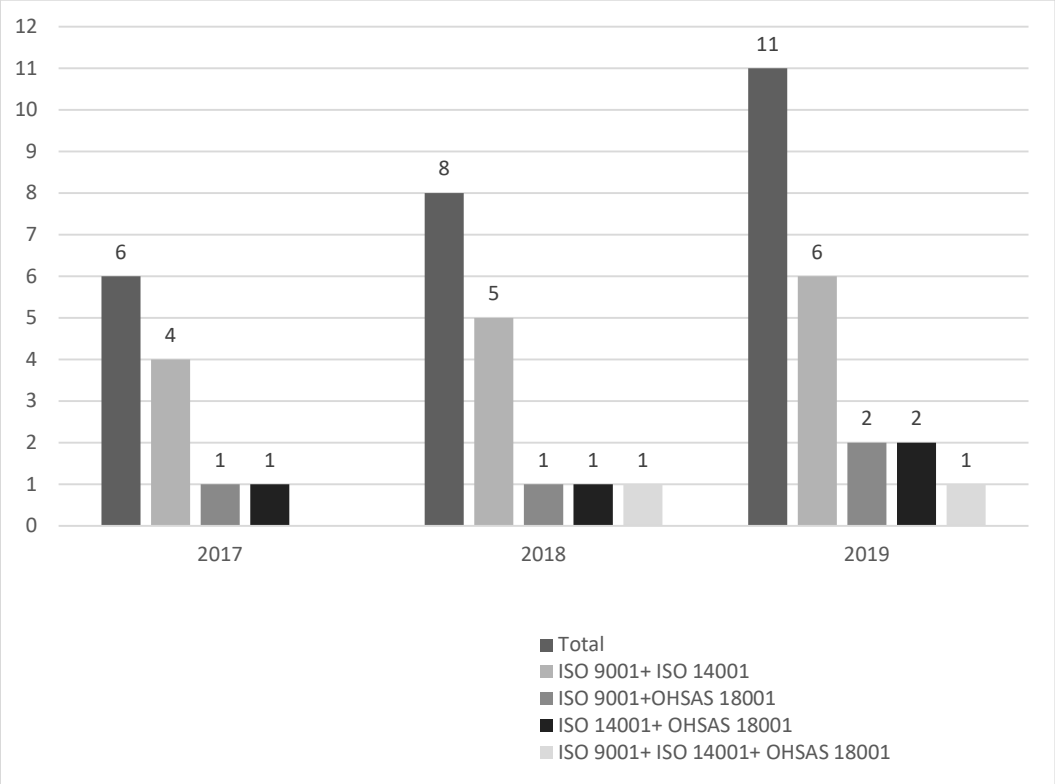

Figure 3.2 Number of RMG industries in Bangladesh that are using IMS from 20017-2019

3.3 Impacts of Parallel Operation of Multiple Management Standards

Better coordination among the various processes within the organization is essential for successful implementation of any management standard [5, 9]. Supervision of various processes is very much important for better control of these processes. However, a huge number of documentations is indispensable for supervision (monitoring and control) of process. A huge number of manpower is requited for preparing and maintaining documents. But an organization has to distribute its total manpower and budget among the individual management standards when these (standard) are operating parallelly. Sometimes, organization cannot provide minimum requirement of manpower and finance for effective implementation of a management standard. Therefore, every management system has to run with limited manpower and funding. Successful implementation of any management standard completely depends on better allocation of these two resources (manpower and finance). As a result, implementation of individual management system is greatly hampered. Poor implementation of any management standard does not ensure achieving of all business objectives. Hence, the performance of an organization is declining in several functional areas.

Environmental management standard always put emphasis on waste minimization. But, the result of waste minimization practice is not satisfactory at field level. Different environmental disasters are frequently occurred in many business organizations. Industry becomes a vital source of many environmental disasters. There are two common industrial wastes that are responsible for many environment disasters. They are littering of liquid waste and solid waste.

First consider the liquid waste. Processed water is the main source of liquid waste in garment industry. This industry is one of the high-water consuming industries in the world [65]. Amount of consumed water varies greatly from industry to industry. Water consumption actually depends on type of equipment used, type of processes used, and management of water. A typical RMG industry in Bangladesh consumes 1500 billion liter of water per year [74]. Water is used almost in every processing steps. Water is mainly used for washing chemical, softener, phenol, resin, lubricant, detergent, different types of reagents from fabric. As a result, processed water becomes polluted. Process water need to be cleaned from oil, chemical, color before discharging to the nature. A limited number of industries are following this rule. But, most of the RMG industries are throwing their waste directly to the river near by the industrial area. Littering of waste into the river causes water pollution. As a result, color of water has been changed. This water produces strong odd ware. A large number of people who are living nearby the river are being threatened by water pollution created by garment waste water. These people are always suffering from various diseases.

Another consequence of excess water use is continuous decrease of underground water level by-2-3 miter per year [178]. Scarcity of underground water has been started in many high land areas. Situation is worsening day by day. In order to control water pollution, it is important to reduce the generation of waste water in garment industries. It is possible only when less amount of water is consumed during textile wet processing because the amount of waste water is directly proportional to the amount of intake water. Reduction of water consumption is one of the important requirements of environmental management standard. Garment industries are not able to fulfill this requirement because of poor monitoring and shortage of modern equipment that can significantly reduce water consumption. Poor monitoring is actually originated from limited manpower whereas lack of modern equipment is originated from insufficient financial support.

3.4 Scope of Integration

At present, four individual management standards such as ISO 9001: 2015, ISO 14001: 2015, OHSAS 18001: 2007, and SA 8000: 2014 are widely used in RMG industries in Bangladesh [27]. These standards are used to enhance the performance of RMG industries in various dimensions of management such as quality, environment, occupational health and safety, and social responsibility. To address this fact, the present study is trying to integrate these four management standards under holistic philosophy of TQM. From literature survey it is found that, it is possible to integrate these management standards with the help of six principles of TQM. Table 3.3 summarizes how these six TQM principles can help to integrate management standards.

Table 3.3 Scope of integration of management standards with TQM

No.	TQM philosophy	Description of opportunity for integration
1.	Continuous improvement	In each of these four management systems, emphasis is given on continuous improvement for firm performance improvement. In this context, it is important to establish continuous improvement culture within the organization. TQM can play a significant role in establishing a continuous improvement culture in an organization [137].
2.	Employee participation	Emphasis is given on employee participation in each of these four management systems for better achievement of objectives set by an organization. TQM can increase employee participation by improving the morel of the employees and team spirit [133].
3.	Combined assignment of authority and responsibility	For effective management of an IMS, the duties and responsibilities of the employee should be stated in an integrated logical structure rather than individual structure. The holistic management philosophy of TQM can help an organization to assign the duties and responsibilities of the employee in an integrated logical structure [132].

No.	TQM philosophy	Description of opportunity for integration
4.	Employee training	In each of these four management systems, emphasis has been given on training to increase the working capacity and knowledge of the employees. TQM philosophy always encourage employee training. TQM can help an organization to arrange regular training for the employees by assessing their training needs through the formation of a permanent training cell [131].
5.	Leadership	Emphasis is given on leadership of top management In each of these four management systems for effective management of a system. TQM can play a significant role in enhancing the quality of leadership of top management [130].
6.	Employee empowerment	In each of these four management systems, emphasis is given on employee empowerment for good decision making and better management of a system. TQM can help an organization to provide the employee a certain degree of autonomy to manage their daily activities [129].

From Table 3.3 it is seen that there is an ample opportunity to integrate these four management standards with the help of TQM principles. Integration of these four management standards would create a single comprehensive management system. This management system will address a comprehensive area. This comprehensive area will capture not only the particular area of these management systems but also the cross-functional areas of these systems [9]. Following paragraphs will describe the how much area (comprehensive area) an integrated management system (IMS) will cover in different management dimensions such as environment, health, safety, quality, and social responsibility.

First management dimension is environment. An industry leaves a great many adverse impacts on environment. Environmental impacts in this management dimension therefore represent the adverse effect of industrial operations in all environmental aspects. There are three aspects of environment. These three aspects include occupational or indoor environment of an industry, local or outdoor environment of an industry and global environment. To protect the environment from the adverse effect of industrial operations, an impact assessment in three environmental aspects is essential [73]. Environmental impacts can only be measured in two aspects (local and global) when multiple management systems (MMSs) are operated separately. On the other hand, IMS can collectively measure environmental impacts in three aspects (occupational, local and global) as there is a strong link among the management systems which construct the integrated management system. Therefore, IMS can provide better environmental protection compared to a separately run management system [73, 76, 179].

Next management dimension is health. Industry also leaves many adverse impacts on health. Health impacts generally represent consequences of industrial operations on occupational health. But health impacts actually cover a wide area ranging from occupational health to social health [180, 181]. When different management systems operate separately, they only measure health impacts in one aspect which is occupational health. Addressing the impacts on occupational health will therefore cover a small portion of the total health impacts. On the other hand, IMS can measure health impacts on both aspects (occupational and societal) since there is a strong correlation among the management systems that construct IMS. Therefore, IMS will provide better protection of health on both aspects (occupational and societal) compared with a separately operated management system. For example, industrial water pollution generates a shortage of pure drinking water which affects both occupational and social health. Providing safe drinking water to industry people would partially solve the problem, leaving people in the society at a higher risk. Therefore, ensuring safe drinking water for both people (industry and society) could be an ideal solution to overcome their health-related problems.

Another management dimension is safety. Safety generally represents occupational safety. But safety has a wider meaning. Actually, safety is a protective measure against various kinds of hazard or thread arising from different areas. These hazards are mainly coming from two major areas. They are occupational area and environmental area. Hazard that is coming from the occupational area is known as occupational hazards whereas, hazard that is coming from the environmental area is known as environmental hazard. Occupational hazards are associated with work related stress and occupational injury or illness while environmental hazards are associated with damage to surrounding environment and harm to human health. To address these potential hazards, safety measures need to be considered in both areas. When different management systems operate separately, they only address occupational hazards. On the other hand, IMS can collectively address hazards in both areas (occupational and environmental) since there is a strong correlation among the management systems that construct IMS. Therefore, IMS can provide a comprehensive safety measure against environmental and occupational hazards compared with a separately operated management system [71]. For an example, air pollution, work overload, musculoskeletal disorder are the most common hazards or threats present in an industry. These threats are arising from two different areas such as environment and occupation. Safety measure will remain incomplete, if any of these threats is not addressed properly. Therefore, safety measures need to be considered in both areas to minimize the threats.

Quality is another management dimension. Quality traditionally means improvement of product design quality. This concept of quality has changed over time since customers become

concern not only about the quality of the product but also about the quality of the production process and quality lifestyle of the worker who are involved in the production. Therefore, quality now carries a comprehensive meaning. It encompasses quality improvement in three different areas such as design of product, design of production process, and lifestyle of the workforce [68]. Quality improvement in product design means considering environmental impacts in product development process. When the environmental impacts are considered in product development process, this consideration will minimize the environmental impacts related to entire life cycle of the product ranging from material selection to final product disposal. As a result, product attributes such as quality, reliability, functionality, and safety will improve. Moreover, quality improvement of production process means to what extent production process is eco-friendly. When the production process becomes green or eco-friendly, it (production process) will reduce the adverse effect of production on environment. Green production will not only reduce negative impact on environment but also improve quality of production through defect free production which will ultimately improve the product quality [24, 183]. On the other hand, improvement of lifestyle of the workforce usually means to what extent organization is concern about well-being of their workers at and outside the workplace. When living standards of workforce will improve, more people will concentrate on quality work. As a result, the quality of the product will increase [69, 182]. Therefore, to ensure product quality, parallel improvement is essential in three areas (product design, production process design, and lifestyle of workforce). When different management systems operate separately, they only address improvement of quality in one area which is product design. On the other hand, IMS can collectively address quality improvement in three areas (product design, production process design and lifestyle of the worker) since there is a strong correlation among the management systems that construct IMS.

Last management dimension is social responsibility. Every business organization has some ethical responsibilities towards the society. Well-being of the employees of an organization is often viewed as social responsibility as employee is a part of the society [181]. However, the scope of social responsibility is not confined to well-being of the employees of an organization. Now, it covers a vast area. This area includes reduction of social problems related to safety and ecological issues as well as increasing facilities in terms of employment, education, medical treatment etc. [82]. When different management systems operate separately, they only address well-being of the employees in terms of human rights such as regular payment, forced labour, working hour, and wage discrimination. On the other hand, IMS can address a comprehensive well-being of both people (employee and society) in terms of their right, safety, and physical facilities since there is a strong correlation among the management systems that construct IMS.

From the above discussion it is revealed that, there is a promising scope to integrate four management standards such as ISO 9001: 2015, ISO 14001: 2015, OHSAS 18001: 2007, and SA 8000: 2014 under TQM framework in RMG sector of Bangladesh. When individual management systems are integrated under holistic philosophy of TQM, a comprehensive management system will be emerged. This management system can easily accommodate the comprehensive area of different management dimensions (environment, health and safety, quality, and social responsibility). This could widen the scope of integration. For example, multi-function approach of IMS can easily accommodate three aspects of environment (occupational, local, and global) into a single management policy and reconfigure the management activities accordingly. Similarly, IMS can focus on human health in two areas (occupational and societal), ensure safety in two areas (environmental and occupational), can improve quality in three areas (product design, production process design, and lifestyle of workforce), can ensure well-being of employee and society in a comprehensive way.

3.5 Impacts of Integration

In the present study, an Integrated Management System (IMS) has been developed under the philosophy of TQM. Therefore, the impact of this IMS will be comprehensive and will cover major areas of business. Actually, this impact will cover two important areas of business. They are financial and operational areas. Impact of firm's performance on financial and operational areas are known as financial and operational impact respectively. Financial impact is usually measured in terms of profitability. Profitability can be increased in many ways. Three important means of increasing profitability are; improving cost efficiency, optimum use of resources, and increasing sales growth. The cost efficiency means reduction or cut off unwanted or unnecessary cost. This cost can be accumulated in the business in several ways. Some important sources that are responsible for accumulating this cost are; occurrence of accident, penalty on pollution, frequent inspection on environmental issue [18] etc. Following paragraphs will discuss the way of generating this unwanted cost, its (cost) consequences on profitability, and way of reducing this cost through IMS adoption.

Generally, an accident incurs two types of unwanted cost. They are direct and indirect cost. Direct costs are those costs that a firm has to pay on cash due to the occurrence of an accident. Some examples of the direct cost are medical and transport expenses, compensation, additional financial benefits other than compensation etc. Indirect costs are those cost that are intangible in nature. Some examples of this indirect cost are productivity loss, late delivery loss, reputation loss etc. Several literatures have pointed out that indirect cost is higher than direct cost [184]. Whatever

cost it is (direct or indirect), it is unwanted and need to be reduced for increasing profitability, IMS can provide better opportunity for risk assessment and control, which will significantly reduce the frequency of accident and their costs [18].

Similarly, pollution penalty and frequent environmental inspection can incur additional cost, which leads to decrease in profitability [185]. IMS can reduce this additional cost through better environment management. Moreover, IMS can reduce cost and increase profitability through optimum use of resources (e.g., raw material, energy, water, etc.).

Another way of improving profitability is to increase sales growth [18]. There are two important means to increase sales growth. They are exploration of new market opportunity and increasing firm's image in the competitive market. A firm can increase its sales growth through exploration of new market opportunity. For an example, customers are fond of environment friendly product. They even like to pay higher price for it. Therefore, green product can help a firm to penetrate an environment strict market and can increase sales. Some researchers have pointed out that, green product may increase firm's image in the competitive market, which will increase sales [73,179]. IMS can help an organization to adopt green technologies in production process. Green technology will produce green product which will increase sales volume of a firm. Therefore, IMS may have a positive impact on firm's financial performance. Among the three important means of increasing profitability, increase of sales growth is used most widely in the literature because, it is easy to measure profitability through increase of sales growth [38].

On the other hand, several literatures discussed that IMS may have a positive impact on operational performance [18]. But there is little or no quantitative or empirical evidence found in the literature to confirm the positive impact. IMS may help a firm to improve its operational performance in several aspects like productivity, efficiency, quality, social responsibility, occupational health and safety, and environment [38] etc. Following paragraphs will elaborate what sorts of impact does IMS has on each aspect.

IMS may have a positive impact on reduction of production time loss which leads to increase productivity. Some researchers have pointed out that accident is an important reason for production time loss [78,186]. According to them, when an accident occurs, people become busy in rescue work or watching the event which leads to production time loss. This loss can be increased significantly at the time of repairing or replacing damage production equipment left over by an accident. Production time loss may arise from another two sources. They are; accident investigation and safety inspection by regulatory body [78]. Consequence of huge production time loss is decreasing productivity [38]. IMS is supposed to have an ability to make the workplace safer for

the employees, which can reduce accident, thereby increasing productivity. Significant reduction in accident frequency will help the employee to change their mentality to perform better, leading to improve productivity. Beside this, ISM facilities to redesign the existing production process so that it can be green and safe [73]. Elimination of inefficient and redundant process during redesign can increase productivity [185].

IMS may have an impact on increasing firm's efficiency [6,78], Some empirical studies have revealed that, loss of efficiency mainly arise from worker's long time absent from work due to injury or illness, departure of skill worker due to unsafe workplace, and absence of resource sharing. Some consequences of efficiency loss are late delivery, decrease in product quality, excess use of resources etc [68,184]. IMS is supposed to ensure both occupational and environmental safety at workplace, which will reduce absenteeism and will prevent skill worker departure from the firm. IMS may ensure optimum use of resources through resource shearing. As a result, efficiency of a firm will increase.

In summary, it is evident from the above discussion that, RMG Sector is an important sector in Bangladesh. It has secured second position in apparel exporting next to china. In order to maintain competitive position in the world, RMG industries of Bangladesh are using several management systems in their organizations to increase firm performance. Four management systems such as QMS, EMS, OHSMS, and CSRMS are widely used in these industries. Most of the RMG industries of Bangladesh have adopted these management systems separately [65, 71, 72]. They are facing difficult ies to implement and operate these individual management systems separately. The key challenge of running of multiple management systems separately is to split the total budget and human resource of an organization into the multiple management systems [71, 73]. As a result, each management system will get a little amount of budget and human resource, which is not sufficient to implement a management system effectively and efficiently. Consequently, RMG industries of Bangladesh are losing their values to the customer and in the long run they may not be able to survive in the competitive market. Realizing this challenge, RMG industries are trying to adopt an integrated management system in their organizations. A small number of RMG industries of Bangladesh have come forward to develop an Integrated Management System (IMS) for their organizations. Since they (RMG industries) have limited knowledge in management system integration, they are facing many challenges. As a result, they are not getting the desired benefit from their own developed IMS. However, most of the RMG industries have a strong demand of developing an IMS which will improve their performance in four in four disciplines of management such as quality, environment, health & safety, and social responsibility. For successful implementation of any IMS, it is essential to bring cultural change within the organization. In order

to bring change in culture within the organization, multiple management systems are to be integrated under a holistic management system. It is evident from the literature that, TQM is a holistic management system. It is possible to integrate these four management standards with the help of six TQM principles. Integration of these four management systems under TQM principle creates a single comprehensive management system. This management system addresses a wide-ranging area encompassing the individual and overlapping areas of these four management systems. Several researchers pointed out that IMS may enhance the performance of a firm both in financial and operational areas of business. But few empirical evidences have found in the literature in favour of this statement. Three most important ways of improving financial performance widely discussed in the literature are; improving cost efficiency, optimum use of resources, and increasing sales revenue. On the other hand, IMS may increase the operational performance of a firm in the field of quality, environment, occupational health & safety, and social responsibility. The most important ways to increase firm performance in these fields are; to reduce the production rate of defective product, air pollution level, number of occupational illness and to increase the employment opportunity for the community.

CHAPTER 4

Factors Influencing TQM Implementation

4.1 Introduction

Ready-Made Garments (RMG) industries of Bangladesh are trying to implement TQM in their organizations to improve firm performance. These industries are not getting desired benefits due to improper implementation of TQM [131]. There are some factors that can influence TQM implementation. Proper implementation of TQM becomes difficult due to inadequate knowledge about these factors. Some important factors that influence TQM implementation are employee empowerment, employee training, employee motivation, teamwork, etc. In the upcoming sections, we will discuss these factors in details.

This chapter is organized as follows. The factors that enable TQM implementation are discussed in Section 2, whereas section 3 describes the factors that hinder TQM implementation. Finally, the issues that need to be emphasized when designing an effective implementation plan for TQM are addressed at the end of this chapter.

4.2 Identification of TQM Enabling Factors

The factor that has a positive impact on TQM implementation is known as TQM enabling factor. A large number of TQM enabling factors have been identified by the researchers. These TQM enabling factors are not universal for all business organizations because the TQM implementation process differs from one country to another. One of the important reasons why the TQM implementation process varies from country to country is that, some important elements of TQM implementation such as human resource management, strategic decision making, organizational structure, and management procedure vary depending on the culture of the country [74]. Therefore, it is evident that, TQM enabling factors are contextual and need to be identified in a particular context. One of our research aims is to identify TQM enabling factors in RMG industries of Bangladesh. The methodology that will be followed to identify the critical TQM enabling factors for RMG industries is shown in Figure 4.1.

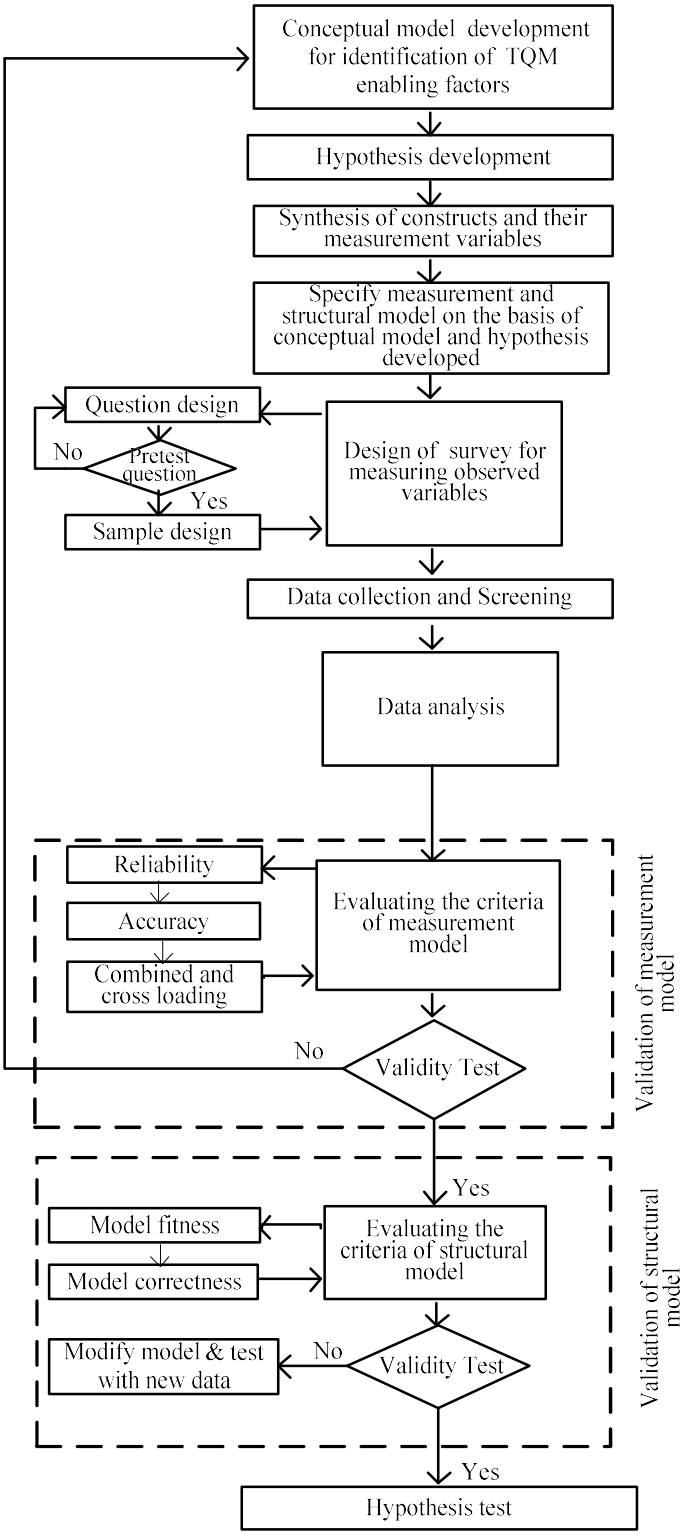

Figure 4.1 Research methodology for identification of TQM enabling factors

The following sub-sections will discuss each of the steps shown in Figure 4.1.

4.2.1 Conceptual Model Development for Identifying TQM Enabling Factors

The model will be developed based on the TQM enabling factors identified in the literature. So far, twenty-five enabling factors are identified from TQM literature. For better understanding, we classified these enabling factors into five major groups. These five groups and the factors under them (shown in Table 4.1) are: (i) human resource enabling factors: employee empowerment, employee training, employee's acceptance to change a culture, teamwork to solve problems, effective appraisal system. (ii) strategic enabling factors: top management commitment, good leadership, appropriate planning, no management turnover, customer satisfaction. (iii) contextual enabling factors: the continuous practice of quality improvement culture, cross-functional teamwork, acceptance to change organizational culture between departments, practicing quality management system, strong communication. (iv) structural enabling factors: appropriate organizational structure, sufficient organizational resources, appropriate information system, strong financial assistance, ample time spent on productivity improvement. Finally, (v) procedural enabling factors: simplicity of processes, regular monitoring of process improvement, effective control of manufacturing processes, knowledge about quality cost, benchmarking of current processes. Figure 4.2 shows the relationship between five groups of enabling factors and TQM implementation. This relationship has been used to identify the critical role of each group of enabling factors on TQM implementation.

Table 4.1 TQM enabling factors with their groups.

Groups	Enabling factors
1. Human resources enabling factors	1. Empowerment of employees
	2. Proper training and education
	3. Employee's acceptance to change culture
	4. Teamwork to solve problems
	5. Effective appraisal system
2. Strategic enabling factors	1. Top-management commitment
	2. Good leadership
	3. Appropriate planning
	4. No turnover at management level
	5. Customer satisfaction
3. Contextual enabling factors	1. Continuous improvement culture
	2. Cross-functional teamwork
	3. Acceptance to change organizational culture between departments
	4. Utilizing a quality management system
	5. Strong communication
4. Structural enabling factors	1. Appropriate organizational structure
	2. Sufficient physical resources
	3. Appropriate information system
	4. Strong financial support
	5. Ample time

Groups	Enabling factors
5. Procedural enabling factors	1. Simplicity of process
	2. Regular monitoring of processes improvement
	3. Effective process control
	4. Knowledge about quality cost
	5. Benchmarking of current processes

4.2.2 Hypothesis Development for Each Group of TQM Enabling Factors

Hypothesis is needed to examine the relationship among a set of variables. Five hypotheses have been developed in this study. These hypotheses are used to investigate the role of five groups of enabling factors on TQM implementation in RMG sector of Bangladesh. The following paragraphs will discuss the development of each of these five hypotheses.

Hypothesis (H1): Human resource enabling factors have a positive relation with TQM implementation.

Human resource enabling factors are associated with the operational performance of the employee. Some examples of human resource enabling factors are employee empowerment, employee training, employee's acceptance to change the culture, teamwork to solve problems, effective appraisal system. Successful implementation of TQM depends on the empowerment of the employee as it is helpful in better decision making [38]. However, at the time of TQM implementation, the organization should emphasize employee training and teamwork because these two activities (employee training and teamwork) will help the employee to contribute more to the TQM implementation process. [18]. Besides this, an effective appraisal system is essential for accessing employee's performance in the TQM implementation process. Regular assessment of employee's performance will help the organization to prepare the training needs of its employees which is important for the successful implementation of TQM [186].

Hypothesis (H2): Contextual enabling factors have a positive relation with TQM implementation.

Contextual enabling factors are associated with the culture needed to implement TQM. Some examples of contextual enabling factors are continuous quality improvement culture, cross-functional teamwork, acceptance to change organizational culture between departments, practicing quality management system, strong communication inside the organization. Developing a culture of continuous quality improvement is the key to the successful implementation of TQM [78]. Moreover, the formation of a cross-functional team is another key to the successful implementation

of TQM since the cross-functional team is helpful for the effective management of business activates. Coordination and communication among the departments need to be improved before developing a cross-functional team [73]. In addition, the cross-functional team will ensure good quality management practice within the organization which is helpful for TQM implementation [185]. Furthermore, acceptance to change organizational culture between departments will increase the success rate of TQM implementation [6].

Hypothesis (H3): Procedural enabling factors have a positive relation with TQM implementation

Procedural enabling factors are strongly connected with the management of business processes. Some examples of procedural enabling factors are simplicity of processes, regular monitoring of process improvement, effective control of manufacturing processes, knowledge about quality cost, benchmarking of current processes. It is difficult to implement TQM without the continuous improvement of a process [68]. Continuous improvement makes a process simple. A simple process is easier to implement and saves both time and money. However, regular monitoring of the processes is an important method to observe the progress of process improvement. Regular monitoring of a process is also helpful to identify and solve the future problem which will make the TQM implementation process easier [45]. But, successful implementation of TQM depends not only on regular monitoring of a process but also on effective control of a process [5]. Effective control of a process means how well an actual process can meet a planned process. If the actual process does not meet the planned process, the deviation between the two processes must be rectified. On the other hand, benchmarking compares the existing procedure of an organization with proven best practice in a similar area. This comparison helps to identify potential drawbacks of an existing process. The identified drawback could be an important input for further development of a process in terms of time and money [10]. However, the knowledge of cost of quality helps to determine how much savings can be achieved through process improvement such as reduction of defects [9].

Hypothesis (H4): Strategic enabling factors have a positive relation with TQM implementation.

Strategic enabling factors are related to the strategic decision making of an organization. Some examples of strategic enabling factors are top management commitment, good leadership, appropriate planning, no management turnover, customer satisfaction. Without top management support effective implementation of TQM is not possible with just a proper implementation plan [1]. Hence, both top management commitment and a proper implementation plan are equally important for the successful implementation of TQM. When top management will be committed to TQM implementation, it becomes the responsibility of top management to provide all kinds of

supports to their employees for TQM implementation. Top management will act as a good leader as they are helping the employees for the effective implementation of TQM. A good leader will motivate all of his employees to make the best effort to do their job. Employee's best effort would make the TQM implementation process easier [8]. To keep the employee motivated, turnover at the top management level needs to be maintained at a minimum level [1]. Another important factor of TQM implementation is customer satisfaction. It is important because the main aim of TQM implementation is to achieve long term success in business through customer satisfaction [8].

Hypothesis (H5): Structural enabling factors have a positive relation with TQM implementation.

Structural enabling factors are associated with the structure and resources of an organization. Some examples of structural enabling factors are: appropriate organizational structure, sufficient organizational resources, appropriate information system, strong financial assistance, ample time spend on productivity improvement.

An important factor of TQM implementation is organizational structure. Organizational structure plays an important role to bring cultural change inside the organization [3]. There are two other factors that also contribute to bring cultural change within the organization. These factors are adequate organizational resources and strong financial support. These two factors also make the TQM implementation process easier [2]. Moreover, to implement TQM successfully, information needs to be well communicated within the organization [15]. Therefore, the organization should possess an effective communication system inside the organization. On the other hand, an important aim of TQM implementation is to improve a firm's performance through continuous productivity improvement. When an organization will spend enough time on productivity improvement, the defect rate will reduce and at the same time firm's performance will increase [4].

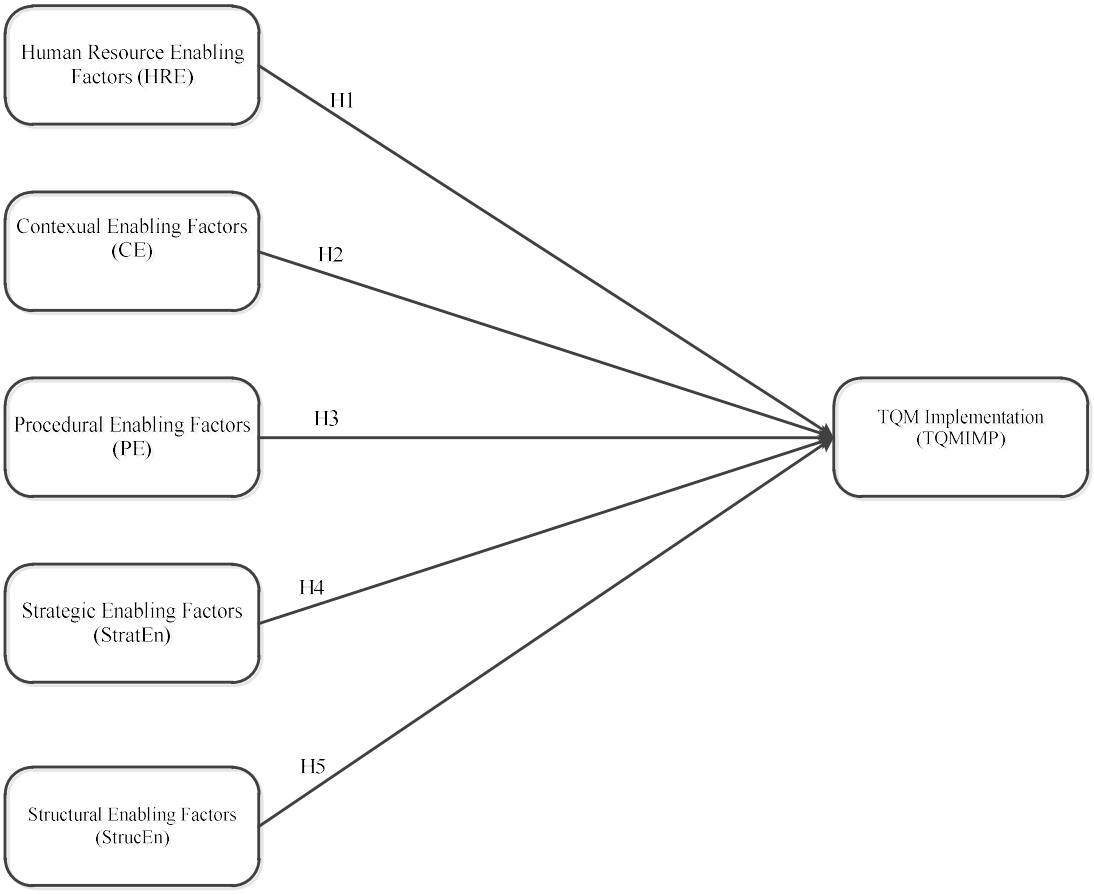

Figure 4.2 Theoretical Model for Identifying TQM Enabling Factors

4.2.3 Synthesis of Constructs and Observed Variables

A number of variables are used to measure the contribution of each ITQM sub-system to enhance firm performance. These variables are of two types. One is construct or latent variable and other is observed variable or measurable items. Observed variable are those variables that can be measured directly. On the other hand, latent variables are those variables that cannot be measured directly. They are constructed and estimated based on the relationship among the observed variables. In our model, there are 6 latent variables and 30 observed variables. All latent variables and their corresponding observed variables are summarized in Table 4.2.

Table 4.2 Key constructs (latent variable) and their measurable items (observed variable) in the measurement model

Latent Construct	Observed variables	Description of observed variables
Human Resource Enabling Factors (HRE)	HRE1	Employees are actively involved in decision making to solve problem
	HRE2	Employees in your organization are trained on TQM or quality management systems
	HRE3	In your organization employees accept culture changes
	HRE4	Your organization encourages teamwork to solve problems
	HRE5	Your organization has an effective staff performance appraisal system
Contextual Enabling Factors (CE)	CE1	Your organization reviews the current processes regularly for further improvement
	CE2	Your organization has cross-functional teams
	CE3	Various departments in your organization actively participate in continuous process improvement
	CE4	Your organization has clear statements of quality policies and objectives to ensure effective quality management systems
	CE5	Your organization has an effective communication system among departments
Procedural Enabling Factors (PE)	PE1	All processes in your organization are simple and easy to control
	PE2	Your organization pays attention to processes improvement
	PE3	Process control is effective in your organization
	PE4	Most of the employees in your organization are aware of the cost of poor quality
	PE5	Your organization performs benchmarking of the current process regularly
Strategic Enabling Factors (StratEn)	StratEn1	Top management always emphasizes the importance of quality
	StratEn2	Leaders motivate the people to establish a quality perfection culture within the organization
	StratEn3	Management has a responsibility to set quality mission and vision for the organization
	StratEn4	Evolution of quality perfection culture is not affected by mid and low-level management turnover
	StratEn5	The organization regularly seeks customer input to identify their needs
Structural Enabling Factors (StrucEn)	StrucEn1	The structure of your organization is simple and flexible
	StrucEn2	Sufficient physical resources are provided to help the organization run quality management system effectively
	StrucEn3	In your organization, the quality management system is successfully implemented because of effective communication
	StrucEn4	Sufficient funds are provided to help the organization run quality management system effectively
	StrucEn5	Rework is usually done in your organization

Latent Construct	Observed variables	Description of observed variables
TQM Implementation (TQMIMP)	TQMIMP1	Customer satisfaction has increased
	TQMIMP2	Employee satisfaction has increased
	TQMIMP3	Quality of the product has increased
	TQMIMP4	Amount of employee involvement has increased
	TQMIMP5	Information sharing has increased

4.2.4 Specifying Measurement and Structural Model

In SEM, a conceptual model is further divided into two parts. One is measurement model and other is structural model. Measurement model graphically specify the relationship between each latent variable and its set of observed variables. For visual understanding, latent and observed variables are shown by ellipse and rectangle respectively in the model. Each relationship is represented by a single headed arrow begins from latent variable and ends in observed variable. This measurement model is illustrated in Figure 4.3.

4.2.5 Design of Survey for Identifying TQM Enabling Factors

Survey design describes the procedure for collecting data. The following subsections will discuss the design and pre-test of questionnaire, sampling technique, data collection method for identifying TQM enabling factor in the context of RMG sector of Bangladesh.

Questionnaire Design

Observed variables are measured based on the opinion of the respondent. Therefore, a questionnaire needs to be developed to get the opinion from the respondent. This questionnaire is also called measurement instrument for survey because the questionnaire is used to perceive or measure the opinion (i.e. data) of respondent on a numerical scale (i.e. likert scale).

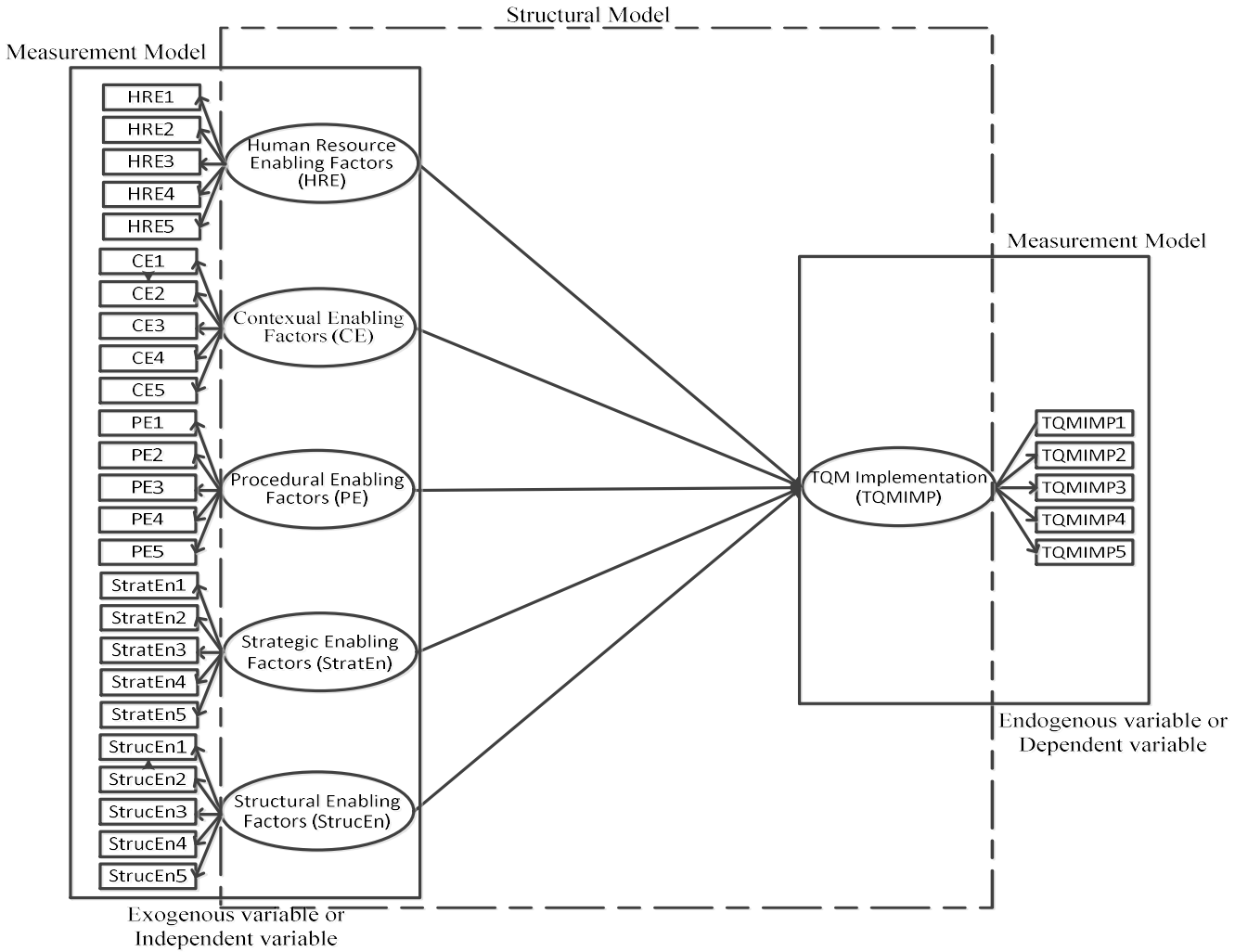

Figure 4.3 Structural and measurement model for identifying TQM enabling factors (Description of each of the variables are given in Table 4.2).

In order to get useful data, questionnaire that is used to conduct a survey should be precious and relevant. For this reason, an extensive review of questionnaires from the literature has been performed to identify relevant questions used for successful implementation of integrated management system. These questions have given useful insights to develop the draft questionnaire for the present study. For better understanding, the draft questionnaire of the present study is divided into three sections.

Section one: The objective of this section is to identify general information about the respondent and their respective industry. There are 4 questions in this Section. These questions are related to respondent's age, gender, designation and the number of employees in the industry, etc.

Section two: The questions in this section are designed to identify the present practice of TQM-enabling factors in RMG industries of Bangladesh. There are 25 questions in this part. The respondents were requested to provide their valuable opinions on a five-point Likert scale (where 1=Strongly Disagree, 2=Disagree, 3= Neither Agree nor Disagree, 4=Agree, 5=Strongly Agree).

Section three: This is the final section of the questionnaire survey. Questions in this section are designed to collect respondent's perceptions of their firm's performance improvement from the successful implementation of TQM. There are five questions in this part. The respondents were requested to provide their valuable opinions on a five-point Likert scale (where 1=Strongly Disagree, 2=Disagree, 3= Neither Agree nor Disagree, 4=Agree, 5=Strongly Agree).

Pretest of questionnaire

Pretest of measurement instrument is very much essential. Pretest shows the accuracy and preciseness of measurement instrument. Pretest is carried out in two steps; expert opinion and pilot study. The following paragraph will discuss these two steps.

Step 1: Expert opinion: Expert opinion is important for checking the validity of the questionnaire used for conducting a survey. To prepare the final questionnaire, an expert opinion is asked to decide which questions will be chosen from the draft questionnaire. For this purpose, a draft questionnaire was sent to 5 expert members. Among the 5 experts, three were taken from industry and rests were taken from senior academicians. These academicians have expertise in teaching, research, and consultancy in TQM implementation over 10 years. The majority of expert's observations were related to the rearrangement of words to make the questionnaire clear and concise. Some of the experts have also identified overlapping items present in the draft

questionnaire. The final draft questionnaire was prepared to take into account the opinions of all experts. This final version of the questionnaire is now ready for a pilot study.

Step 2: Pilot study: In a pilot study, the survey was conducted with 50 respondents. These respondents were randomly selected from those RMG industries of Bangladesh that are practicing or in the process of practicing TQM. Reliability of the survey questionnaire was tested using this pilot study. To test reliability, the value of Chronbatch alpha has been calculated for each for each construct items (as stated in Annexure 6). SPSS 16 software was used for this purpose. Chronbatch alpha value for each measure was found greater than 0.8. This indicates that conducting the present survey the questionnaire is reliable. The questionnaire that has been developed is suitable for contacting the survey.

Sampling Plan

In Bangladesh, about 5,000 export-oriented garment industries are operating [67]. Yamne's [191] formula was chosen to determine the sample size. According to this formula, a sample size of 370 is required to reach 95 % confidence level.

$$n = \frac{N}{1 + N(e)^2} = \frac{5000}{1 + 5000(0.05)^2} = 370$$

Moreover, a sample size of 150 has been considered satisfactory in recent operation management literature [130, 187, 192, 193].

4.2.6 Data Collection and Screening

The questionnaire was e-mailed to 655 employees of different RMG industries that are planning or in the process of TQM implementation. These employees are working in various disciplines (production, quality control, compliance, human resource management etc.) in RMG industry. A reminder e-mail is also sent to those employees who have not completed their survey. Finally, 255 inclusive and useable responses were collected. The response rate of the survey was found nearly 38.93%. This response rate is relatively adequate and comparable to other operations management studies [56, 80]. Profile of the respondent is shown in Table 4.3.

Table 4.3 Profile of the respondents

Variables	Categories/Class	Response (%)
Gender	Male	74.22
	Female	25.78
Age group	28-35 years	53.52
	36-45 years	46.48
Cadre	Top management	11.33
	Middle management	29.30
	Bottom management	59.37
Size of the Organization	Small (< 50 employees)	46.10
	Medium (50-500 employees)	53.90

The non-response bias test was also carried out for screening of collected data. To perform this test, reply from every respondent was sorted against the date of receipt and divided into early and late response sample groups. The wave analysis method [222] was employed to measure the difference between the two response groups. Comparison was made by performing a t-test on two sets of samples, which found an insignificant alteration. Therefore, this study draws off a non-response bias.

4.2.7 Data Analysis

Partial least square-structural equation model (PLS-SEM) method was used to analysis this data. Justification for using PLS-SEM method for data analysis has been discussed in section 2.6. A partial least square structural equation model consists of two models. They are: measurement model and structural model. Measurement model describes the relationship among the observed variables and latent variables. On the other hand, structural model describes the relationship among the latent variables or constructs.

Validation of Measurement Model

During quantitative analysis, PLS-SEM method first estimates the measurement model. The measurement model shows which observation variables are to be measured. These observed variables will be measured on a numerical scale using a questionnaire that has been developed previously. Therefore, estimation starts with checking the reliability and accuracy of measuring scale. The procedures for checking the reliability and accuracy of measuring scale are described in the following paragraphs.

Step 1: Reliability of measurement scale

In the case of multiple measurements, the reliability of measurement is an important issue because reliability determines whether the scale used for measuring a variable is consistent or not. That is, the scale will provide the same result if the measuring process is repeated. Items of measurement construct are already presented in Table 4.2. Cronbach Alpha is widely used to check the reliability of measurement (also known as measurement scale). If the value of Cronbach Alpha is 0.6 or more, it is considered suitable for exploratory research [193]. In the present study, Cronbach Alpha value is evaluated for each latent factor. All values of Cronbach Alpha for each latent variable (ITQM management sub-systems and firm performance) are shown in Table 4.4. Values are found greater than 0.6 which indicates measurement scale used in this study is reliable for analysis.

Table 4.4 Coefficients of latent construct

	HRE	**CE**	**PE**	**StrucEn**	**StrucEn**	**TQMIMP**
R-squared coefficients	--	--	--	--	--	0.239
Adjusted R-squared coefficients	--	--	--	--	--	0.223
Scale Composite Reliability (SCR)	0.778	0.890	0.847	0.775	0.742	0.831
Cronbach's alpha (α) coefficients	0.723	0.890	0.803	0.716	0.744	0.792
Average variances extracted (AVE)	0.505	0.620	0.540	0.520	0.578	0.510
Variance inflation factors (VIF)	1.250	2.349	3.796	2.910	1.580	1.197

Step 2: Accuracy of measurement scale

Accuracy of measure is also important in case of multiple items measurement. Accuracy of measuring scale is confirmed through validity test. Validity test are of two types: one is convergent other is divergent validity.

Convergent Validity Test: It is important to assess the accuracy of a measurement scale. Convergent validity test is used to assess the accuracy of the scale. The Average Variance Extracted (AVE) and Scale Composite Reliability (SCR) are two important parameters to test convergent validity. To attain convergent validity, values of AVE, and SCR of each latent factor should be greater than or equal to 0.5 and 0.7 respectively [193]. From Table 4.4, it is found that, all values of AVE and SCR are within the acceptable range. It indicates that convergent validity has arrived.

Discriminant Validity Test: Discriminant validity is another important test to assess the accuracy of a measurement scale. In a word, it indicates, to what extent one latent factor is truly distinct from others. In order to check discriminant criteria, a matrix named discriminant validity matrix is constructed which is shown in the Table 4.5. Discriminant validity will be achieved only when no values under the diagonal element will be greater than the diagonal value (i.e, √AVE for each latent factor) [200].

Table 4.5 Discriminant validity matrix

	HRE	CE	PE	StrucEn	StrucEn	TQMIMP
HRE	**0.710**					
CE	0.120	**0.787**				
PE	0.107	0.743	**0.735**			
StrucEn	0.187	0.573	0.674	**0.648**		
StrucEn	0.373	0.123	0.309	0.452	**0.615**	
TQMIMP	0.306	0.060	0.014	0.007	**0.303**	**0.714**

From the above discussion, it can be concluded that, the measurement scale has confirmed both reliability and accuracy. It means that, measurement scale has a greater capability to capture latent variables. Now, PLS-SEM method will check whether all the latent variables have been correctly captured by their observed variables. The procedures for checking this criterion (latent variables have been identified from correct set of observed variables) is discussed in the following paragraph.

Step-3: Combined and Cross Loading of Observed Variables

PLS-SEM method calculates combined and cross loading of all observed variables which is summarized in Table 4.6. In this table, latent factors are listed at the top of each column and observed variables are listed at the beginning of each row. This indicates a clear link between observed variables and their corresponding latent variables. This table highlights the higher loading of some observed variables on one latent factor compare to others which ensures that latent variables have been identified from correct set of observed variables.

Table 4.6 Loadings (combined and cross) of variables

	HRE	CE	PE	StratEn	StrucEn	TQMIMP	SE-value	p-value
HRE1	**0.375**	-0.426	0.429	0.02	-0.343	-0.103	0.059	<0.001
HRE2	**0.707**	0.343	0.129	-0.429	0.013	-0.04	0.056	<0.001
HRE3	**0.567**	0.079	-0.25	0.236	-0.079	-0.283	0.057	<0.001
HRE4	**0.475**	0.046	-0.338	0.162	0.136	0.093	0.058	<0.001
HRE5	**0.582**	-0.327	0.032	0.173	-0.076	0.208	0.057	<0.001
CE1	0.084	**0.701**	-0.671	0.14	-0.006	0.171	0.056	<0.001
CE2	0.06	**0.845**	-0.321	0.074	-0.109	-0.01	0.054	<0.001
CE3	-0.015	**0.806**	-0.16	-0.256	0.23	0.047	0.055	<0.001
CE4	-0.096	**0.799**	-0.051	-0.139	-0.009	-0.151	0.055	<0.001
CE5	-0.063	**0.778**	0.239	-0.062	-0.027	-0.136	0.055	<0.001
PE1	0.063	0.088	**0.762**	-0.721	0.41	-0.118	0.055	<0.001
PE2	0.062	-0.726	**0.363**	-0.228	-0.041	0.378	0.059	<0.001
PE3	0.105	-0.271	**0.863**	-0.201	-0.145	0.115	0.054	<0.001
PE4	-0.072	0.012	**0.813**	0.307	-0.204	-0.045	0.055	<0.001
PE5	-0.169	0.356	**0.763**	0.051	-0.053	-0.026	0.055	<0.001
StratEn1	0.054	-0.049	0.621	**0.739**	-0.24	-0.039	0.055	<0.001
StratEn2	-0.177	-0.329	-0.042	**0.49**	-0.422	0.055	0.058	<0.001
StratEn3	-0.037	0.069	-0.3	**0.63**	-0.088	0.091	0.056	<0.001
StratEn4	0.027	0.057	-0.573	**0.828**	-0.008	-0.14	0.054	<0.001
StratEn5	0.015	-0.112	-0.278	**0.477**	0.49	0.008	0.058	<0.001
StrucEn1	-0.076	-0.038	-0.042	0.029	**0.808**	0.031	0.055	<0.001
StrucEn2	-0.078	-0.001	-0.138	0.64	**0.432**	-0.048	0.058	<0.001
StrucEn3	0.013	0.288	-0.176	-0.027	**0.679**	-0.313	0.056	<0.001
StrucEn4	0.052	-0.093	0.479	-0.803	**0.625**	0.141	0.056	<0.001
StrucEn5	-0.223	-0.396	-0.05	0.112	**0.448**	0.214	0.058	<0.001
TQMIMP1	0.006	0.054	0.012	0.036	0.175	**0.626**	0.056	<0.001
TQMIMP2	-0.098	-0.271	0.085	-0.014	-0.006	**0.825**	0.054	<0.001
TQMIMP3	0.011	0.226	-0.03	-0.139	0.05	**0.869**	0.054	<0.001
TQMIMP4	-0.007	-0.114	-0.088	0.152	-0.332	**0.752**	0.055	<0.001
TQMIMP5	-0.173	0.503	-0.635	0.523	-0.387	**0.397**	0.059	<0.001

Validation of Structural Model

Next step is to test the validity of structural model. Structural model is shown in Figure 4.3. To validate this model, PLS-SEM method first check the fitness and correctness of structural model. The procedures for checking the fitness and correctness of the model are described in the following paragraphs.

Step 1: Checking the fitness of structural model

Average path coefficient (APC), Average R-Squared (ARS), and Average variance inflation factor (AVIF) are used to check the fitness of the model [193, 194]. These three parameters are used to assess the explanatory power of the model to interpret maximum variance. All values of these parameters are shown in Table 4.7. This table shows that, values are within the tolerance range. It is a good indication of better model fit.

Table 4.7 Model fit index and Quality fit index

Indexes	Estimated Value	Tolerable range
Average path coefficient (APC)	0.160, p<0.001	p<0.001
Average R-squared (ARS)	0.239, p<0.001	p<0.001
Average block VIF (AVIF)	1.367	tolerable if ≤ 5, best ≤ 3.3

Step-2: Checking the Correctness of Structural Model

Causality assessment is another measure to check the correctness of the model. Three parameters are used to check the correctness of the model. They are: Simpson's paradox ratio (SPR), R-squared contribution ratio (RSCR) and Statistical suppression ratio (SSR) [193, 194]. The values of these parameters are presented in Table 4.8. The values in table are within the tolerance range. It is a good indication of correctness of the structural model.

Table 4.8 Indexes of Causality assessment

Indexes	Estimated value	Tolerable range
Simpson's paradox ratio (SPR)	1.000	tolerable if >= 0.7, best = 1
R-squared contribution ratio (RSCR)	1.000	tolerable if >= 0.9, best = 1
Statistical suppression ratio (SSR)	1.000	tolerable if >= 0.7

4.2.8 Hypothesis Testing

The next step is to validate the relationship between two latent variables. The relationship between the two latent variables is shown by a path. PLS-SEM method estimates the value of path relationship by path coefficient (β) and level of significance (p). Path coefficient (β) can take any value between -1 to 1 [193]. Value closer to +1 indicates strong positive relationship among the latent factors. On the other hand, value closer to 0 indicates weaker relationship. Level of significance (p-value) estimates the statistical significance of relationship between two latent

factors. If the p-value is less than significant level, 0.05 α values; the relationship between two latent factors is statistically significant [193]. Hypothesizes along with their two parameter values (β and p) are presented in Table 4.9. This table shows that, all hypotheses are statistically significant.

Table 4.9 Outcomes of hypotheses test

Hypothesis for assessment	Estimate	Outcomes
H1: Human resource-enabling factors have a positive relation with TQM practices	β=0.21 at p<0.01	Supported
H2: Contextual enabling factors have a positive relation with TQM practices	β=0.13 at p=0.02	Supported
H3: Procedural enabling factors have a positive relation with TQM practices	β=0.02 at p=0.37	Not supported
H4: Strategic enabling factors are positively related to TQM practices	β=0.27 at p<0.01	Supported
H5: Structural enabling factors have a positive relation with TQM practices	β=0.17 at p<0.01	Supported

Statistical analysis finally gives a conclusive model. It is shown in Figure 4.4. This conclusive model shows that, all hypothesis except third one is statistically significant.

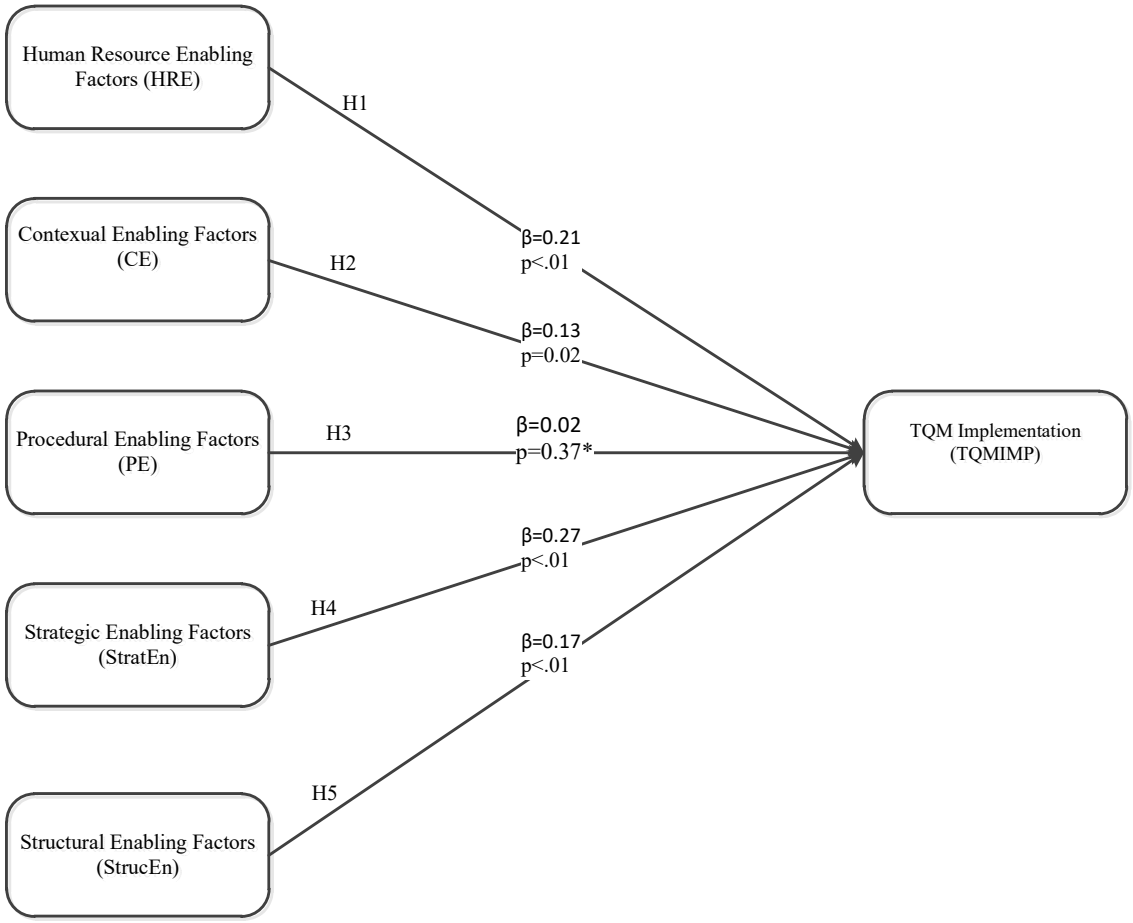

Figure 4.4 Conclusive model for identifying TQM enabling factors.

*indicates hypothesis is not satisfied

4.3 Discussion on Findings

All hypothesizes are found statistically significant except the third hypothesis. An in-depth discussion on findings of hypotheses test is given in the following paragraphs.

The first hypothesis was observed statistically meaningful ($p<0.01$), with a β coefficient of 0.21. This hypothesis suggests that training employees on TQM could have a big impact on quality problem identification and prevention. When employees are encouraged to share their opinion in problem solving, they will be empowered. As a result, employees will give their best effort to perform quality work, which will ultimately increase the rate of effective TQM implementation. This finding is consistent with earlier studies [196-199].

For the second hypothesis, the β coefficient is 0.130, which is statistically substantial ($p=0.02$), thus suggesting that a change in organizational culture creates a supportive environment for TQM implementation. When employees are motivated toward teamwork, they become an active member of different cross-functional teams. This change in employee attitude makes them to take more responsibility in their work. A positive team spirit can overcome the resistant attitude of various departments toward change. As a result, a good environment will be established for continuous quality improvement. This finding is also supported by previous studies [187, 201-203].

For the third hypothesis, the β coefficient is 0.02, which is not statistically significant ($p=0.37$). This finding might be because of the scope of the study, which only concentrates on RMG sector in Bangladesh. For example, if firm size is considered, most of the RMG organizations come under the category of SMEs. Top management of SMEs is less committed to continuous quality improvement. Therefore, organizations pay little attention to process improvement, which is also supported by several studies [204-206]. Another comprehensive insight is that quality management systems are often informal in SMEs. Therefore, effective process control is difficult to achieve for SMEs. This finding is also supported by several research studies [132, 201]. Furthermore, in order to sustain in the competitive market, the RMG organizations need to perform benchmarking of their current processes on a regular basis to identify weaknesses for further improvement [131]. This standardized practice leads to a greater understanding within the industry regarding the cost of poor quality [197]. Due to lack of expertise, RMG organizations are not able to perform benchmarking of the current processes [183]. Therefore, most of the employees are not aware of the cost of poor quality. As a result, the measurement variables have correctly captured that procedural enabling factors are not well managed and, therefore, these factors do not contribute

to successful TQM implementation in the RMG sector of Bangladesh. This finding is comparable with previous studies [199, 204-206].

For the fourth hypothesis, the β coefficient is 0.270, which is statistically significant ($p<0.01$). This suggests that if the top management of an organization involves itself in TQM activities, then the quality objectives and policies will be properly reflected in the strategic plan of the organization. As a result, the TQM implementation plan will be executed appropriately. Proper formulation and implementation of quality policy and objectives, originated from good leadership, is important for successful TQM implementation. Furthermore, continuous improvement is possible only when there is little or no management turnover at the bottom and mid-level within an organization. Further, customer satisfaction is a key factor for TQM implementation. However, in most of the cases, textile manufacturers are responsive to customer complaints, which lead to better customer satisfaction. Our findings are in agreement with previous studies [91, 187, 207, 208].

In the fifth hypothesis, the β coefficient is 0.170, which is statistically significant ($p<0.01$). This hypothesis suggests that a flat organizational structure is more flexible and enhances employee engagement in TQM implementation. A flat organizational structure also ensures effective communication within the organization, which is a pre-requisite for successful TQM implementation. Moreover, the organizational structure determines the degree to which the organization can create a favorable environment for change. Therefore, this finding is also supported by past studies [197, 209-211].

4.4 Identification and Prioritization of TQM Barrier in the Context of the RMG Sector of Bangladesh

Although some factors promote TQM implementation, there are some factors that can hinder TQM implementation. Therefore, understanding TQM enabling factors is not enough for the successful implementation of TQM. It is also important to understand those factors that hinder TQM implementation process because without a good knowledge of these factors, TQM implementation becomes difficult. The factor that hinders the TQM implementation process is known as TQM barrier in the literature. As stated in section 2.4, twenty-five TQM barriers have been identified in the literature.

These barriers do not hinder TQM implementation in the same way. Some barriers may be more critical to TQM implementation while some others are less critical. Overcoming those major barriers would make the TQM implementation easier. Hindrance level of these TQM barriers varies with the economic condition and cultural values of a country [91]. Therefore, it is necessary to find

out the hindrance level of these TQM barriers in the RMG sector of Bangladesh. Hindrance level of these barriers in TQM implementation can easily be identified by prioritizing them. There are several techniques for prioritizing TQM barriers. Some examples of these techniques are Analytic hierarchy process (AHP), Fuzzy Analytic Hierarchy Process (FAHP), Analytic Network Process (ANP), Regression Analysis (RA), etc. In this study, we have chosen FAHP technique to prioritize TQM barriers for the following reasons: it

i. can deal with multiple criteria and its sub-criteria simultaneously [212-214].
ii. is appropriate to deal with vague or uncertain expert judgments [215, 216].
iii. is more convenient to represent a real-life problem into structural form [214, 217, 218].
iv. can make better decisions in a complex situation compared to other techniques such as AHP, ANP, and RA [214-216].

Researchers have employed FAHP technique in a wide variety of areas due to competitive benefits offered by this technique. Table 4.10 summarizes various applications of this technique.

Table 4.10 various applications of FAHP technique

Sl.No.	Author (Year)	Area of application
1.	Amrita et al. [217]	Evaluating critical success factors of women entrepreneurship
2.	Gupta et al. [213]	Ranking of cloud ERP implementation.
3.	Cakir, [212]	Ranking of machine alternatives.
4.	Mahtani and Garg [215]	Evaluating key factors of financial distress in airline companies
5.	Kumar and Garg [214]	Evaluating sustainable supply chain indicators in automotive industry
6.	Wibowo and Grandhi [216]	Ranking of knowledge management practices in SMEs.

The procedure that will be followed to prioritize the TQM barriers is shown in Figure 4.5 with the help of flow chart.

All procedures of FAHP technique are discussed step by step:

Step 1: *Defining the Study Objective*

This technique is being used to prioritize the barriers that hinder the TQM implementation process.

Step 2: *Breaking Down the Objectives into Categories and Sub-Categories*

Study objective is further divided into five categories and 25 sub-categories. Groups of TQM barrier are set at category level where as barriers of each category are set at sub-category level.

Step 3: *Structuring a Hierarchical Model for Analysis*

A hierarchical framework shown in Figure 4.6 includes objective of the study, categories, and sub-categories.

Step 4: *Quantifying the Expert's Judgment Using Fuzzy Scale*

Saaty's [219] fuzzy scale is used in order to quantify expert's judgment. This scale is shown in Table 4.11**.** Experts were asked to perform a pair-wise comparative assessment using a nine-point scale.

Table 4.11 Triangular fuzzy scale for pair-wise comparisons

Fuzzy scale	**Definition**	**Explanation**
(1,1,1)	Equal importance	Equally preferred two obstacles
(2,3,4)	Weak importance	Moderately preferred one over another
(4,5,6)	Strong importance	Strongly preferred one over another
(6,7,8)	Very strong importance	Very strongly preferred one over another
(8,9,9)	Extremely strong importance	Extremely preferred one over another
(x-1,x,x+1)	Any intermediate value	When comparison is required

Source: Saaty's (1990) [219]

Step 5: *Collection of Relevant Data*

An expert team consists of 15 members. These members were taken from different RMG industries in Bangladesh. Members of expert team were taken from middle and top-level professional. Ten of the expert members were top level professionals (senior manager) while others were mid-level (assistant manager) professionals. They have experience in quality management more than 12 years. At the beginning of the interview, the experts were introduced to the objective of this interviewing and the pair wise competitive assessment procedure.

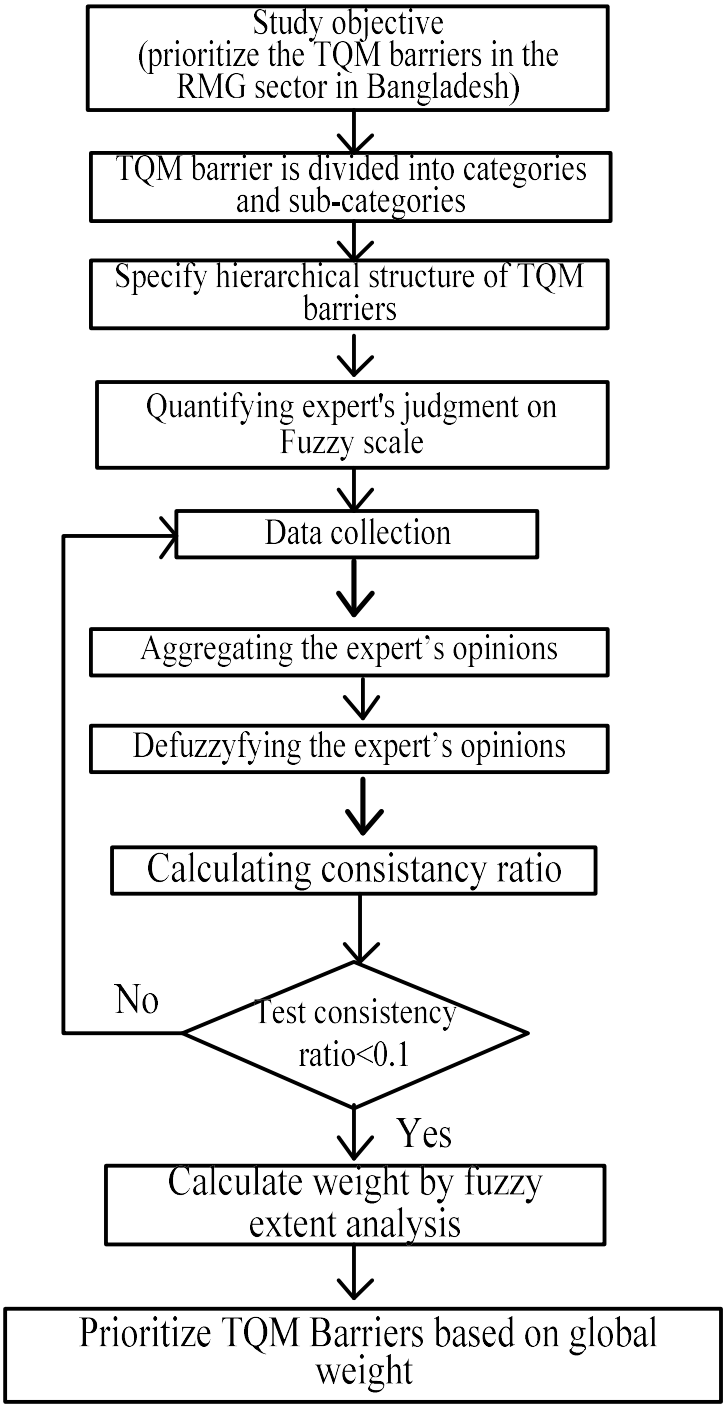

Figure 4.5 Procedure for prioritizing the TQM barriers

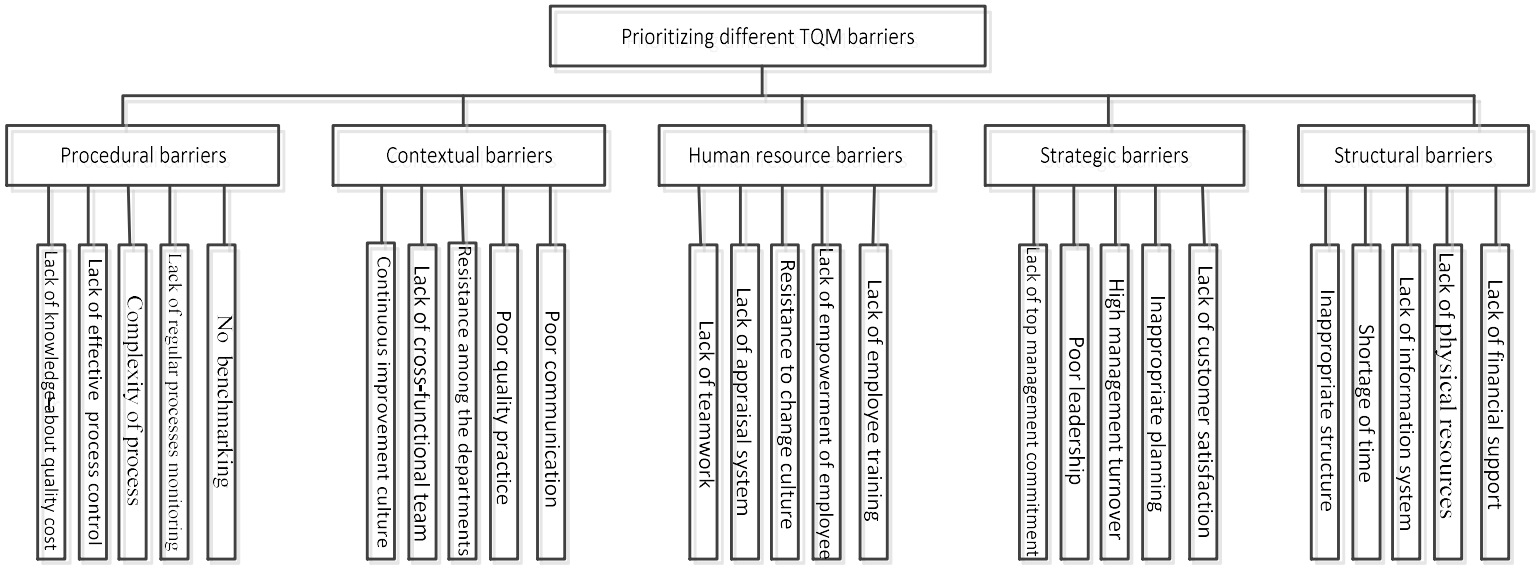

Figure 4.6 A hierarchical framework of TQM barriers

Step 6: *Aggregating the Expert's Opinions*

Relative importance of two barriers C_i and C_j can be quantify as $\tilde{I} = (I_{ij}^l, I_{ij}^m, I_{ij}^u)$ where, $I_{ij}^l, I_{ij}^m, I_{ij}^u$ are calculated by Equation 1-3.

$$I_{ij}^l = \min\{O_{ijk}^l\} \tag{1}$$

$$I_{ij}^m = \sqrt[n]{\prod_l^n O_{ijk}^m} \tag{2}$$

$$I_{ij}^u = \max\{O_{ijk}^u\} \tag{3}$$

Where, O_{ijk}^l, O_{ijk}^m, and O_{ijk}^u are the three parameters of integrated expert opinion. The integrated comparison matrix of categories of barriers is represented in Table 4.12, whereas Tables from 4.13 to 4.17 show the integrated comparison matrixes of different TQM barriers under each category.

Table 4.12 Pair-wise comparisons among the main categories

	Procedural	Contextual	Human resource	Strategic	Structural
Procedural	(1,1,1)	(0.5,0.60,1)	(0.5,0.68,1)	(0.25,0.36,1)	(0.33,0.43,0.5)
Contextual		(1,1,1)	(1,0.65,1)	(0.33,0.52,1)	(0.5,0.65,1)
Human resource			(1,1,1)	(0.33,0.64,1)	(0.5,0.94,1)
Strategic				(1,1,1)	(0.33,0.85,1)
Structural					(1,1,1)

Table 4.13 Pair-wise comparisons among the barriers under the procedural category

Procedural	Quality cost	Controlling	Complex process	Regular monitoring	Benchmarking
Quality cost	(1,1,1)	(1,1.35,2)	(0.33,0.95,1)	(0.125,0.65,1)	(0.25,0.65,1)
Controlling		(1,1,1)	(0.125,0.85,0.5)	(0.33,0.47,0.5)	(0.33,0.38,0.5)
Complex process			(1,1,1)	(0.167,0.47,2)	(0.25,0.45,1)
Regular monitoring				(1,1,1)	(1,0.38,2)
Benchmarking					(1,1,1)

Table 4.14 Pair-wise comparisons among the barriers under the contextual category

Contextual	Improvement	Cross-team	Resistance	Quality practice	Communication
Improvement	(1,1,1)	(0.11,0.95,3)	(1,1.65,3)	(0.11,0.48,2)	(0.167,0.67,2)
Cross-team		(1,1,1)	(1,0.59,2)	(2,1.24,3)	(0.167,0.26,0.5)
Resistance			(1,1,1)	(0.125,0.28,0.5)	(1,0.65,2)
Quality practice				(1,1,1)	(0.125,0.96,1)
Communication					(1,1,1)

Table 4.15 Pair-wise comparisons among the barriers under the human resource category.

Human resource	Teamwork	Appraisal system	Resistance	Empowerment	Training
Teamwork	(1,1,1)	(1,0.9,2)	(1,0.96,3)	(0.125,0.65,1)	(1,0.65,0.5)
Appraisal system		(1,1,1)	(0.33,0.62,0.5)	(0.25,0.47,0.5)	(0.167,0.38,0.33)
Resistance			(1,1,1)	(0.167,0.35,3)	(0.5,0.35,1)
Empowerment				(1,1,1)	(1,0.98,2)
Training					(1,1,1)

Table 4.16 Pair-wise comparisons among the barriers under the strategic category.

Strategic	Commitment	Leadership	Turnover	Planning	Satisfaction
Commitment	(1,1,1)	(2,1.6,3)	(1,1.35,3)	(1,0.48,2)	(0.167,0.43,2)
Leadrship		(1,1,1)	(1,0.59,2)	(2,1.24,3)	(0.125,0.35,0.5)
Turnover			(1,1,1)	(0.167,0.37,0.5)	(1,0.65,2)
Planning				(1,1,1)	(0.5,0.96,1)
Satisfaction					(1,1,1)

Table 4.17 Pair-wise comparisons among the barriers under the structural category.

Structural	Structure	Time shortage	Information	Physical resource	Financial
Structure	(1,1,1)	(1,1.75,3)	(2,1.65,3)	(1,0.65,2)	(0.25,0.45,1)
Time shortage		(1,1,1)	(0.25,0.65,1)	(0.2,0.47,1)	(0.33,0.38,1)
Information			(1,1,1)	(0.125,0.28,0.5)	(1,0.35,2)
Physical resource				(1,1,1)	(1,0.58,2)
Financial					(1,1,1)

Step 7: *Defuzzyfication the Opinion*

Expert's opinion can be defuzzified in variety of ways. Liou and Wang [220] developed a defuzzification method which is very popular. This method was used in this study for converting the fuzzy pair-wise comparison matrix $\tilde{F}$ (see Equation 4) to crisp pair-wise comparison matrix P (Equation 6). Conversion formula is shown in Equation (5)

$$\tilde{F} = [\tilde{f}_{ij}] = \begin{bmatrix} 1 & \tilde{f}_{12} & \dots & \tilde{f}_{1n} \\ \frac{1}{\tilde{f}_{12}} & 1 & \dots & \tilde{f}_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ \frac{1}{\tilde{f}_{1n}} & \frac{1}{\tilde{f}_{2n}} & \dots & 1 \end{bmatrix} \tag{4}$$

$$P = [p_{ij}] = \begin{cases} \beta\left(\left(f_{ij}^{m} - f_{ij}^{l}\right)\alpha + f_{ij}^{l}\right) + (1-\beta)\left(f_{ij}^{u} - \left(f_{ij}^{u} - f_{ij}^{m}\right)\alpha\right), & 0 \le \alpha, \beta \le 1 \; i \le j \\ \frac{1}{p_{ij}}, & 0 \le \alpha, \beta \le 1 \; i > j \end{cases} \tag{5}$$

Where α and β are known as preference of the decision maker and risk associated with decision making respectively. Usually, the values of α and β are considered equal to 0.5.

$$P = [p_{ij}] = \begin{bmatrix} 1 & p_{12} & \dots & p_{1n} \\ 1/p_{12} & 1 & \dots & p_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ 1/p_{1n} & 1/p_{2n} & \dots & 1 \end{bmatrix} \tag{6}$$

Step 8: *Checking Consistency of Pair-Wise Comparison*

Equation 7 shows Consistency index (CI). It is used to calculate Consistency ratio (CR). Consistency in the pair-wise comparisons matrix is checked by Consistency ratio (CR) by equation (8). If the value of consistency ratio is less than 0.1 (i.e., 10 percent), then we can arrive at a decision is that value is consistent.

$$\mathrm{CI} = (\lambda_{max} - n)/(n-1) \tag{7}$$

Where, n = total number of factors taken and λ_{max}= greatest number among the eigen values.

Consistency ratio (CR) can be calculated using Equation (8)

$$\mathrm{CR} = \mathrm{CI}/\mathrm{RI} \tag{8}$$

Where, RI = random index. The value of RI is shown in Table 4.18.

Table 4.18 RI values.

n	1	2	3	4	5	6	7	8	9
RI	0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.45

Consistency Ratio (CR) was calculated separately for every normalized comparison matrix. These values were found within the threshold limit.

Step 9: *Calculating Weight of Each Criteria and Sub-Criteria*

Chang's [221] extent analysis method was used to measure the weight of all criteria and its sub-criteria. This analysis method was chosen because it is simple and robust in nature [212, 214-216].

For categories of TQM barriers (see Table 4.12), Fuzzy synthetic extent values are calculated

$$S_H = (2.58, 3.07, 4.5) \otimes \left({}^{1}/_{39.62}, {}^{1}/_{28.36}, {}^{1}/_{20.57}\right) = (0.065, 0.108, 0.218)$$
$$S_C = (3.83, 4.487, 6) \otimes \left({}^{1}/_{39.62}, {}^{1}/_{28.36}, {}^{1}/_{20.57}\right) = (0.096, 0.158, 0.291)$$
$$S_P = (3.83, 5.589, 6) \otimes \left({}^{1}/_{39.62}, {}^{1}/_{28.36}, {}^{1}/_{20.57}\right) = (0.096, 0.197, 0.291)$$
$$S_{trg} = (4.33, 8.113, 12.06) \otimes \left({}^{1}/_{39.62}, {}^{1}/_{28.36}, {}^{1}/_{20.57}\right) = (0.109, 0.286, 0.586)$$
$$S_{tru} = (6, 7.104, 11.06) \otimes \left({}^{1}/_{39.62}, {}^{1}/_{28.36}, {}^{1}/_{20.57}\right) = (0.151, 0.250, 0.537)$$

Degrees of possibility are calculated

First requirement	Second requirement	Third requirement
$V(S_H \geq S_C) = 0.709$	$V(S_C \geq S_H) = 1$	$V(S_P \geq S_H) = 1$
$V(S_H \geq S_P) = 0.578$	$V(S_C \geq S_P) = 0.833$	$V(S_P \geq S_C) = 1$
$V(S_H \geq S_{trg}) = 0.381$	$V(S_C \geq S_{trg}) = 0.587$	$V(S_P \geq S_{trg}) = 0.672$
$V(S_H \geq S_{tru}) = 0.321$	$V(S_C \geq S_{tru}) = 0.603$	$V(S_P \geq S_{tru}) = 0.724$

Fourth requirement

$$V(S_{trg} \geq S_H) = 1$$
$$V(S_{trg} \geq S_C) = 1$$
$$V(S_{trg} \geq S_P) = 1$$
$$V(S_{trg} \geq S_{tru}) = 1$$

Fifth requirement

$$V(S_{tru} \geq S_H) = 1$$
$$V(S_{tru} \geq S_C) = 1$$
$$V(S_{tru} \geq S_P) = 1$$
$$V(S_{tru} \geq S_{trg}) = 0.923$$

Minimum degree of possibility (i.e. weight vector of criteria) is found for each pair-wise comparison

$$W' = (0.321, 0.587, 0.672, 1, 0.923)$$

Normalized weights are calculated

$$\mathrm{W} = (0.092, 0.168, 0.192, 0.285, 0.263)$$

Similar calculations were made to assess the normalized weight of other TQM barriers within each category. Table 4.19 summarizes these values.

Step 10: *Prioritizing the Criteria*

Prioritizing weights are of two types. One is local weight and other is global weight. Local weight is used for prioritizing the preceding hierarchical level. The global weight is calculated by combining local weight of each category with local weight of its sub-category. Finally, prioritization was made for TQM barriers based on the global weight of various barriers which is shown in Table 4.19.

Table 4.19 Ranking of the TQM barriers.

Categories of barriers	Local weight of Categories	Barriers			
		Sub- Categories	Local weight	Global weight	Rank
Procedural	0.092	Lack of knowledge about quality cost	0.1490	0.013708	22
		Lack of effective controlling of manufacturing processes	0.0310	0.002852	24
		Complexity of process	0.1000	0.009200	23
		Lack of regular monitoring of processes improvement	0.2200	0.020240	20
		No benchmarking of current process	0.5000	0.046000	10
Contextual	0.168	Lack of Continuous quality improvement culture	0.2000	0.033600	14
		Lack of cross-functional teams	0.1320	0.022176	19
		Resistance to change organizational culture between departments	0.1400	0.023520	18
		Lack of practicing a quality management system	0.3340	0.056112	7
		Poor communication	0.1940	0.032592	15
Human resource	0.192	Lack of teamwork to solve problems	0.1320	0.025344	16
		Lack of effective appraisal system	0.0020	0.000384	25
		Employee's resistance to change culture	0.1300	0.024960	17
		Lack of empowerment of employees	0.3560	0.068352	4
		Lack of employee training	0.3800	0.072960	3
Strategic	0.285	Lack of top management commitment	0.2080	0.059280	6
		Poor leadership	0.1320	0.037620	11
		Management turnover	0.1300	0.037050	12
		Inappropriate planning	0.3640	0.103740	1
		Lack of customer satisfaction	0.1660	0.047310	9
Structural	0.263	Inappropriate organizational structure	0.2060	0.054178	8
		time shortage	0.0650	0.017095	21
		Lack of information system	0.1300	0.034190	13
		Lack of sufficient physical resources	0.2420	0.063646	5
		lack of financial support	0.3570	0.093891	2

It is evident from the Table 4.19 that, several barriers can arise during TQM implementation. But all barriers do not hinder TQM implementation in the same way. Prioritization of TQM barriers shows which barriers are more critical to TQM implementation and which barriers are less critical. Clear understanding of these TQM barriers will help to prepare a good implementation plan for TQM or TQM based management systems. Therefore, prioritization of TQM barriers will play a significant role in developing an implementation plan for TQM or TQM integrated management system. In the present study, prioritization of TQM barriers has been done in the context of RMG sector of Bangladesh. This will help us to develop a new IMS framework named integrated TQM (ITQM) system framework where different individual management systems are integrated under the philosophy of TQM. As the integration is made based on TQM philosophy, successful implementation plan of ITQM system depends on the successful implementation of TQM. The implementation of TQM is hampered by several barriers. Analyzing the TQM barriers, it is found that there are several barriers that can hinder TQM implementation plan. Therefore, measures should be taken to prevent or to minimize these barriers. It is difficult to prevent or minimize all of those barriers at a time and requires a lot of resources. Due to limited resources, we have focused only on major barriers while preparing an TQM implementation plan for RMG sector of Bangladesh. The following paragraphs will describe the major barriers, how they hinder TQM implementation and how they can be prevented or minimized.

First major barrier is inappropriate planning for implementation. It means plans are not correctly aligned with the organizational goal. One of the important reasons for this misalignment is that the plan has not been designed considering the current strength and weakness of the organization [158]. Therefore, the current strengths and weaknesses of an organization need to be assessed before formulating a plan to achieve the goal. **Second major barrier** is lack of financial support. In any plan, allocation of financial resource to achieve a goal remains incomplete due to inadequate financial support. Hence, formulation of an effective TQM implementation plan becomes difficult due to inadequate financial support. It is therefore needed to know the minimum amount of financial resources to finalize a plan, at what interval and how long this financial support will continue [56]. **Third major barrier** is lack of employee training. Without proper training, it is difficult for the employees to perform their job according to the TQM implementation plan [80]. The implementation plan for TQM should therefore incorporate employee training program. In addition, an arrangement should be made to observe whether the training program is being carried out according to the training plan. **Fourth major barrier** is lack of empowerment of employees. It means providing employees a certain degree of autonomy to manage their daily activities. In real

practice, employees are not autonomous in managing their daily activities. They have to rely on top management's decisions which is time consuming and makes TQM implement difficult [132]. TQM implementation plan should therefore incorporate a suitable strategy for employee empowerment. This strategy will also help to solve many of the problems instantly that arise during TQM implementation immediately. **Fifth major barrier** is lack of physical resources. Like financial resource, formulation of an effective implementation plan is also hampered due to insufficient physical resources such as material, equipment, and other facilities [158]. Therefore, it is needed to know what kind of physical resources is required to finalize a plan, when and how much these resources are needed.

CHAPTER 5

Development of Conceptual Model for Integrated Management System

5.1 Introduction

The business environment is changing faster than ever before. Every business organization in the world is performing their business in a competitive and volatile business environment. To survive in this situation, there is no other option rather than improving firm performances. Different types of management systems are used to increase firm performances in various dimensions such as; quality, occupational health & safety, environment, and social responsibility. Some other management systems are also used to satisfy the requirements of the customer depending upon customer choice. Since the customer choice differ from one another, the number of individual management system is increasing day by day. As the number of individual management system is increasing, organizations are facing difficulties to implement and operate these individual management systems simultaneously. Therefore, industries are showing their interest in management systems integration to reduce the overall size of management system. Management systems integration means combining multiple individual management systems into a single system. Some industries have started integrating their management systems to achieve the following benefits. These are; development of integrated approach for risk management in business, better decision-making, ensure optimum use of resources, improve the compliance of legislation, enhance collaboration inside and outside the organization, reduce duplication of documents, records, lowering the implementation and management cost of IMS, and to attain sustainability in business.

In order to integrate Multiple Management Systems (MMs), industries have adopted two integration strategies. One is sequential adoption of MMSs and other is simultaneous adoption of MMSs. These two strategies are simple for integrating a small number of management systems. But the integration becomes more complex and time consuming when the number of management systems increases. To overcome these difficulties, academia and different standardization bodies throughout the world have come forward to develop a suitable method for integrating a large number of management systems. As stated in sub-section 2.3.2.2, academia has developed several Integrated Management System (IMS) models such as Synergetic model, Meta-Management

model, Sun model, Lean model, etc. In most of the cases, models of IMS were developed on the basis of common elements found in various management systems which are to be integrated. Although this common element method for management system integration is popular, it possesses some drawbacks. First, it is difficult to achieve full integration with the help of this integration method since this method can only integrate common management elements and rest of the management elements remain unintegrated. Second, this method is only suitable to bring compatibility among the management systems. It is not suitable to merge several management systems into a single system as the common elements have different meanings in different management standards. For example, "monitoring and measurement" has three different meanings in three different management standards. In ISO 9001:2015, it means tolerance in production process, whereas in ISO 14001:2015, and OHSAS 18001:2007 it means minimization of resource consumption and minimization of accident respectively. So, common elements are similar but not identical. Similar elements can only bring compatibility among the management systems but cannot marge them together. Third, the management standards that are not working on PDCA cycle cannot be integrated with this method. Forth, this method of integration does not ensure successful implementation of IMS because change in organizational culture has not considered in this method. Researchers opined that, change in organizational culture is an important factor for successful implementation of IMS [1, 2, 6]. They suggested that management systems need to be integrated under holistic philosophy where change in culture has given preference. It is evident from the literature that, a holistic philosophy named Total Quality management (TQM) is widely used to bring cultural change inside the organization. Therefore, it is wise to integrate management systems under the philosophy of TQM.

On the other hand, as stated in sub-section 2.3.2.3, many standardization bodies in the world such as Spanish Association for Standardization and Certification, Danish Standard Association, British Standards Institution have developed their own standards to formulate an IMS. But, these IMS standards are not able to serve the purpose of all business organizations in the world as these standards have been developed as per the requirement of a particular country. In addition, no international standard of IMS has been developed yet for global use. This situation motivated us to develop a new integrated management system for RMG industries of Bangladesh named Integrated Total Quality Management (ITQM system) system. This management system is so named since multiple management systems are integrated into the framework of TQM.

This chapter is organized as follows. Development of conceptual model for ITQM system is presented in Section 2, whereas section 3 describes formulation of an implementation framework

for ITQM system and also describes all steps in implementation process. Finally, section 4 validates the effectiveness (i.e., success) of implementation framework of ITQM system.

5.2 Development of Integrated Total Quality Management (ITQM) System

As stated in sub-section 2.3.2, multiple management systems can be integrated in a variety of ways. In the present study, we have integrated four individual management standards under the TQM philosophy. These are ISO 9001:2015, ISO 14001:2015, OHSAS 18001: 2007, and SA 8001: 2014. We have chosen these four management standards since RMG industries of Bangladesh are widely using these four management standards in their organization. On the other hand, there are several reasons for choosing TQM philosophy for integration of management standards. First, TQM can operate different management functions with its holistic management philosophy [9, 37, 58, 119]. Second, there is no need for structural similarity between different management standards in order to integrate them through TQM philosophy [3, 63]. Third, management standards can be seamlessly integrated with each other through TQM philosophy [13, 16]. This means that in an integrated management system, these management standards will lose their independence but their existence will remain unchanged. Fourth, TQM offers sharing of common resources while managing business processes [13, 16, 22, 31]. Fifth, TQM philosophy brings major cultural change within the organization while managing business processes [11, 38]. A detailed discussion on proposed integrated management system (ITQM system) is provided in the following paragraphs.

ITQM system consists of four management sub-systems such as ISO 9001:2015, ISO 14001:2015, OHSAS 18001: 2007, and SA 8001: 2014 as illustrated in Figure 5.1. The structure of ITQM system is divided into two parts. One is core management system and other is functional management system. Core management system is employed to manage cross-functional activities of ITQM system. On the other hand, functional management systems are employed to manage function specific activities of ITQM system. Four management sub-systems of ITQM system are also called functional management sub-systems. The following paragraphs will discuss about the core and functional management system of ITQM system.

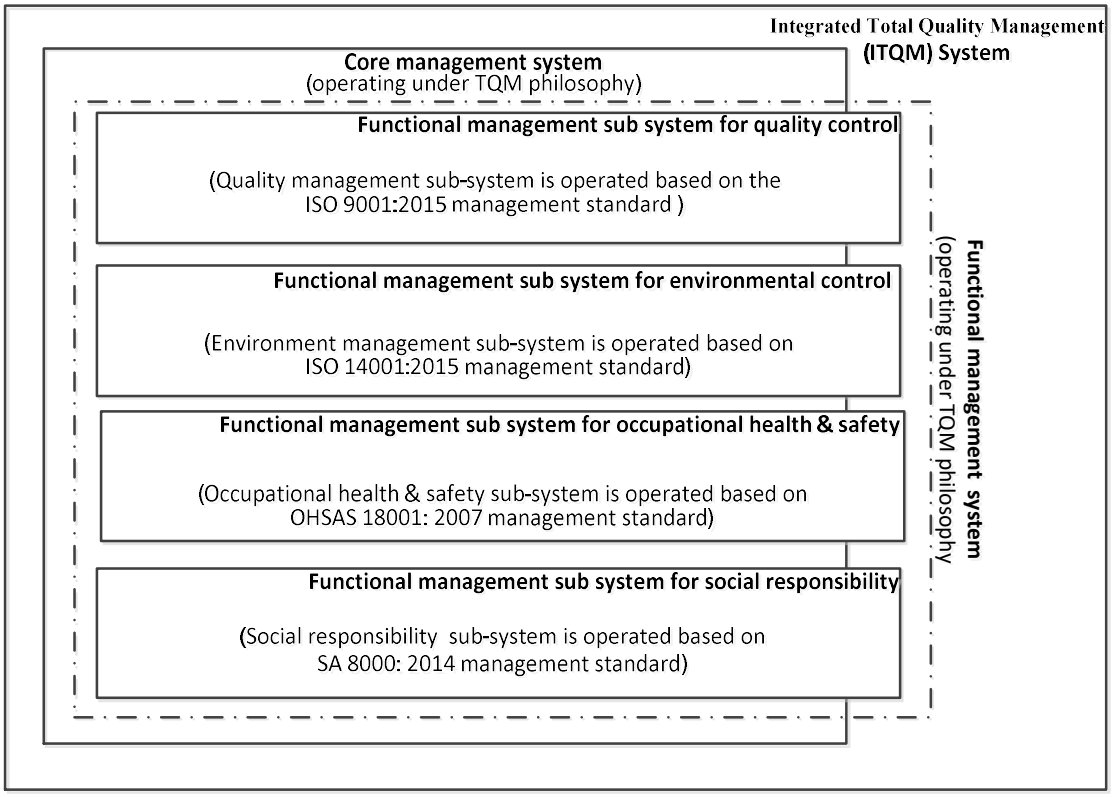

Figure 5.1 Structure of Integrated Total Quality Management (ITQM) system

5.2.1 Core Management System

The core management system of ITQM system has been developed by integrating important management procedures of its sub-systems under the holistic management philosophy of TQM. As the core management system of ITQM system has been developed based on TQM philosophy, it (core management system) will introduce an integrated management culture within the organization. Development of such culture is essential for effective management of ITQM system. In a word, a core management system has an integrated structure for managing cross-functional activities of ITQM system. The integrated management structures of core management system are as follows:

(i) Integration of Policy, Objective, and Processes

In order to fulfill the requirements of all stakeholders in an integrated way, it is necessary to create a unified set of policy as well as objective by aligning the policies and objectives of different management sub systems of ITQM system. Holistic management philosophy of TQM can help core management system to create a unified set of policy and objectives of ITQM system. It is also

necessary to create a comprehensive process map by integrating all processes of an organization based on the interactions between them. This comprehensive process map will help in creating an integrated action plan to achieve the objectives of ITQM system. Holistic management philosophy of TQM can help core management system to create a comprehensive process map and an integrated action plan for ITQM system.

(ii) Integration of Organizational Responsibility and Authority

Since most of the activities in the integrated action plan are multi-disciplinary, teamwork is essential for performing such activities. Therefore, team need to be formed taking employees form different departments at different management levels. As the TQM philosophy encourage teamwork, this philosophy can help core management system to build an effective team within the organization. The duties and responsibilities of multi-discipline team members should be stated in an integrated logical structure rather than individual structure. This is called the combined declaration of duty and responsibility. Cross functional philosophy of TQM can help core management system to declare such duty and responsibility in ITQM system.

(iii) Integrated Use of Organizational Resources

Three types of resources are required to carry out the ITQM system activities. These resources are financial, physical, and human resource. An organization possesses a certain amount of these resources. Therefore, the limited resources of the organization should be allocated in such a way that core management system can access these resources from various functional domains to carry out the cross-functional activities of the integrated action plan. This will also ensure optimum use of the resources.

(iv) Integrated Management of Information

In order to execute the cross-functional activities of ITQM system, different types of information need to be shared among the management sub systems of ITQM system. This information is of two types. One is managerial information and other is operational information. Managerial information includes audit results, performance evaluation results, policy, objective, management review report, etc. On the other hand, operational information includes work instructions, records of monitoring activities, different forms, etc. To make all this information readily available at the point of use, a central information management system is needed for storing, updating, and retrieving managerial and operational information. Holistic management philosophy of TQM can help core management system in creating such a central information management system for ITQM system.

(vi) Integrated Performance Evaluation

Policy, objectives, management procedures of ITQM system need to be reviewed at regular intervals to determine how well this system is able to satisfy stakeholder requirements. This is known as management review. The performances of ITQM system should be evaluated as a single management system rather than the sum of performances of individual management sub systems. Therefore, an integrated management review need be arranged to evaluate the performance of ITQM system. The following information are provided as an input in integrated management review meeting. These include follow-up action of previous meeting, audit results, status of corrective and preventive action, stakeholder's feedback, records of monitoring activities of process effectiveness, etc. Integrated management review should recommend the need for improvement of ITQM system for enhancing adequacy and effectiveness of this integrated system.

(vii) Continuous Improvement of ITQM System

In order to survive in the competitive market, the organization need to improve the adequacy and effectiveness of ITQM system continuously. Therefore, the opportunities for further improvement of integrated management system will be highlighted in the outcome of the management review meeting of ITQM system. For further improvement, the organization should re-define authority and responsibly among the employees and re-allocate the resources (physical and financial) to perform cross-functional activities in the integrated action plan of ITQM system.

5.2.2 Functional Management System

Function specific activities of ITQM system cannot be managed with the help of integrated management structure of core management system. Therefore, function specific management systems are required to manage these activities. ITQM system has four management sub-systems which are function specific. These four sub-systems can easily be used to manage function specific activities of ITQM system. Due to functional uniqueness, it is difficult to integrate function specific management procedures of different management sub-systems into a single procedure, but synergies can easily be made among these procedures. In order to bring synergy among the function specific procedures of four management sub- systems, these procedures or its part need be combined in such a way that the management sub-systems can share common resources (human, physical, financial) and information of a business organization. Functional management systems will include the following management principles for managing function specific activities of ITQM system:

(i) Sharing of Human Resource of the Organization

In order to share human resource of an organization during carry out function specific activities, some specific functional processes of different management sub-systems or its parts are combined together in such a way that these management sub-systems of ITQM system can share common human resources of the organization. Sharing approach of management, a philosophy of TQM, can help functional management system to share common human resources of the organization among the management sub-systems of ITQM system.

(ii) Sharing of Physical Resources of the Organization

In order to ensure rationalizing usage of physical resources (space, equipment, machinery, energy) of an organization to carry out function specific activities, some functional processes of different management sub-systems or its parts are operated combinedly in such a way that shearing of physical resource is possible among different management sub-systems of ITQM system. Management by sharing, a TQM philosophy, can help functional management system to share common physical resources.

(iii) Sharing of Information of the Organization

To bring operational synergy among the ITQM sub-systems, information is shared among the different sub systems. Sharing approach of management, a TQM management principle, can help functional management system to share information of the organization among the management sub-systems.

The above discussion gives a clear concept about how to build an overall management structure of ITQM system based on TQM philosophy. This concept is also illustrated in Figure 5.2 with the help of a schematic diagram.

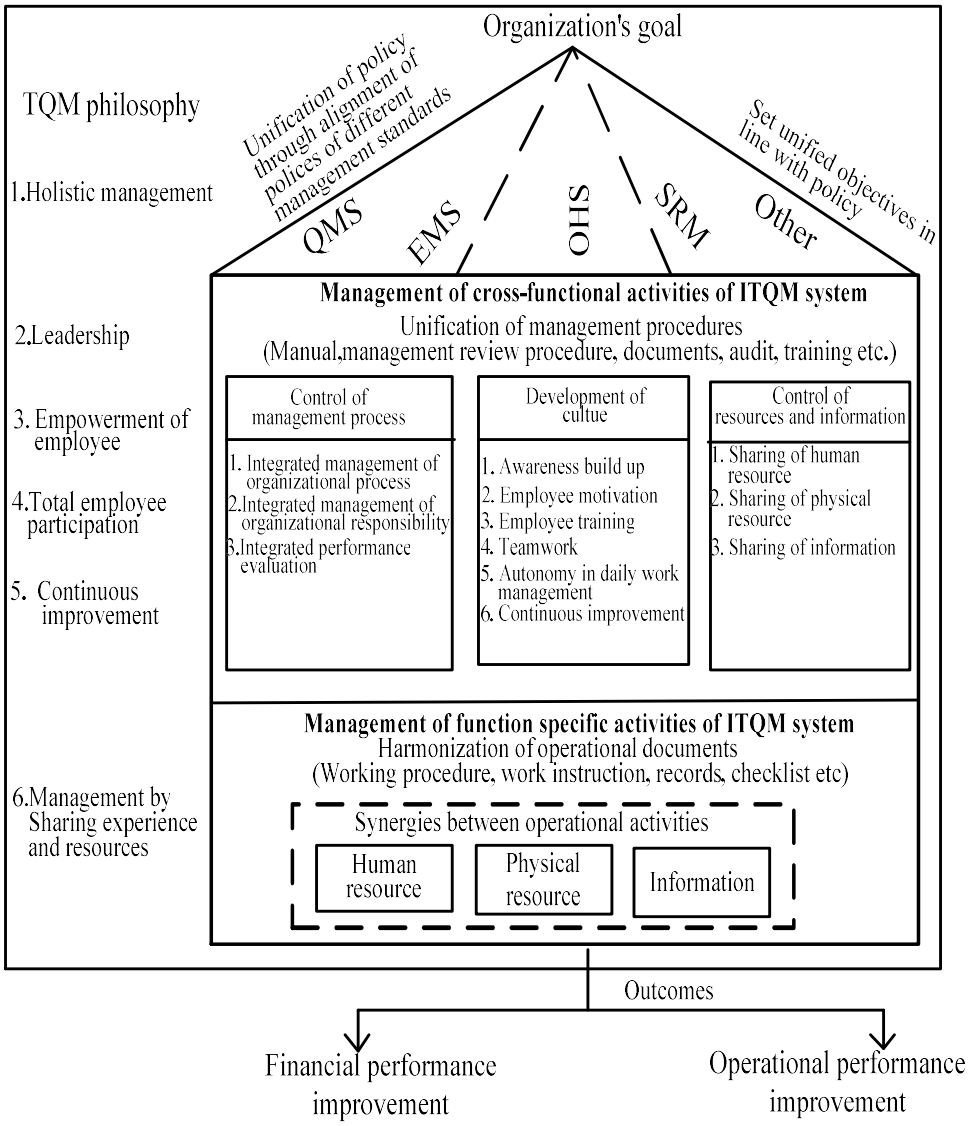

Figure 5.2 Development of ITQM system under TQM philosophy

5.3 Implementation Framework for ITQM System

Successful implementation of an integrated management systems is important for efficient and effective management of business activities [1, 2, 6]. In the present study, a framework has been developed for successful implementation of ITQM system. The developed framework will help an organization to implement ITQM system using TQM. As stated in section 4.4, five important TQM barriers such as inappropriate planning for implementation, lack of financial support, lack of employee training, lack of empowerment of employees, and lack of physical resources were emphasized when designing an effective implementation plan for the ITQM system. This implementation framework consists of twenty-four steps which will be completed in six phases. The interlinks of steps and phases are schematically illustrated in Figure 5.3. The details of six phases and all the implementation steps are discussed below.

First Phase- *Awareness Building*

Awareness needs to be built up among the employee about the concept, practice, benefits, tools and techniques of ITQM system in this phase, Top management will take initiative to build up such awareness. To complete this phase, the following step needs to be performed.

Step 1: Increasing Awareness on ITQM System

To implement TQM successfully, huge cultural change needs to be brought in the organization. To accommodate this huge cultural change inside the organization, it is necessary to bring a supportive environment within the organization. In order to create a supportive environment, awareness needs to be created among the employees about the basic requirements of organizational change. Awareness building should first start from top management as the driving force for implementation of ITQM system will be initiated from top management.

Second Phase - *Preparation*

In this phase, organization takes preparation for implementation of ITQM system at three management level (top, middle, and bottom). While preparing for implementation of ITQM system, management need to know two important information. One is how much experience the organization has in management system integration and other is how much resource is available in the organization for management system integration. Based on these two information, top management will decide whether it is necessary to hire a consultant for implementation of ITQM system. They will also form a steering committee for ITQM system implementation. Again, this two information will help mid-level management (steering committee of implementation of ITQM

system) to take all necessary preparation for implementation of ITQM system such as setting policy and objectives of ITQM system, assigning responsibility of the employee, preparing a unified manual for ITQM system, etc. In addition, this two information will help operational or bottom-level management (all section heads, supervisors) to take necessary preparation for implementation of ITQM system such as harmonization of operational documents (work instructions, forms, reports). All activities of this phase are carried out in nine steps (from step 2 to step 10) which are described below.

Step 2: **Review the Present Status of ITQM System Adoption**

Once the awareness is buildup within the organization, next step of implementation is to understand how far the organization has integrated its procedures and process, organization's experience for integration, and availability of resources within the organization.

Step 3: **Determine the Scope of ITQM System**

Scope of integration looks at the area covered by integration of Multiple Management Systems (MMS). An organization may have several management systems. Organization does not need to integrate all of its existing management systems. An integrated management system needs to be built according to the need of an organization. In the present study, an ITQM system is formed by integrating four management systems. They are Quality, environment, occupational health & safety, and social responsibility management system.

Step 4: **Ensuring Top Management Commitment**

Top management plays an important role in implementation of ITQM system. If top management commits to implementing ITQM system, they will directly involve in the implementation process. They will provide all kinds of assistance to the employees to make the implementation process successful. They usually provide three kinds of support. They are: manpower, financial and technical support. They will also manage organizational resources synergistically.

Step 5: Forming a Steering Committee

Top management will from a steering committee to look after all issues related to implementation of ITQM system. Top management can also hire external consultant for establishing and implementing ITQM system in their organizations.

Step 6: Developing Comprehensive Requirements, Unified Policy and Set Objectives

In this step, a comprehensive list of all stakeholder's demand will be prepared by top management. In order to achieve these comprehensive requirements, they will design a unified policy by aligning the policies of all the functional sub-systems of ITQM system. Objectives of ITQM system will be set in line with the unified policy.

Step 7: Developing a Unified Manual and Amalgamation of Procedures

Organization will develop a unified manual for ITQM system. The main aim of developing a such manual is to consolidate social responsibility, occupational health &safety, environmental, and quality management processes in a single document and to show the interconnection among the management processes. In addition, this manual will also include unified policy, unified objectives to achieve comprehensive requirements, and function specific operational processes.

Step 8: Prepare Combined Authority and Responsibility

As the activities of ITQM system are multi-disciplinary, these activities need to be carried out by developing a team. Duties and responsibilities of the team members need to be assigned in an integrated logical structure. Assigning duties and responsibilities in this way is known as combined declaration of authority and responsibility. The main benefit in assigning duties and responsibilities to the team members in this manner is that duties and responsibilities of each team member can be well communicated within the organization.

Step 9: Establishing Training Facility

All employees are not equally competent to contribute to implementation of ITQM system. Training can help the employee to improve their performance. As a result, they become more competent and can contribute more on management system integration. To ensure effective training among the employee, a permanent training cell needs to be established inside the organization. This cell will assess the need of training, arrange appropriate training program and finally conduct training assessment after each training program.

Step 10: Harmonizing of Operational Documents

Various type of documents (work instruction, records, and checklists) are needed to perform activities at operational level in ITQM system. In these documents the same data is presented in different formats which results in duplication of data. In order to avoid duplication of data in operational documents, data collected from the heterogenous source need to be compiled in such a

way that data can be converted into integrated, reliable, and unambiguous information and then this information can be shared by all operational documents. This procedure is called harmonization of operational documents.

Third Phase - *Planning*

An implementation plan for ITQM system will be developed in this phase. The top management will make the steering committee responsible for preparing an implementation plan for ITQM system. Only mid-level management will perform all activities assigned at this phase and will be carried out in two steps (from step 11 to step 12). The details of these steps are described below.

Step 11: Preparing an Implementation Plan

In this step, an implementation plan will be developed for ITQM system. The plan maps out the policy into action by breaking the plan into identifiable steps. These steps will give better insight on where to begin integration, what to do and when to do.

Step 12: Identifying Improvement Projects

For effective implementation of ITQM system, all activities of implementation plan are divided into small groups. Each group of activities is known as single project.

Third Phase - *Execution*

In this phase, top management delegates authority to its subordinate line management for execution of implementation plan of ITQM system. Only mid and bottom management will carry out all activities in this phase. The mid-level management will form several teams to perform all activities of ITQM system. They will also arrange training for each team member. On the other hand, bottom management will help superior management in motivating their employees. All activities in this phase are carried out in three steps (from step 13 to step 15) which are described below.

Step 13: Formation of Project Team

At this point, the organization should form a team for each project as the group effort generally brings success. It also promotes faster completion of task.

Step 14: Provide Training for Team Member

All members in a team may not possess equal skill and knowledge. To bring harmony of skills among the team members, the organization should arrange training program for the team members.

As a result, all team members will try to contribute equally which will ultimately increase the team spirit.

Step 15: Promote Active Team Effort

ITQM system implementation is difficult without the collective effort of all employees. Top management should motivate their employees so that they can actively participate in the ITQM system implementation process. If all employees can be motivated, they will become more responsible for their work and will render their best effort to perform the job. In this way, the whole organization will work together as a team and will try to implement ITQM system successfully.

Fifth Phase - *Review*

In this phase, internal performance of an organization is assessed. Mid and bottom management will carry out all activities assigned at this phase. Mid-level management will evaluate the internal performance of an organization using performance evaluation tools (audit, management review) and feedback mechanism of ITQM system. On the other hand, bottom management will help mid-level management to collect feedback from the employee. All activities in this phase will be carried out in six steps (from step 16 to step 21) which are described below.

Step 16: Obtaining Team Feedback

To work better in the future, management should collect feedback from all team members as they (management) do not know which team member knows best how to work better. However, employee feedback is one of the ways to empower the employee, as the feedback gives employees the opportunity to participate in the business decision-making process. On the contrary, top management considers team feedback as a shearing of lesson learnt from current business practices. This learning can contribute taking wonderful decision to improve current processes.

Step 17: Obtaining Stakeholder's Feedback

Stakeholder's feedback reflects the degree of satisfaction of the stakeholders with the current performance of the organization. If they are not satisfied with the organization's current performance, they will specify the week-points of the current business process which will help the organization to adjust the business policies according to the needs of the stakeholders. As a result, organization can better serve its stakeholders. In addition, feedback opens up an effective communication between organization and stakeholders. It is a great means for developing a relationship with stakeholders. The organization should build up a feedback system for its stakeholders.

Step 18: Assessment of Internal Performance

Assessing the internal performance is a good technique to keep track on process improvement. Assessment act as proactive tool as it has an ability to identify the areas of organizational processes that are poorly managed. Rapid actions need to be taken to improve these areas before major problems arise. Regular assessment of internal performance will allow better achievement of organizational goal. Hence, the organization should arrange an internal assessment process.

Step 19: Benchmarking of Current Processes

In the competitive business environment, every organization is trying to compare their performance with the best competitor. Benchmarking is a suitable method for comparing the performance. It discovers the remarkable performance made by an organization. It gives a clear picture how well the organization's current performance is compared to identified best performance. It provides opportunities for further improvement. Hence, the organization should benchmark their current processes.

Step 20: Conducting Internal Audit

The organization should arrange internal audit on regular basis. Internal audit is a useful tool for assessing whether internal process are operating as per documented policies and procedures. If any of the processes of an organization is found operating not according to the documented procedures, the audit team will raise non conformity (NC). Respective department will then take necessary control measure to improve the process. This improvement must be cheeked by the audit team before clearing the NC. Therefore, internal audit is an assessment as well as improvement tool for organization's operational activities. Audit need to be carried out in different disciplines in an integrated fashion with cross-functional members.

Step 21: Conducting Management Review

The organization will arrange a management review meeting on regular basis. Management review is a process for evaluating whether the integrated management system is providing expected result. It also estimates the effective implementation of ITQM system and identifies gaps in process performance, policies and management procedures for further improvements. The management review meeting should be conducted on the basis of the documents such as audit reports, stakeholder's feedback, compliance evolution report, data of organizational performance. Reviewers provide some suggestions for process improvement of ITQM system (if any).

Sixth Phase - *Modification*

This is the final phase for ITQM system implementation. In this phase, adjustments will be made in basic organizational structure and in some elements of management system to fulfill the requirements of all stakeholders. The activities in this phase are performed by top and mid-level management only. Top level management will reform the basic organization structure such as re-arrangement of duties and responsibilities among the employee. On the other hand, mid-level management (steering committee of implementation of ITQM system) will made adjustments in policy, objectives, processes, and management procedures of ITQM system. All activities in this phase are carried out in three steps (from step 22 to step 24) which are described below.

Step 22: Rectify Plan, Objectives and Methodologies

As per the recommendation of management review committee, steering committee of ITQM system implementation will take necessary actions to rectify plan, objectives, policies, management procedures for further improvement.

Step 23: Preparing Corrective and Preventive Action Plan

Every process of an organization has a risk of producing nonconformity. There are two ways to prevent or to reduce nonconformity. They are: corrective action and preventive action. Corrective actions are reactive attitude to prevent nonconformities; whereas preventive action is a proactive attitude. Corrective actions take initiatives to stop the occurrence of similar nonconformity. It eliminates the root cause of existing nonconformities. On the other hand, preventive action prohibits the occurrence of probable nonconformities. It eliminates the probable causes of potential nonconformities. Hence, the organization should prepare corrective and preventive action plans.

Step 24: Modify Organizational Structure

When the ITQM system becomes inadequate to fulfill stakeholders demand, necessary adjustments are to be made in the basic organizational structure such as rearranging the duties and responsibilities of the employees.

5.4 Research Design for Validation of Implementation Framework for ITQM System

To identify whether the ITQM system can be successfully implemented using the proposed framework, the implementation framework of ITQM system need to be validated. It means whether the ITQM sub-systems are contributing to its successful implementation. To assess the contribution of sub-systems, the firm performance improvement is measured in four management discipline (quality, environment, occupational health & safety and social responsibility). In a word, we have to show whether the implementation of ITQM system has improved the performance of the firm in those management disciplines. The process that will be followed to validate the implementation framework of ITQM system is shown in Figure 5.4.

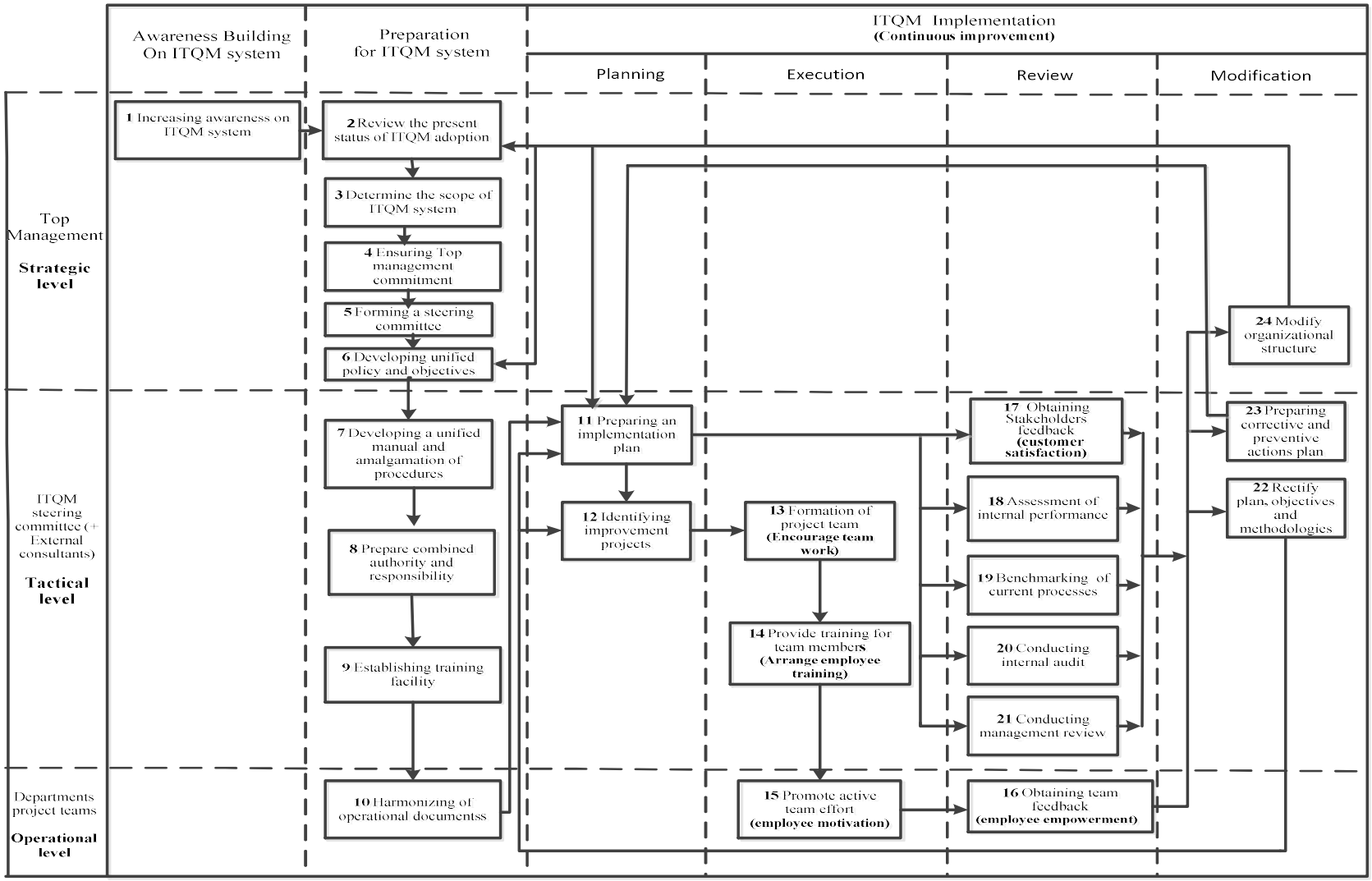

Figure 5.3 Implementation framework of ITQM system

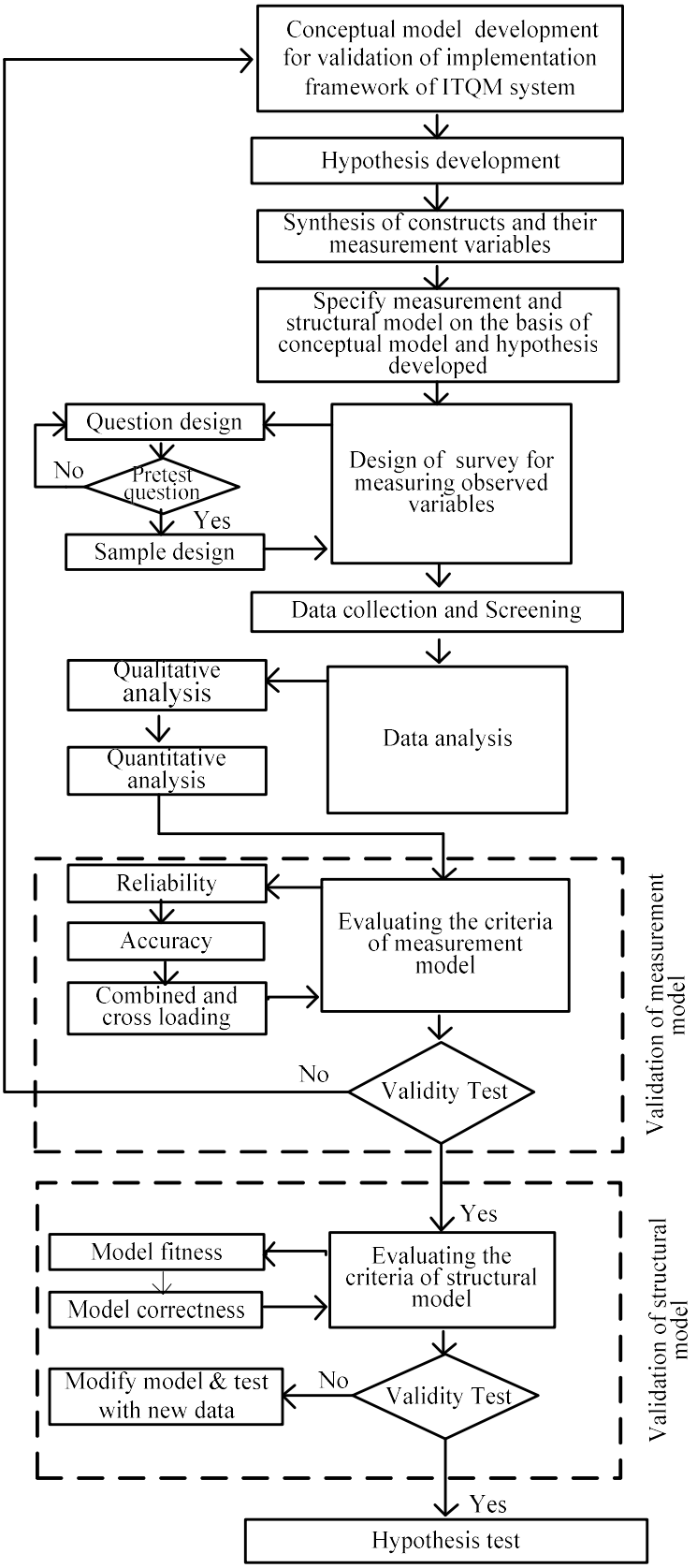

Figure 5.4 Flow chart of validation process of implementation framework

5.4.1 Model Development

In order to verify whether the firm performance will be improved by implementing ITQM system, it is essential to develop a conceptual model. This model will help to translate theoretical knowledge into mathematical equation. The conceptual model is composed of two major components. One component is formed encompassing various management sub-systems of ITQM system. It includes quality, environment, occupational health & safety and social responsibility. Other component is firm performance encompassing financial and non-financial performance. The conceptual model graphically represents the relationship between various management sub-systems of ITQM system and firm performance which is illustrated in Figure 5.5. Once the conceptual model is developed, it is necessary to identify the relationship between each management sub system of ITQM system and firm performance.

5.4.2 Hypothesis Development

Hypothesis is a predictive statement. It helps to define the relationship among different factors or variables. Four hypothesizes have been proposed by the present study to define the relationship between management sub systems of ITQM system and firm performance. They are discussed in the following paragraphs.

Hypothesis (H1): There is a positive relationship between quality management sub-system of ITQM system and firm performance.

In order to improve quality performance of a firm, production of defective products need to be reduced or eliminated in the manufacturing process [9, 10, 24]. Defective products refer to those products that are not confirming the quality specified by the customer. Quality management sub-system of ITQM system has an important role to reduce or eliminate the product non-conformity. For example, when a non-confirming product is traced in the manufacturing process, Quality Management Sub-System (QMSS) will take initiative to identify root cause of the problem. Root cause will provide valuable inputs for preparing a corrective and preventive action plan to stop producing defective product [27, 64]. Hence, QMSS can contribute directly to firm's quality performance improvement.

Hypothesis (H2): There is a positive relationship between environmental management sub-system of ITQM system and firm performance.

All environmental impacts should be mitigated to improve the performance of a firm. For this reason, it is essential to identify those operations that have major impacts on environment. Environmental Management Sub-System (EMSS) can help ITQM system to identify all environmental impacts on the firm. EMSS can also assist ITQM system in preparing a corrective and preventive action plan to mitigate the environmental impacts. In addition, EMSS can support ITQM system to form an emergency response team to handle all emergency situations. This team will save lives and will reduce financial losses of a firm [27, 29, 39]. Accordingly, EMSS can directly contribute to enhance firm performance.

Hypothesis (H3): There is a positive relationship between occupational health & safety management sub-system of ITQM system and firm performance.

Healthy and safe working environment should be ensured for the employee to improve firm performance [1, 44, 8]. In order to ensure healthy and safe environment for the employee, occupational accident and illness need to be reduced or eliminated. Occupational Health & Safety Management Sub-System (OHSMSS) can help ITQM system to identify all potential hazards related to health and safety present in the firm. It can also support ITQM system in health and safety risk assessment and treatment. As a result, a healthy & safe environment will be established inside the firm. Consequently, OHSMSS can contribute directly to improve firm performance.

Hypothesis (H4): There is a positive relationship between social responsibility management sub-systems of ITQM system and firm performance.

In order to improve firm performance, firm should be more responsible to the society [4, 31]. It means that a firm has to run business not only for marking profit but also for the well-being of the society [63, 49]. Social Responsibility Management Sub-Systems (SRMSS) can support ITQM system to work for the well-being of the society. For example, SRMSS can provide an opportunity to ITQM system to introduce a socially responsible labor practice (e.g., regular payment, job security, no wage discrimination etc.) in the firm. SRMSS can also provide an opportunity for community development (e.g. employment creation, providing health care service to community, providing skill development training etc.). Hence, SRMSS can directly contribute to firm performance improvement.

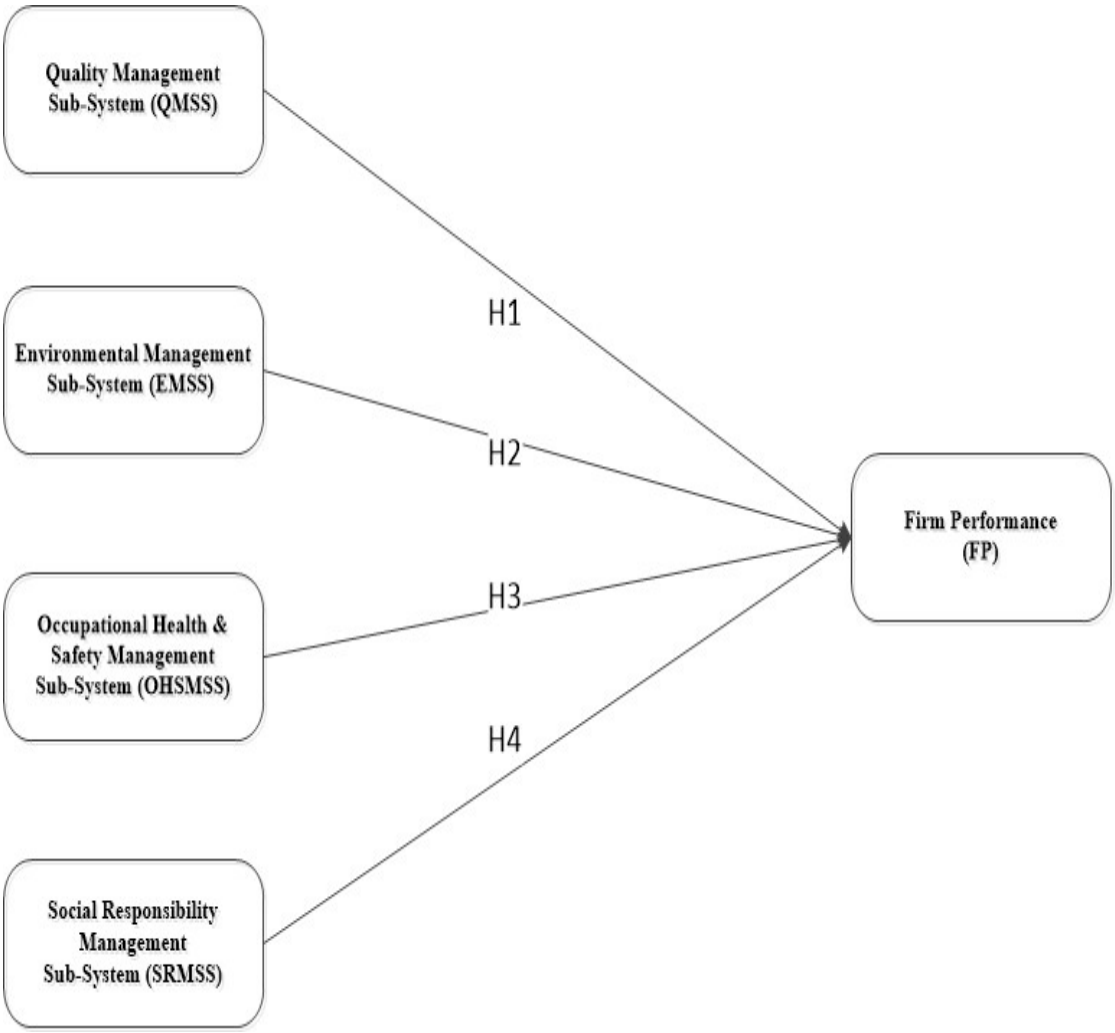

Figure 5.5 Development of conceptual model for ITQM system implementation

5.4.3 Synthesis of Constructs and Observed Variables

A number of variables are used to measure the contribution of different ITQM sub-systems to improve firm performance. These variables are of two types. One is construct or latent variable and other is observed variable or measurable items. Observed variable are those variables that can be measured directly. On the contrary, latent variables cannot be measured directly. This variable is constructed and estimated based on the relationships with its corresponding observed variables. In our model, there are 5 latent variables and 25 observed variables. All latent variables and their corresponding observed variables are summarized in Table 5.1.

Table 5.1 Key constructs (latent variable) and their measurable items (observed variable) in the measurement model

Latent variables	Observed variables	Description of observed variables
Quality Management Sub-System (QMSS)	QMSS1	ITQM system policy is helpful to set measurable objectives for minimization of major quality related problems.
	QMSS2	Integrated approach of findings quality nonconformities can help ITQM system to update operating procedures.
	QMSS3	Sharing of all records in ITQM system is helpful for preparing an effective plan for corrective and preventive actions.
	QMSS4	Top management is committed to establish integrated management system in the organization
	QMSS5	Clear assignment of role, authority, responsibility for each function in ITQM system is helpful for achieving quality objectives
Environmental Management Sub-System (EMSS)	EMSS1	ITQM system policy is helpful to set measurable objectives for minimization of major environmental impacts
	EMSS2	Integrated approach is helpful to identify all potential environmental emergency situations and make plans accordingly
	EMSS3	An integrated approach for preparing corrective and preventive action plan will facilitate better environmental performance
	EMSS4	Top management encourages to make a decision at field level
	EMSS5	Involving employee in continuous improvement activities
Occupational Health & Safety Management Sub-System (OHSMSS)	OHSMSS1	ITQM system policy is helpful to set measurable objectives for minimization of major risks associated with OH&S
	OHSMSS2	Integrated approach is helpful to identify all potential OH&S emergency situations and make plans accordingly
	OHSMSS3	A training unit/department has been established for the purpose of organizing and conducting training program.
	OHSMSS4	Lessons learn from previous emergency practices (an integrated approach) can help ITQM system to update operating procedure on regular basis.
	OHSMSS5	Employees are rewarded for giving improvement suggestion
Social Responsibility Management Sub-System (SRMSS)	SRMSS1	ITQM system policy is helpful to set measurable objectives for the well-being of the society (maintaining social security, societal health, and ecology)
	SRMSS2	Sharing of all records in ITQM system is helpful to evaluate the attitude and commitment of an organization towards social well-being

Latent variables	Observed variables	Description of observed variables
	SRMSS3	Conducting management review meeting based on shared data is helpful for continuous welfare of the society on different issues.
	SRMSS4	Employee turnover hampers the implementation of individual management system or integrated management system
	SRMSS5	Continuous improvement is a high priority in the organization
Firm Performance (FP)	FP1	Sales revenue of your organization has deteriorated extremely /deteriorated little/ stayed same/ improved little/ improved greatly
	FP2	Defective production rate has improved not at all/ little/ same/ greatly/ extremely
	FP3	Air pollution level has improved not at all/ little/ same/ greatly/ extremely
	FP4	Number of occupational illness has decreased not at all/ little/ same/ greatly/ extremely
	FP5	Employment rate of local people has improved not at all/ little/ same/ greatly/ extremely

5.4.4 Specifying Measurement and Structural Model

In Structural Equation Modeling (SEM), two separate models are derived from the conceptual model. One is measurement model and other is structural model. This measurement and structural model are illustrated in Figure 5.6. Measurement model graphically specify the relationship between each latent variable and its set of observed variables. For visual understanding, latent and observed variables are shown by ellipse and rectangle respectively in the model. Each relationship is represented by a single headed arrow begins from latent variable and ends in observed variable. The structural model represents the relationship between four ITQM sub-systems and firm performance. For visual understanding, all latent variables are presented by ellipse and the relationship between four ITQM sub-systems and firm performance is presented by a single headed arrow begins from one latent variable to other.

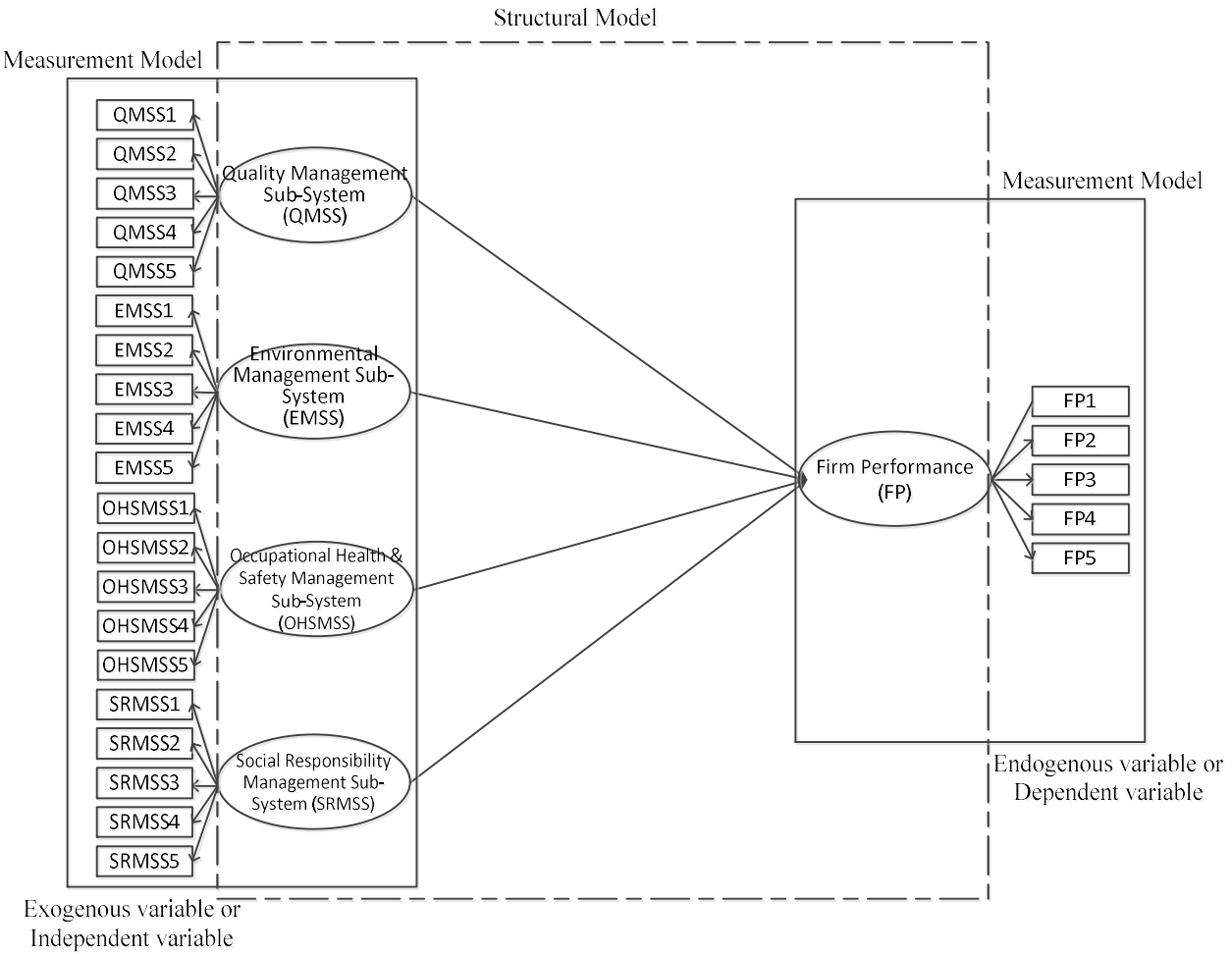

Figure 5.6 Structural and measurement model for ITQM system implementation

5.4.5 Design of Survey for Measuring Observed Variables

Design of Survey describes the procedures for collecting and measuring data. The following subsections will discuss the development and pre-test of questionnaire, sampling technique, data collection method for measuring observed variables of measurement model.

Questionnaires Development

Questionnaires are developed to measure the observed variables based on the opinion of the respondent. This questionnaire is also called measurement instrument for survey because the questionnaire is used to perceive or measure the opinion (data) of respondent on a numerical scale (e.g. Likert scale). In order to get useful data, questionnaire that is used to conduct a survey should be precious and relevant. For this reason, an extensive review of questionnaires from the literature has been performed to identify relevant questions used for successful implementation of integrated management system. These questions have given useful insights to develop the draft questionnaire for the present study. For better understanding, the draft questionnaire of the present study is divided into three sections.

Section One: Main objective of this section is to identify general information about the participating industries of the survey. There are 11 questions in this Section. These questions are related to number of employees in the industry, which management standards are being used in the industry, how many years these management standards have been used, which of these standards are being used by integration, how many years these integrated management standards are being used. etc.

Section Two: The questions in this section are designed to identify the present practice of TQM philosophy in RMG industries of Bangladesh and to collect the perception on ITQM system whether this system can assist performance improvement of an organization in the field of quality, environment, occupational health & safety, social responsibility. This section is also designed to collect respondent's perceptions on possible firm performance improvement from the successful implementation of ITQM system. This section is divided into seven parts. The respondents were requested to provide their valuable opinions on a five-point Likert scale (where 1=Strongly Disagree, 2=Disagree, 3= Neither Agree nor Disagree, 4=Agree, 5=Strongly Agree).

Section Three: This is the final section of the questionnaire. Questions in this section are designed to collect major reasons to know why they want to implement ITQM system in their organizations. This section is divided into three parts. In each part, there are several concepts as checklists. The respondents were asked to put tick mark on the checklists.

Pretest of Questionnaire

Pretest of questionnaire is used to check the accuracy and preciseness of measurement instrument for survey. Pretest is carried out in two steps; expert opinion and pilot study. The following paragraph will discuss these two steps.

Step 1: Expert Opinion

Expert opinion is important to check the reliability and validity of questions. Expert opinion is asked to decide which questions will be selected from draft questionnaire to prepare the final questionnaire. Draft questionnaire was sent to 5 expert members to refine and validate the measures of each construct. Among the 5 experts, three were taken from industry and rests of the expert were senior academicians. These academicians have expertise in teaching, research and consultancy in IMS and TQM implementation over 10 years. Annexure 2 of current thesis shows the list of experts with their affiliations. Majority of expert's comments were related to detailing of word to make the questionnaire clear and concise. Some overlap items were also deleted according to the expert opinion. Questionnaire was revised according to the opinions given by all experts. This final version of draft questionnaire was made ready for pilot study.

Step 2: Pilot Study

In pilot study, survey was conducted with 55 respondents. These responds were randomly selected from those RMG industries in Bangladesh that are practicing TQM and IMS. Chronbatch alpha value for each measure (as stated in Annexure 7) were found greater than 0.8. This indicates that, questionnaire is reliable to conduct the current survey. To calculate Chronbatch alpha, SPSS 16 software was used.

Sampling Plan

This study has included those RMG industries in Bangladesh which have already implemented or in process of IMS as well as TQM implementation. Garment Manufacturers and Exporter Association (BGMEA), a recognized body in RMG sector in Bangladesh, has published a report in 2019. This report has shown that, there are nearly eleven RMG industries in Bangladesh that are

using IMS in their organizations. List of the eleven RMG industries is shown in Annexure 3. Among the eleven RMG industries, only five of them are practicing TQM system in their organizations. Therefore, these five RMG industries have been selected to conduct survey. List of the five RMG industries is shown in Annexure 4. These five RMG industries are located in Dhaka-Savar region of Bangladesh. Keeping in mind the objectives of the present study, respondents were classified according to the working experience in RMG industry. Top level or senior manager (having experience fifteen year or more), mid-level manger (having experience ten years or more) and bottom level or assistant manager (having experience five years or more). Respondents were identified from 5 RMG industries at three management levels according to their (respondent) years of experience.

5.4.6 Data Collection Method and Screening

Questionnaire was e-mailed to 350 employees of 5 listed RMG industries shown in Annexure 4. These employees are working in various disciplines (production, quality control, compliance, human resource management etc.) in RMG industry. A reminder e-mail was also sent to those employees who have not completed their survey. In order to increase the response rate, telephone call was made to all non-respondents. Phone call was made to understand their willingness to complete the survey. Physical contact was made with those non-respondents who have an interest to complete the survey. Finally, 256 inclusive and useable responses were collected. The response rate of the survey was found 73.14%. This response rate is quite satisfactory compared to others studies [130, 187, 192, 194].

Table 5.2 shows the number of target respondents and the number of completed response for each RMG industry. Respondents were chosen form three different management levels. The demography of the respondents is shown in Table 5.3.

The non-response bias test was also carried out for screening of collected data. Reply from every respondent was sorted against the date of receipt and divided into early and late response sample groups. The wave analysis method [222] was employed to measure the difference between the two response groups. Comparison was made by performing a t-test on two sets of samples, which found an insignificant alteration. Therefore, this study draws off a non-response bias.

Table 5.2 Number of target and completed respondents

Name of the industry	Top management		Middle management		Bottom management		Total	
	Target	Respondent	Target	Respondent	Target	Respondent	Target	Respondent
Liz Fashion Industry Ltd	8	8	27	21	35	33	70	62
Gildan Active wear Bangladesh Ltd.	5	5	30	22	35	30	70	57
FCI (BD) Ltd.	5	5	30	19	35	24	70	48
Epillion style Ltd.	5	5	27	17	38	25	70	47
Green textile limited	4	4	30	15	36	23	70	42
Total	27	27	144	94	179	135	350	256

Table 5.3 The demography of the respondents

Variables	Categories/Class	Response (%)
Gender	Male Female	70.25 29.75
Age group	28-35 years 36-45 years	51.56 48.44
Cadre	Top management Middle management Bottom management	9.40 30.28 60.32
Size of the Organization	Small (< 50 employees) Medium (50-500 employees)	40.08 59.92

5.4.7 Data Analysis

There are two common methods for data analysis. One is qualitative analysis and other is quantitative analysis method. Selection of these data analysis methods depend on the nature of the data (numeric or non-numeric). The first and third parts of the questionnaire (shown in annexure 1) are qualitative in nature. Therefore, qualitative methods will be employed to analyze these data. On the other hand, data collected through second part of the questionnaire is quantitative in nature. Therefore, quantitative method will be employed to analyze these data.

5.4.7.1 Qualitative Analysis

Qualitative data analysis focuses on exploration of important information and identification of significant phenomenon or patterns under investigation. Qualitative data analysis will provide the followings information: adoption of individual management standard, adoption of IMS, adoption of TQM, and the reasons for IMS implementation in RMG sector of Bangladesh. This information is presented in the following paragraphs.

Adoption of Individual Management Standard

RMG industries are using several management standards according to the choice of the customer. In order to know which management standards, they are using in their organizations, the respondents are asked to provide information on usages of management standards. Survey reveals that, RMG industries that have participated in the survey are using four management standards. They are: ISO 9001:2015, ISO 14001: 2015, OHSAS 18001: 2007, SA 8001: 2014. RMG industries are using these standards to survive in the competitive market. The details of the survey results are presented in Figure 5.7. It reveals that, out of five RMG industries, three industries have been implemented ISO 9001: 2015 for 10 years while rest of the industries have been implemented for 8 years. This figure also shows that, two and three industries have been implemented ISO 14001: 2015 standard for 8 and 6 years respectively. In addition, this figure demonstrates all (five) industries have been implemented SA 8000: 2014 and OHSAS 18001: 2007 standards in their organizations for 5 and 4 years respectively. From this analysis it can be concluded that, the management standards are implemented sequentially in the RMG sector of Bangladesh. That is, ISO 9001 has been implemented first followed by ISO 14001, SA 8001 and OHSAS 18001.

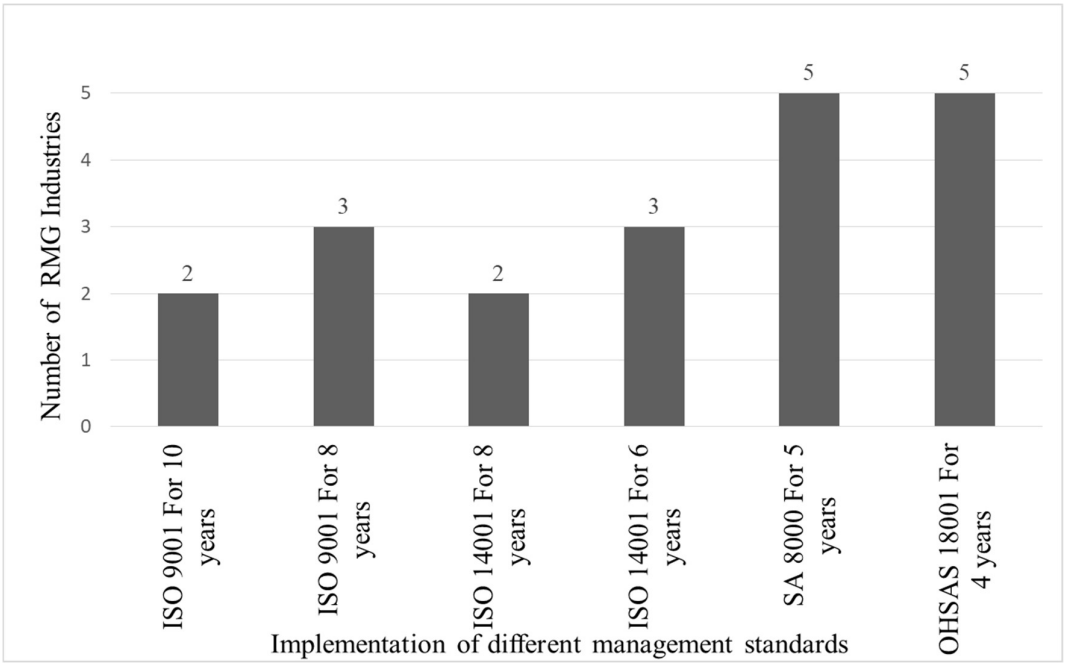

Figure 5.7 Adoption of management standards in surveyed RMG industries in Bangladesh

Adoption of IMS in RMG Industries

The RMG industries that participated in the survey have a little bit of knowledge of applying IMS in their organizations. To know the IMS implementation skill of RMG industries, the respondents were asked to provide details on which management standards are integrated in their industries. The details of the survey results are presented in Figure 5.8. From this figure it is found that, out of five industries, two have integrated ISO 9001: 2015 and ISO 14001: 2015 standards in their organizations, one industry has integrated ISO 9001: 2015 and OHSAS 18001:2007, another industry has integrated ISO 14001:2015 and OHSAS 18001:2007, and another industry has integrated ISO 9001:2015, ISO 14001:2015, and OHSAS 18001:2007 standards. However, no industry has been able to integrate four management standards so far. It is important to mention that, the management standards that have not yet been integrated are operating individually in the respective industries. It means, the surveyed industries have experience in running these management standards both in an integrated way and individually. They have the ability to differentiate these two styles of management (individual and integrated). Hence, they can easily perceive the impact of four management sub-systems of ITQM system on firm performance improvement.

Again, the respondents were asked to provide details on how many years these IMS are being operated in their industries. The details of this survey results are presented in Figure 5.9. It reveals that, the industries that integrated management standards either in the form of ISO 9001: 2015 and ISO 14001:2015 or ISO 9001: 2015 and OHSAS 18001 or ISO 14001:2015 and OHSAS 18001:2007 have been operating these standards for last three years. One industry that integrated three management standards in the form of ISO 9001:2015, ISO 14001:2015, and OHSAS 18001:2007 has been operating these standards for last two years. From this survey analysis it can be concluded that the RMG industries of Bangladesh have started integrating individual management standards and are attempting to implement such systems in their organizations.

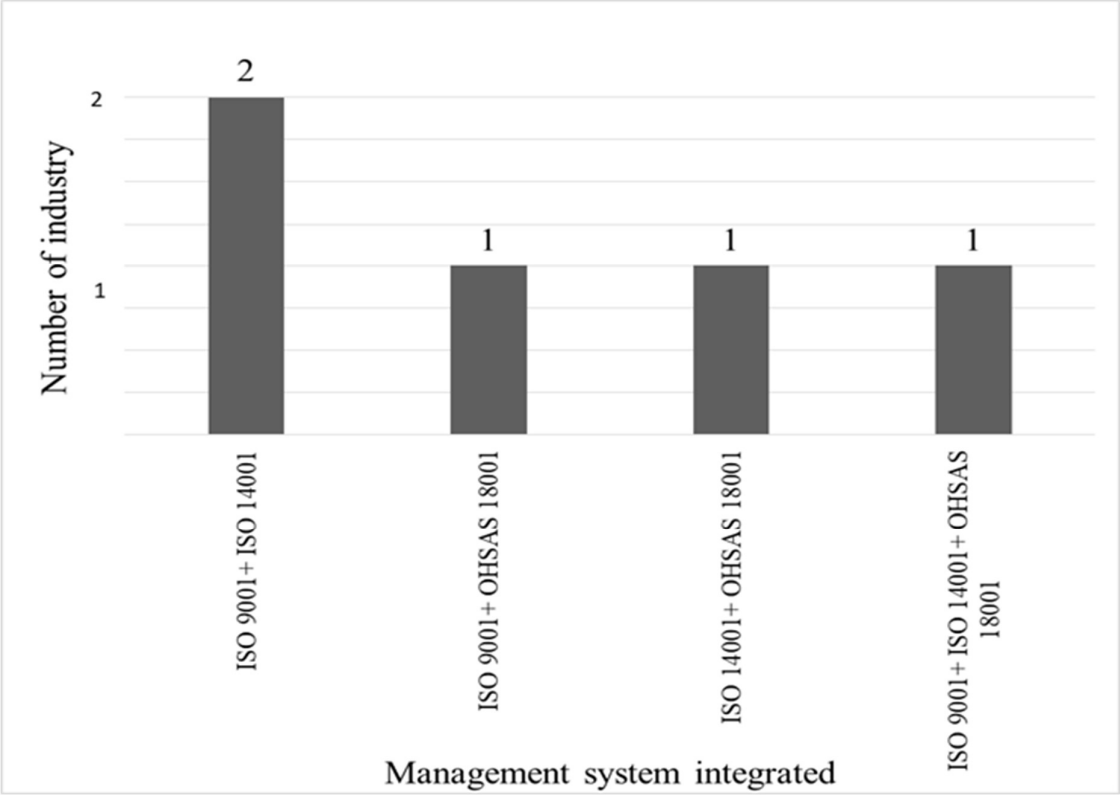

Figure 5.8 Number of surveyed RMG industries that have adopted integrated management system

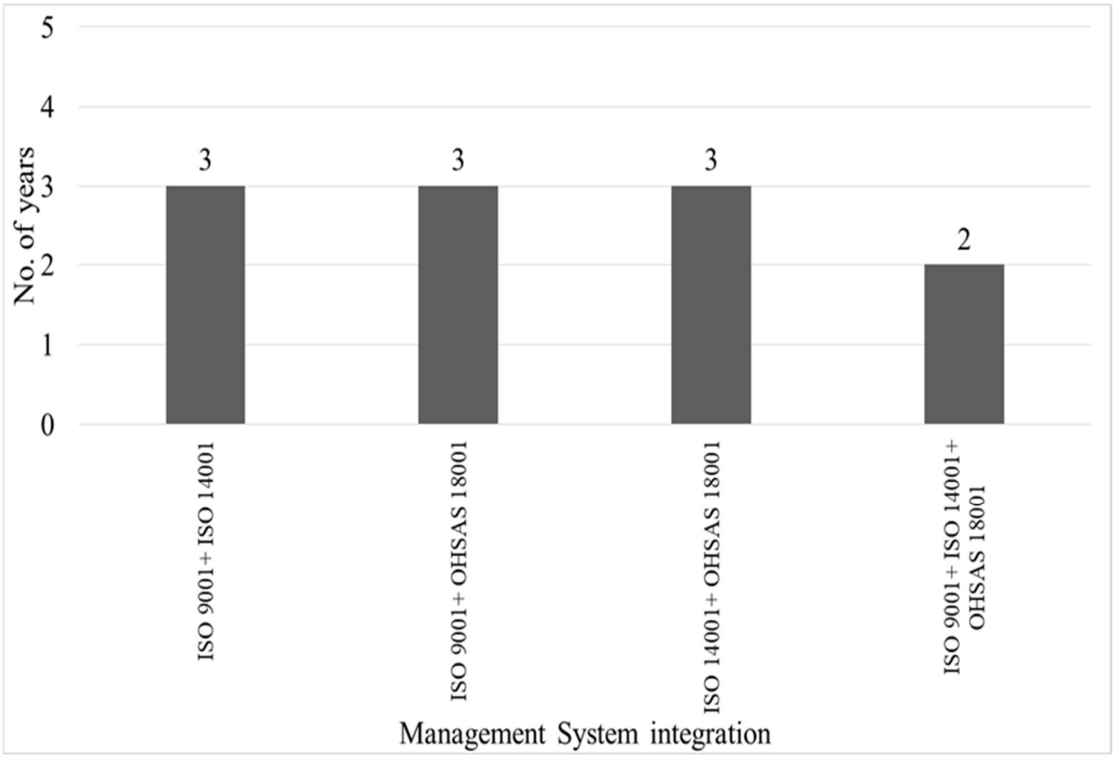

Figure 5.9 Adoption of integrated management system in surveyed RMG industries

Adoption of TQM in RMG Industries

In order to know the progress of TQM implementation in the surveyed industries, respondents are requested to provide information on TQM implementation status in their (respondent) industries. The details of the survey results are presented in Figure 5.10. It reveals that, out of 5 industries TQM is fully implemented only in one industry. Rests of the industries are in the process of TQM implementation. From this survey analysis, it can be concluded that, most of the RMG industries in Bangladesh are in the process of TQM implementation. As our integrated management system (ITQM system) is developed based on TQM philosophy and has been designed to implement using TQM framework, adoption of such ITQM system will be easier for those RMG who are in the process of TQM implementation.

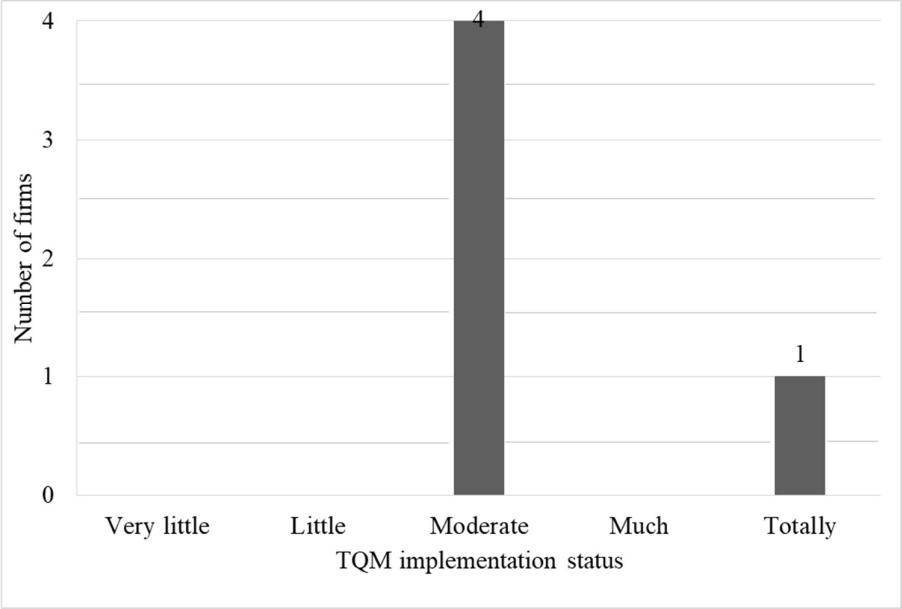

Figure 5.10 Adoption of TQM in surveyed RMG industries

Reasons for IMS Implementation

Respondents were asked to provide details on the purpose for integrating multiple management standards in RMG Industries of Bangladesh. According to 60% of respondents, RMG industries are trying to integrate multiple management systems to increase firm performance in different management disciplines such as quality, environment, occupational health and safety. Similarly, 25% of respondents think that industries are trying to integrate management systems to improve organizational culture. On the other hand, 10% and 5% of respondents think that the reasons for management system integration are to make optimum use of resources and for better information sharing among the management sub-systems respectively. The reasons identified from survey for management system integration is presented in Figure 5.11.

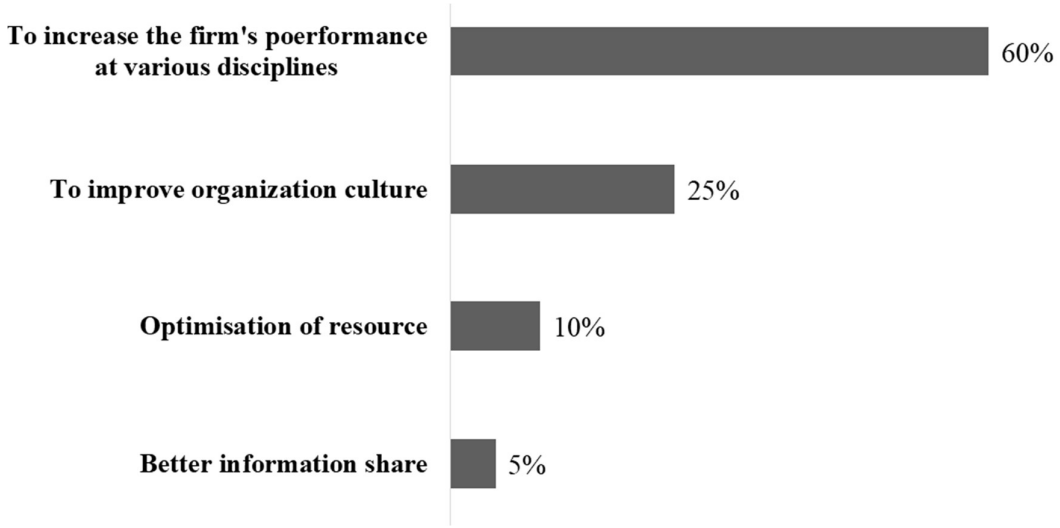

Figure 5.11 Reasons for management system integration in RMG industries of Bangladesh

5.4.7.2 Quantitative Analysis

Data collected through the second section of questionnaires are quantitative in nature. Partial least square-structural equation modeling (PLS-SEM) method is used to analyze these data. As stated in section 2.6, this method is suitable for small number of data and there is no need to check the normality of data for this method. The measurement model and the structural model have already been derived from the conceptual model using PLS-SEM method which is shown in Figure 5.6. The PLS-SEM method first validates the measurement model and then validates the structural model. The following paragraphs will describe the validation of these models.

Validation of Measurement Model

The first step of validation of measurement model is to check the reliability of measurement scale used for observed variables. The second step is to check the accuracy of the measurement scale. The third steps is to calculate the loading and cross loading values of observed variables. The details of these steps are described in the following paragraphs.

Step-1: Reliability of Measurement Scale

Reliability of a measure is important in any statistical analysis while measuring multiple variables. Reliability reflects the consistency of a variable what is intended to measure. Cronbach Alpha is used to test the reliability of a measure. Cronbach Alpha expresses the average value of inter-correlation among the observed variables that are measuring the latent factors. Cronbach Alpha usually takes any value between 0 and 1 [193, 195]. Value closer to 1, reflects higher reliability. In

exploratory research, Cronbach Alpha value 0.6 is considered useable [193]. Cronbach Alpha value is evaluated for each latent variable. All values of Cronbach Alpha for each latent variable (ITQM management sub-systems and firm performance) are shown in Table 5.4. It is found that Cronbach Alpha values are greater than 0.6 which indicates measurement scale used in this study for conducting the survey is reliable.

Table 5.4 Coefficients of latent variables or constructs

	QMSS	**EMSS**	**OHSMSS**	**SRMSS**	**FP**
R-squared coefficients	--	--	--	--	0.221
Adjusted R-squared coefficients	--	--	--	--	0.209
Scale composite reliability (SCR)	0.769	0.919	0.779	0.817	0.860
Cronbach's alpha (α) coefficients	0.712	0.893	0.744	0.716	0.790
Average variances extracted (AVE)	0.502	0.695	0.523	0.576	0.560
Variance inflation factors (VIF)	1.112	1.215	1.280	1.388	1.123

Step-2: Accuracy of Measurement Scale

Accuracy of measure is also important in statistical analysis while measuring multiple variables. Accuracy of measuring scale is confirmed through convergent and discriminant validity tests. These tests are described in the following paragraphs.

Convergent Validity Test: It is an important method for verification of measurement scale's accuracy. In our measurement model, there are 25 observed variables and five latent variables. As each of the latent variable is estimated by a set of observed variables, these latent variables are also called parent latent variable of their corresponding observed variable set. Convergent validity test examines to what extent observed variables belong to their parent latent variables. Average Variance Extracted (AVE) and Scale Composite Reliability (SCR) are two important parameters to test convergent validity. In order to achieve convergent validity, values of AVE and SCR of each latent factor should be greater than or equal to 0.5 and 0.7 respectively [193]. The values of AVE and SCR of each latent factor is presented in Table 5.4. From this table, it shows that, all values of AVE and SCR are within the acceptable range. It indicates that, convergent validity has achieved.

Discriminant Validity Test: It is another significant method for verifying the accuracy of measurement scale. This validation method examines to what extent observed variables of a latent

variables are uncorrelated with other observed variables outside the corresponding parent latent variables. In other words, discriminant validity indicates, to what extent one latent variable is truly distinct from others. In order to check discriminant criteria, a discriminant validity matrix is constructed as shown in Table 5.5. Discriminant validity will be achieved only when no values under the diagonal element will be greater than the corresponding diagonal value (i.e, $\sqrt{\text{AVE}}$ for each latent factor) [193, 200].

Table 5.5 Discriminant validity matrix

	QMSS	**EMSS**	**OHSMSS**	**SRMSS**	**FP**
QMSS	**0.709**				
EMSS	0.073	**0.834**			
OHSMSS	0.256	0.009	**0.723**		
SRMSS	0.112	0.390	0.324	**0.759**	
FP	0.216	0.075	0.226	0.089	**0.748**

From the above discussion, it can be concluded that, the measurement scale has confirmed both reliability and accuracy. It means that, measurement scale has a greater capability to capture latent variables. Now, PLS-SEM method will check whether all the latent variables have been correctly captured by their observed variables. The procedures for checking this criterion (latent variables have been identified from correct set of observed variables) is discussed in the following paragraph.

Step-3: Combined and Cross Loading of Observed Variables

PLS-SEM method calculates combined and cross loading values of all observed variables which is summarized in Table 5.6. In this table, latent factors are listed at the top of each column and observed variables are listed at the beginning of each row. This table highlights the higher loading of some observed variables on one latent variable compare to others. This indicates a clear link between observed variables and their corresponding latent variables. That means each latent variable has been identified from correct set of observed variables.

Table 5.6 Loadings (combined and cross) of variables

	QMSS	EMSS	OHSMSS	SRMSS	FP	SE-value	p-value
QMSS1	**0.522**	-0.129	-0.224	0.145	-0.090	0.057	<0.001
QMSS2	**0.738**	0.343	0.053	-0.234	0.006	0.055	<0.001
QMSS3	**0.640**	0.022	-0.013	0.236	-0.079	0.057	<0.001
QMSS4	**0.601**	-0.076	0.138	0.162	0.136	0.058	<0.001
QMSS5	**0.651**	-0.236	0.005	0.173	-0.076	0.057	<0.001
EMSS1	0.120	**0.799**	-0.017	0.14	-0.006	0.056	<0.001
EMSS2	0.069	**0.873**	-0.107	0.074	-0.109	0.054	<0.001
EMSS3	0.016	**0.847**	0.172	-0.256	0.23	0.055	<0.001
EMSS4	-0.109	**0.838**	-0.038	-0.139	-0.009	0.055	<0.001
EMSS5	-0.097	**0.810**	-0.009	-0.062	-0.027	0.055	<0.001
OHSMSS1	-0.006	-0.043	**0.801**	-0.721	0.41	0.055	<0.001
OHSMSS2	-0.002	0.046	**0.450**	-0.228	-0.041	0.059	<0.001
OHSMSS3	0.049	0.206	**0.706**	-0.201	-0.145	0.054	<0.001
OHSMSS4	0.070	0.063	**0.695**	0.307	-0.204	0.055	<0.001
OHSMSS5	-0.143	-0.325	**0.538**	0.051	-0.053	0.055	<0.001
SRMSS1	0.010	0.271	-0.143	**0.739**	-0.24	0.055	<0.001
SRMSS2	-0.191	-0.195	-0.290	**0.49**	-0.422	0.058	<0.001
SRMSS3	-0.051	0.014	-0.061	**0.63**	-0.088	0.056	<0.001
SRMSS4	0.064	-0.023	-0.067	**0.828**	-0.008	0.054	<0.001
SRMSS5	0.025	-0.154	0.465	**0.477**	0.49	0.058	<0.001
FP1	0.017	0.099	0.259	0.036	0.175	0.056	<0.001
FP2	-0.066	-0.220	0.085	-0.014	-0.006	0.054	<0.001
FP3	0.033	0.161	0.122	-0.139	0.05	0.054	<0.001
FP4	0.035	-0.158	-0.242	0.152	-0.332	0.055	<0.001
FP5	-0.023	0.213	-0.324	0.523	-0.387	0.059	<0.001

Validation of Structural Model

Next step is to validate the structural model. Structural model is shown in Figure 5.6. The first step of validation of structural model is to check the fitness of the model. The second step is to check

the correctness of the model. The details procedures for checking the fitness and correctness of the structural model are described in the following paragraphs.

Step-1: Checking the Fitness of Structural Model

Three parameters are used to check the fitness of the structural model. They are: Average Path Coefficient (APC), Average R-Squared (ARS) and Average Variance Inflation Factor (AVIF) [193, 194]. All the estimated and tolerance values of these parameters are shown in Table 5.7. The values in the table shows that, these are within the tolerable range. It is a good indication of better model fit. It means that, the model has a good explanatory power to interpret the maximum variance.

Table 5.7 Model fit index and Quality fit index

Indexes	Estimated Value	Tolerable range
Average path coefficient (APC)	0.199, $p<0.001$	$p<0.001$
Average R-squared (ARS)	0.221, $p<0.001$	$p<0.001$
Average block VIF (AVIF)	1.045	tolerable if ≤ 5, best ≤ 3.3

Step-2: Checking the Correctness of Structural Model

Causality assessment is an important method to check the correctness of the structural model. In this assessment method, three parameters are used to check the correctness of the model. They are: Simpson's Paradox ratio (SPR), R-Squared Contribution Ratio (RSCR) and Statistical Suppression Ratio (SSR) [193, 194]. All the estimated and tolerance values of these parameters are presented in Table 5.8. The values in the table shows that, all values are within the tolerate range. It is good indication of correctness of the structural model.

Table 5.8 Indexes of Causality assessment

Indexes	Estimated value	Tolerable range
Simpson's paradox ratio (SPR)	1.000	tolerable if >= 0.7, best = 1
R-squared contribution ratio (RSCR)	1.000	tolerable if >= 0.9, best = 1
Nonlinear bivariate causality direction ratio (NLBCDR)	0.75	tolerable if >= 0.7

5.4.8 Hypothesis Testing

Hypothesis Testing will validate the relationship between two latent variables (constructs). The relationship between the two latent variables is shown by a path in PLS-SEM method. It estimates the value of path relationship by path coefficient (β) and statistical significance of hypothesis test result (expressed by p-value). Path coefficient (β) can take any value between -1 to 1 [193]. Value closer to +1 indicates strong positive relationship among the latent variables. On the other hand, value closer to 0 indicates weaker relationship. The p-value determines the statistical significance of relationship between two latent variables. If the p-value is less than 0.05 (i.e., p-value is less than level of significance value), the relationship between two latent variables is statistically significant [193]. Hypothesizes along with their two parameter values (β and p-value) are presented in Table 5.9. The values in the table shows that, all hypotheses are statistically significant.

Table 5.9 Outcomes of hypotheses test

Hypothesis for assessment	Estimate	Outcomes
H1: Quality management sub-system of IMS has a positive relation with firm performance	β=0.20 at p<0.01	Supported
H2: Environmental management sub-system of IMS has a positive relation with firm performance	β=0.13 at p=0.01	Supported
H3: Occupational health & safety management sub-system of IMS has a positive relation with firm performance	β=0.14 at p=0.01	Supported
H4: Social responsibility management sub-system of IMS has a positive relation with firm performance	β=0.32 at p<0.01	Supported

Statistical analysis finally gives a conclusive model. It is shown in Figure 5.12. This conclusive model shows that, all four management sub-systems (QMSS, EMSS, OHSMSS and SRMSS) of ITQM system support firm performance improvement. That means, these four management sub-systems will support successful implementation of ITQM system.

5.5 Discussion on Findings

All four hypotheses are found statistically significant. An in-depth discussion on findings of hypotheses test is given in the following paragraphs.

First hypothesis is statistically meaningful ($p<0.01$), with a β coefficient of 0.20. This hypothesis suggests that, quality management sub-system of ITQM system has a great impact on quality problem identification and prevention. When the top management of an organization involves its employee in decision making. The employee will be encouraged. They will render their best effort to identify the root cause of quality problem. They will also help the management to take necessary steps for corrective and preventive actions accordingly. This corrective and preventive action will stop producing nonconforming product. This finding is also supported by previous studies [9, 10, 24, 38]. In other words, empowerment of employee, a TQM philosophy, can help ITQM system to improve firm performance in the field of quality. Therefore, it can be said that, ITQM quality management sub-system will contribute successful implementation of ITQM system.

For the second hypothesis, the β coefficient is 0.13, which is statistically substantial ($p=0.01$), thus suggest that, ITQM environment management sub-system has a significant impact on environment. With the help of TQM philosophy, environmental sub-system will help ITQM system to identify those business activities that are causing harm to environment. When the employees are motivated about their job responsibility, they will perform their job sincerely. As a result, environmental impact will be reduced significantly. This finding is also supported by previous studies [24, 37, 39, 171]. In other words, employee motivation, a TQM philosophy, can help ITQM system to improve firm environmental performance. Therefore, ITQM environmental management sub-system will contribute successful implementation of ITQM system.

Third hypothesis is also statistically significant ($p=0.01$), with a β coefficient of 0.14. This hypothesis suggests that, occupational health & safety management sub-system of ITQM system is helpful to establish healthy and safe working environment in an organization. With the help of TQM philosophy, this management sub-system will support ITQM system to arrange training for the employee regarding health and safety in occupation. Training will build health & safety awareness among the employee. It will play an important role to change the safety behavior of the employee. As a result, number of occupational illness and injury will reduce significantly. This finding is also supported by previous study [25, 26, 39]. In other words, employee training, a TQM philosophy, will help ITQM system to improve firm's occupational health & safety performance.

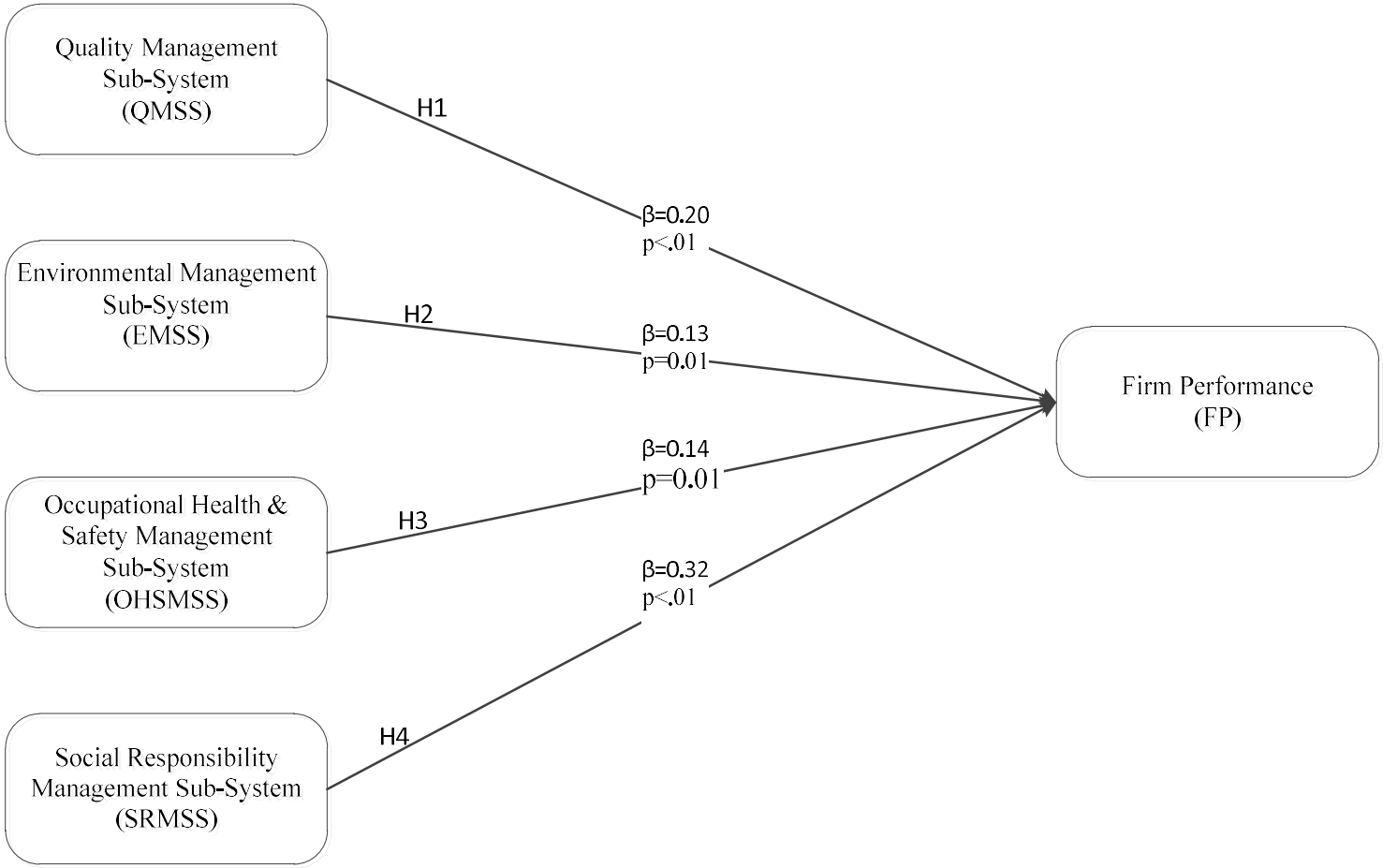

Figure 5.12 Conclusive model for validating the implementation framework of ITQM system

Therefore, ITQM occupational health and safety management sub-system will make its (ITQM system) implementation process successful.

For the fourth hypothesis, the β coefficient is 0.32, which is statistically significant ($p<0.01$). This hypothesis suggests that, social responsibility management sub-system of ITQM system is helpful to establish a socially responsible management practices in an organization. For example, SRMSS will provide an opportunity to ITQM system to introduce a socially responsible labor practice in the organization (e.g. regular payment, job security, no wage discrimination etc.). SRMSS will also provide an opportunity for continuous community development (i.e., employment creation, providing health service to community, providing skill development training etc.). The above-mentioned management practices will help an organization to improve firm performance continuously. This finding is also supported by previous study [21, 32, 35, 40]. In other words, continuous improvement philosophy of TQM will help ITQM system to improve firm's social performance. Therefore, SRMSS will contribute successful implementation of ITQM system.

CHAPTER 6

Conclusion, Recommendation and Future Scope of Study

6.1 Summary

Business environment is changing faster than ever before. Every business enterprise conducts its business in a complex, unpredictable and challenging business environment. To survive and to grow within this volatile business environment, the business enterprises have no other choice but to improve their performance. Various types of individual management system are used to increase the performance of a firm in different business dimensions such as quality, occupational health & safety, environment, and social responsibility management. Some other management systems are also used to meet the requirements of the customer depending upon their requirements. As a result, the number of individual management system is increasing day by day as the requirements of customer varies from one to another. RMG industries of Bangladesh are also facing difficulties to implement and operate these individual management systems separately. The key challenge of running of multiple management systems is to split the total budget and human resource of an organization into the multiple management systems. Each management system will get a little amount of budget and human resource, which is not sufficient to implement a management system effectively and efficiently. Consequently, many of the objectives of individual management systems are often left unachievable due to its poor implementation. In addition, the performance of RMG industries in Bangladesh is declining in four disciplines of management. These are quality, environment, occupational health & safety, and social responsibility. Consequently, RMG industries of Bangladesh are losing their values to the customer and in the long run they may not be able to survive in the competitive market. In this context, RMG industries of Bangladesh are forced to adopt an integrated management system in their organizations. A small number of RMG industries of Bangladesh have come forward to develop an Integrated Management System (IMS) for their organizations. As they have no model for integration of management systems, they have built their own IMS based on common elements present in different management standards. The RMG industries of Bangladesh are not getting the desired benefit from their own developed IMS due to lack of developing organizational culture. It is essential to bring change in culture within an organization for successful implementation of any IMS. In order to bring change in culture within

the organization, multiple management systems are to be integrated under a holistic management system. It is evident from the literature that, TQM is a holistic management system [9, 37, 58] (Nadae et al., 2019; Rebelo et al., 2015; Wiengarten et al., 2017). This manifests the demand of developing a model that will be holistic in nature and can accommodate various management standards. In the present work, we developed an IMS by integrating different management systems under the philosophy of TQM. The IMS developed in this study is named as Integrated Total Quality Management (ITQM) system. While integrating multiple management systems in this way, several issues come up. Some of the most important issues are: i) identifying the scope and impact of integration, ii) identifying the factors that lead to success or failure of TQM implementation, and iii) developing and validating an effective implementation framework for ITQM system. The following paragraphs will summarize how each of the above issues were addressed in the present study.

To define the **scope of integration**, it is important to know which management standards are to be integrated to formulate an IMS so that every RMG industry of Bangladesh can use this IMS. To do so, we conducted a survey in RMG industries of Bangladesh. We have found that, RMG sector of Bangladesh are widely using four management standards such as ISO 9001: 2015, ISO 14001: 2015, OHSAS 18001: 2007, and SA 8000: 2014. Most of the RMG industries of Bangladesh have adopted these standards separately while a small number of industries have adopted two or three of those management standards in an integrated way. However, no industry had integrated four management standards so far. It is important to mention that, the management standards that have not yet been integrated are operating separately in the respective industries. Each RMG industry of Bangladesh will be able to use an IMS if it is composed of commonly used management standards in this sector. In this context, the present study has integrated these four management standards under the holistic management philosophy of TQM. Integration of these four management systems creates a single comprehensive management system. This management system addresses a wide-ranging area encompassing the individual and overlapping areas of these four management systems. After defying the scope, it is important to evaluate the impact of integration.

To evaluate the impact of management systems integration, it is important to assess the impact in terms of improving firm performance. An in-depth review of literature has been conducted to identify the areas where an IMS can improve firm performance. Several researchers pointed out that IMS may enhance the performance of a firm both in financial and operational areas of business. But few empirical evidences were found in the literature in favor of these statements.

IMS may increase the financial performance of a firm in many ways. Three most important ways of improving financial performance widely discussed in the literature are; improving cost efficiency, optimum use of resources, and increasing sales revenue. On the other hand, IMS may increase the operational performance of a firm in the field of quality, environment, occupational health & safety, and social responsibility. The most important ways to increase firm performance in these fields are; to reduce the production rate of defective product, air pollution level, number of occupational illness and to increase the employment opportunity for the community. The present study conducted an empirical examination to confirm the impact of ITQM system on financial as well as operational performance of a firm. The outcome of empirical examination showed that ITQM system can improve financial performance through increase of sales revenue. It can also improve operational performance by reducing the number of defective products, level of air pollution, number of occupational accident or illness, and by creating new job opportunities for local people. After define the scope and assessing the impact of integration, it is necessary to recognize the factors that are critical to the implementation of ITQM system.

As we are trying to implement ITQM system using TQM framework, it is important to identify those factors which are critical to TQM implementation in RMG sector. Critical factors are of two kinds. Some factors enable TQM implementation while some others hinder TQM implementation. An in-depth review of literature has been conducted to identify the factors which are helpful for successful implementation of TQM in this sector. These factors are known as TQM enabling factor. Twenty-five of such factors were identified from TQM literature. As these enabling factors are contextual, it was empirically examined which of these factors are significant for the RMG industries of Bangladesh. The empirical study was carried out in four steps. At first step, the conceptual model which consists of measurement model and structural model was developed. In second step, the hypotheses were developed. In third step, the validation of the measurement and structural model were performed. And finally, the testing of hypothesis was conducted. More specifically, the conceptual model consists of six constructs. Five of them were formulated with five groups of TQM enabling factors such as human resources, contextual, procedural, strategic, and structural while the rest was formulated with implementation of TQM. In addition, the measurement model had two measuring scales. The first scale is concerned with measuring the five groups of TQM enabling factors while the other scale is concerned with measuring the success of TQM implementation. Five groups of TQM enabling factor are measured in terms of degree to which enabling factors are contributing to implement TQM principles in an organization. The success of TQM implementation is measured in terms of improving financial and operational performance of a firm. A questionnaire was then developed based on previous questions in the

literature and expert opinion. This questionnaire was pilot tested before conducting the survey. The reliability of questionnaire was tested by Cronbach alpha value. The accuracy of the measurement model was verified through convergent as well as divergent validity test. The structural model represents the causal relationship of five groups of TQM enabling factors with implementation of TQM. Fitness and correctness of structural model were checked through model fit index and causality index respectively. All tested values were found satisfactory. Finally, the hypotheses were tested using structural equation modelling. The test results suggested that, five TQM enabling factors in procedural group such as benchmarking of current processes, knowledge about cost of quality, regular monitoring of processes improvement, and degree of simplicity of a process are not significant for RMG industries of Bangladesh. However, the enabling factors of the remaining four groups will assist in successful implementation of TQM in RMG sector.

To identify the factors that hinder the successful implementation of TQM in RMG sector, an in-depth review of literature was also conducted. These factors are known as TQM barrier. Twenty-five of such barriers were identified from the literature. All of these twenty-five barriers do not hinder TQM implementation in the same way. Some of the barriers may be more critical to TQM implementation while some others are less critical. In other words, hindrance level of these TQM barriers varies with the economic condition and cultural values of a country. To identify the hindrance level of these twenty-five TQM barriers in the context of RMG industries of Bangladesh, these barriers were prioritized using FAHP technique. This study of prioritization of TQM barriers was carried out in five steps. At first step, a hierarchical structure of TQM barriers was developed. In second step, a fuzzy scale was designed for measuring the expert's judgement. In third step, the consistency ratio was estimated for checking the accuracy of expert opinion. In fourth step, the local and global weight of each barrier was estimated. And finally, TQM barriers were prioritized based on calculated global weights. Some of the important barriers identified by prioritizing of TQM barriers are; inappropriate planning for implementation, lack of financial support, lack of employee training, lack of empowerment of employees, lack of physical resources, lack of top management commitment, lack of practicing a quality management system, inappropriate organizational structure, lack of customer satisfaction, no benchmarking of current process, etc.

Finally, a framework for implementation of the ITQM system was developed. The implementation framework was empirically tested in order to decide if this framework would work properly in the RMG sector of Bangladesh. This empirical study had four hypotheses. All hypotheses were found statistically significant. It indicates that all four management sub-systems

of ITQM system will help a firm to improve its performance. In other words, the proposed framework could be used to implement the ITQM system successfully in RMG sector.

6.2 Conclusions

This study was conducted to develop an integrated management system (ITQM system) for RMG sector of Bangladesh as well as proposed a framework for its successful implementation. To develop such management system, this study used holistic management philosophy of TQM to accommodate different management standards. Doing so, the ITQM system will ensure cultural change within the organization. This change in culture will help the organization to work together as a team for successful implementation of ITQM system. The validity of the implementation framework of ITQM system shows that the proposed framework is capable to successfully implement ITQM system. More specifically, the following conclusions might be drawn from this study:

i. There is a promising scope to integrate four management standards such as ISO 9001: 2015, ISO 14001: 2015, OHSAS 18001: 2007, and SA 8000: 2014 under TQM framework in RMG sector of Bangladesh.
ii. The study developed an integrated management system named as ITQM system and an implementation framework for ITQM system by integrating aforementioned four management standards under TQM philosophy.
iii. To implement ITQM system successfully, this study identified that there are four groups of TQM enabling factors such as human resources, contextual, strategic, and structural that will play a significant role. But procedural enabling factors has no influence on successful implement of ITQM system in RMG industries.
iv. This study also identified that there are five major barriers of TQM that hinder ITQM implementation in RMG sector of Bangladesh. These are inappropriate planning for implementation, lack of financial support, lack of employee training, lack of empowerment of employees, and lack of physical resources.
v. To overcome the first obstacle of ITQM implementation (i.e., inappropriate planning for implementation), it is essential to assess the current strengths and weaknesses of an organization before formulating an action plan for implementation of ITQM system. To resolve the second obstacle (i.e., lack of financial support), it is important to assess the minimum amount of financial resources required to finalize an implementation plan for ITQM system. In order to overcome third obstacle (i.e., lack of employee training), there should be a permanent training cell inside the organization for arranging training facilities for the

employee by assessing the training need regularly. To overcome the fourth obstacle (i.e., lack of empowerment of employees), employees should be given a certain degree of autonomy to manage their daily activities. To resolve the fifth obstacle (i.e., lack of physical resources), it is essential to assess what kind of physical resources (e.g., machine, equipment, space, etc.) is required to finalize an implementation plan for ITQM system.

vi. The proposed implementation framework of ITQM system is capable to successfully implement ITQM system in RMG industries of Bangladesh.

vii. RMG industries will be able to improve their firm performances by implementing the ITQM system. It has a positive impact on firm performance. It can improve not only the operational performance of a firm but also its financial performance. The areas in which the ITQM system can improve the operational performance of a firm are: rate of production of defective product, level of air pollution, number of occupational accident or illness, and creating employment opportunities for local people whereas the area in which the ITQM system can improve the financial performance through increasing sales revenue (revenue generation through addition sales).

6.3 Theoretical Implications

The outcome of the present study will add value to the existing literature in many ways. Some theoretical implications of this study are listed below:

i. As far as knowledge goes, little study has been conducted to identify the linkage between IMS and TQM. Present study has successfully identified the linkage between IMS and TQM. In this context, present study can contribute a lot to the existing literature.

ii. Many researchers have pointed out that, IMS implementation typically fails due to poor concentration on cultural change within the organization. The present study has correctly addressed this gap by integrating multiple management system under the philosophy of TQM as the continuous improvement philosophy of TQM will help to bring cultural change within the organization.

iii. So far, little study has been conducted to identify the impact of IMS on firm performance. Present study has explored the combined impact of multiple management systems on firm performance. In this context, this study has made a significant contribution to the current literature.

iv. The present study offers an important insight into the development of an instrument (survey tool) for measuring several aspects of an integrated management system.

v. Several researchers have opined that common sharing of resources and information might bring better synergies among the multiple management systems. The present study has outlined the way to share common resources of the organization by combining the operational processes of different management sub-systems of ITQM system or its parts.

6.4 Managerial Implications

The findings of this study are intended to be useful for managers and other practitioners who are responsible for managing business operations. Some managerial implications that come from the present study are listed below:

i. Outcome of the present study provides an important insight into the impact of management sub-systems of ITQM system on firm performance. This outcome will help the manager to understand the role of each management sub-system on firm performance improvement.

ii. Managers will get an opportunity for better utilization of limited resources of their organizations through successful implementation of ITQM system.

iii. The management system integration process referred in this study highlights a mechanism for handling the overlapping areas of the different management disciplines.

iv. This study provides an immense scope to RMG industries of Bangladesh to adopt ITQM model in their organizations without any major modification.

6.5 Recommendations to Implement ITQM System in RMG Sector of Bangladesh

The present study has developed an ITQM system and its implementation framework for RMG industries of Bangladesh. To ensure fruitful implementation of ITQM system, this study has been made some recommendations. These recommendations are equally important for both RMG industries who are planning to implement IMS and who are in the process of IMS implementation in their organizations. These are listed below:

i. Top managements should have strong commitment to establish an integrated management system in their organizations. They will ensure timely supply of organizational resources (manpower and finance) to perform activities to achieve objectives. Top management will form a steering committee to look after all issues related to ITQM system. Steering committee will take decision on behalf of the top management.

ii. Unified policy and objective of ITQM system need to be clearly defined and documented in a common ITQM manual. The policy shall contain clear commitment of performance improvement in all management sub-systems of ITQM system. Objectives should be set in-line with ITQM policy. Policy and objective must be well communicated within the organization and stakeholders as necessary.
iii. ITQM system should perform all its activities through team work. A combined responsibility and authority for each team shall be defined and well communicated within the organization.
iv. All management procedures and operational processes (either common or function specific) should be included in the manual of ITQM system. All forms, work instructions, and process standards of ITQM system shall be included in the same manual.
v. To evaluate the overall performance of ITQM system, environment, health & safety, social responsibility, and quality performance data need to be collected and analyzed.
vi. Key Performance Indicators (KPIs) should be set as a milestone for assessing the improvement of process performance of ITQM system.
vii. Unified audit system should be established for ITQM system.
viii. Regular assessment should be carried out to determine the level of compliance achieved.
ix. Management review process shall recommend necessary corrections and opportunities for further improvement. These recommendations shall be prioritized and incorporated in the process modification.
x. A massive change in culture within the organization should be developed. It needs to be initiated from top management. The top management will then motivate all other employees towards management system integration and its implementation.

6.6 Scope of Future Study

This study was conducted in RMG industries of Bangladesh. We conducted the study with utmost care and sincerity but still it is not beyond some limitations. There are some unaddressed areas of the present research problem which can be performed in future research. Some suggestions for future study are listed below:

i. To generalize the findings of the present study, replication of this study could be made in different context, location, and culture.
ii. This study could be replicated over longitudinal time frame to examine whether the finding of the current study could change over time.
iii. Relationship among the four management sub-system of ITQM system has not shown in the present study. There is a future scope to explore the relationship.
iv. Future study could incorporate different organizational theories in management system integration. It could be a biggest breakthrough for the further research.

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ANNEXURE-1

Sample Questionnaire for Research

This study is being carried out to find the enabling factor of TQM implementation. The information collected would be used for academic purposes only. Your cooperation would be a great help.

Survey on TQM Practices in RMG Industry

Section-A (Top management only)

General Information of the industry

Name ……..……
Designation……
Name of the Organization…….
Address……
Telephone……
E-mail……..……

Please answer/give tick mark to the following questions that you know:

1. Is TQM a guiding philosophy in your organization? Yes/No
2. How many years ago TQM was started?
   (a) less than a year (b) less than 3 years (c) recently started (d) Others, if any write down
3. How long is this quality program been practiced in the company?
   (a) less than 3 years (b) less than 5 years (c) recently got certificate (d) Others, if any write down
4. Quality issues are reviewed in management meeting
   (a) regularly (b) sometimes (c) not at all
5. Quality issues are reviewed in management meeting
   (a) regularly (b) sometimes (c) not at all
6. Does your company have formed a steering committee for TQM implementation? Yes/No
7. Please indicate quality tools used in your organization (for continuous improvement
   (a) 5 S Activities (b) Kaizen Activities (c) Suggestion Scheme (d) Pareto Diagram (e) Scatter Plot (f) Run Chart (g) Benchmarking (h) SPC (i) Brainstorming (j) TPM (k) PERT/CPM (l) FBD (m) PDCA Circle (n) BPR (o) Quality Function Deployment (p) FMEA (q) Control Chart (r) Six Sigma (s) Histogram
8. How much time does the top management spend on managing quality improvement activities?
   (a) less than 5 per cent of each working week (b) less than 10 per cent of each working week (c) Others, if any write down

9. Training is organized and evaluated at regular interval depending on training needs Yes/No
10. Is TQM implementation plan developed based on organization's strength and weakness? Yes/No
11. Is there any quality mission, vision, policy and objectives for the organization? Yes/No
12. Is there any staff performance appraisal system in the organization? Yes/No
13. Can you manage your daily activity by your own decision? Yes/No
14. Is TQM implementation plan developed based on organization's available financial and physical resources? Yes/No
15. Does your organization have any customer feedback system? Yes/No
16. Please indicate the recruitment policy of your organization

    (a) long term (b) short term (c) Others,if any write down

Questionnaire ID: _____

This study is being carried out to gain insight about management/employee's perception on enabling factor of TQM implementation. The information collected would be used for academic purposes only. Your cooperation would be a great help.

Section-B

Please give tick marks to the number to indicate your preference that best describes the firm's situation (here, 5 scale measurements are used. where 1=Strongly Disagree, 2=Disagree, 3= Neither Agree nor Disagree, 4=Agree, 5=Strongly Agree):

Sl no	Questionnaires	Score				
		1	2	3	4	5
1	Employees are actively involved in decision making to solve problem					
2	Employees in your organization are trained on TQM or quality management systems					
3	In your organization employees accept culture changes					
4	Your organization encourages teamwork to solve problems					
5	Your organization has an effective staff performance appraisal system					
6	Your organization monitor/reviews the current processes regularly					
7	Your organization has cross-functional teams					
8	Various departments in your organization actively participate in monitoring/ reviewing the current process					
9	Your organization has clear statements of quality policies and objectives to ensure effective quality management systems					
10	Your organization has an effective communication system among departments					
11	All processes in your organization are simple and easy to control					
12	Your organization pays more attention to processes improvement					
13	Process control is effective in your organization					
14	Most of the employees in your organization are aware of the cost of poor quality					
15	Your organization performs benchmarking regularly					
16	Top management always emphasizes on the importance of quality					

Sl no	Questionnaires	Score				
		1	2	3	4	5
17	Leaders motivate the people to establish a quality perfection culture within the organization					
18	Management has a responsibility to set quality mission and vision for the organization					
19	Evolution of quality perfection culture is not affected by mid and low-level management turnover					
20	The organization regularly seeks customer input to identify their needs					
21	The structure of your organization is simple and flexible					
22	Sufficient physical resources are provided to help the organization run quality management system effectively					
23	In your organization, the quality management system is successfully implemented because of effective communication					
24	Sufficient funds are provided to help the organization run quality management system effectively					
25	Rework is usually done in your organization					

Section-C

Please give tick marks to the number to indicate your preference that best describes the firm's performance improvement (here, 5 scale measurements are used. where 1=Strongly Disagree, 2=Disagree, 3= Neither Agree nor Disagree, 4=Agree, 5=Strongly Agree):

Sl. no	Questionnaires	Score				
		1	2	3	4	5
26	Customer satisfaction has increased					
27	Employee satisfaction has increased					
28	Quality of the product has increased					
29	Amount of employee involvement has increased					
30	Information sharing has increased					

Survey on Integrated Management System Practices in RMG sector of Bangladesh

SECTION 1

Part A: General Information - Organization Background

1. What is the approximate number of employees in your organization?

   ☐< 50 ☐ 51 – 150 ☐ 151 – 250 ☐> 250

2. How many years have your organization been established?

   ☐< 5 years ☐ 5 to 10 years ☐> 10 years but less < 15 years ☐> 15 years

3. Which of the following management systems is/are present in your organization?

   ☐ ISO 9001 ☐ISO 14001 ☐OHS 18001 ☐SA 8001

   ☐ Others. Please specify _____

4. Which of the following management systems are integrated in your company?

   ☐ ISO 9001 ☐ISO 14001 ☐OHS 18001 ☐SA 8001

   ☐ Others. Please specify _____

5. How many years have your organization been involved in operating the management standards?

   ISO 9001____ years ISO 14001____ years OHS 8001____ years SA 8001____ years

   ☐ Others. Please specify _____

6. To what extent you are familiar with the concept of **Integrated Management System (IMS)**? (1 = very little, 2 = little, 3 = moderate, 4 = much, 5 = very much/fully)

   ☐1 ☐2 ☐ 3 ☐ 4 ☐ 5

7. Please indicate, in general, the approximate capital (machine, equipment, etc.) size of your organization.

   ☐ 1 million –5 million US$ ☐ 5 million –10 million US$

   ☐ 10 million –50 million US$ ☐ > 50 million US$

8. How many years have your organization been involved in operating integrated management standards?

   ☐1 ☐2 ☐ 3 ☐ 4 ☐ 5 ☐ Others. Please specify _____

9. Which of following components are found integrated in your organization? *(You can tick in more than one box)*

   ☐Management review ☐Internal audit ☐Control of non-conformities ☐ Performance measurement and monitoring ☐Document and data control ☐Management of preventive and corrective action ☐External audit ☐Manual ☐ Policy ☐ Others. Please specify _____

10. To what extent your organization has implemented **Total Quality Management (TQM) System**? (1 = very little , 2 = little , 3 = moderate , 4 = much , 5 = totally implemented)

☐1 ☐2 ☐3 ☐4 ☐5

11. What your experience say management system integration increases the scope of a management system.

☐ only in individual area ☐ both in individual and overlapping areas ☐ No effect

SECTION 2

Part A: Conceiving the practice of Total quality management (TQM) philosophy in different international management standards and its current implementation status

Management Leadership and Commitment *Please indicate the extent to which your organization is going to practice/already implemented the*					
	Not at all	A little	Moderately	Much	A great deal
Top management is committed to establish integrated management system (IMS) in the organization.	1	2	3	4	5
Top management set the policy, objective(s), and key performance indicator (KPIs) for integrated or individual management system (e.g., Quality, Environment, occupational health & safety, social responsibility management system) clearly and adequately.	1	2	3	4	5
They communicated the above things to others.	1	2	3	4	5
Top management inspires the employees to achieve the organization's KPIs and goals.	1	2	3	4	5
Top management is supportive for constant change and continuous improvement.					
Top management is visibly involved in different integrated management system.	1	2	3	4	5
Top management encourages involvement of all employees in different activities of integrated or individual management system	1	2	3	4	5
Top management provides technical and financial supports for different individual management systems or integrated management system.	1	2	3	4	5
Empowerment of Employees *Please indicate the extent to which your organization is going to practice/already implemented the following*					
	Not at all	A little	Moderately	Much	A great
Giving employees a broader range of tasks.	1	2	3	4	5
Giving employees more planning responsibility.	1	2	3	4	5
Foster trust values on employees.	1	2	3	4	5
Encourage to make a decision at field level.	1	2	3	4	5
Employee Involvement *Please indicate the extent to which your organization is going to practice/already implemented the following*					
	Not at all	A little	Moderately	Much	A great
Involving employee in decision making activities.	1	2	3	4	5
Involving employee in planning activities.	1	2	3	4	5
Involving employee in continuous improvement activities.	1	2	3	4	5

Involving employee in problem solving activities.	1	2	3	4	5
Training *Please indicate the extent to which your organization is going to practice/already implemented the following*					
	Not at all	A little	Moderately	Much	A great
A training unit/department has been established for the purpose of organizing and conducting training program.	1	2	3	4	5
All levels within the organization received training on TQM and other international management standards.	1	2	3	4	5
Training is organized and conducted at regular interval.	1	2	3	4	5
Training changes employees' perspective towards TQM and other international management standards practices.	1	2	3	4	5
Employees are trained for multi-skill tasks.	1	2	3	4	5
Organization sees training as an investment rather than a cost.	1	2	3	4	5
Human Resource Management *Please indicate the extent to which your organization is going to practice/already implemented the following*					
	Not at all	A little	Moderately	Much	A great
Provide long term employments (company holds its employees for a long time and does not replace them shortly)	1	2	3	4	5
Employee turnover during implementation of different international management standards or integrated management system.	1	2	3	4	5
Employees are rewarded for giving improvement suggestion	1	2	3	4	5
Employees are rewarded for giving cost reduction initiatives	1	2	3	4	5
Organizational Change *Please indicate the extent to which your organization is going to practice/already implemented the following*					
	Not at all	A little	Moderately	Much	A great
Employees are motivated to embrace change as an opportunity rather than a threat	1	2	3	4	5
Encouraging an environment of thinking continuous improvement.	1	2	3	4	5
Increasing the responsiveness of all the employees for change.	1	2	3	4	5
Teamwork *Please indicate the extent to which your organization is going to practice/already implemented the following*					
	Not at all	A little	Moderately	Much	A great
In our organization teams are formed to solve problems.	1	2	3	4	5
In our organization all team members share common goals and attitudes.	1	2	3	4	5
In our organization different tasks are performed by the teams.	1	2	3	4	5
In our organization many problems have been solved through team efforts.	1	2	3	4	5
In our organization team members' opinions and ideas are considered in decision making.	1	2	3	4	5

In our organization team has a lot of freedom to make change to work area.	1	2	3	4	5
In our organization team leaders are elected by their own team co-workers.	1	2	3	4	5
Continuous Improvement *Please indicate the extent to which your organization is going to practice/already implemented the following*					
	Not at all	A little	Moderately	Much	A great deal
In our organization teams are responsible in continuous process improvement.	1	2	3	4	5
Organization believes that strategic plan of continuous process improvement will bring competitive advantage for the organization.	1	2	3	4	5
We have formal continuous improvement program.	1	2	3	4	5
Continuous improvement is a high priority for us.	1	2	3	4	5
Employees at different levels are rewarded for best practices of continuous improvement.	1	2	3	4	5

Part B: Current implementation status of different international management standards.

Please indicate the level of implementation for any of the following practices in your organization					
Quality Management (*please do not answer to the questions of this section if you have not implemented Quality Management individually or integrated way*)	Almost not at all	A little	Moderately	Much	A great deal
Current Quality management policy is helpful to attain continuous quality improvement.	1	2	3	4	5
Quality objectives cover minimization of major quality related problems.	1	2	3	4	5
Quality management system has clearly assigned role, authority, responsibility for each function.	1	2	3	4	5
Fishbone diagram is used to identify causes of quality problems.	1	2	3	4	5
Statistical Process Control (SPC) techniques are used to monitor and measure reduction of process variation.	1	2	3	4	5
All quality monitoring and measurement records are commonly shared and are made available at point of use.	1	2	3	4	5
Operating procedures are updated in accordance with lesion learned from previous nonconformities in quality management system.	1	2	3	4	5
Organization reviews whither all quality procedures are implemented and maintained according to the policy.	1	2	3	4	5
Management review meeting can identify the current status of achievement of different quality objectives and can suggest necessary correction in policy, objectives, and procedures.	1	2	3	4	5
Environmental Management (*please do not answer to the questions of this section if you have not implemented Environmental Management individually or integrated way*)	Almost not at all	A little	Moderately	Much	A great deal

Present Environmental management policy is helpful to achieve environmental performance in all aspects (indoor and outdoor environment).	1	2	3	4	5
Environmental objectives cover mitigation of all environmental impacts (local, regional, and global)	1	2	3	4	5
Environmental management system has clearly assigned role, authority, responsibility for individual functions.	1	2	3	4	5
Organization is able to response all environmental emergency situations.	1	2	3	4	5
Key characteristics of effluent discharge, air emission, solid and hazardous waste are monitored and measured on regular basis.	1	2	3	4	5
All environmental monitoring and measurement records are commonly shared and are made available at point of use.	1	2	3	4	5
Operating procedures are updated in accordance with lesion learned from previous environmental nonconformities.	1	2	3	4	5
Organization reviews whither all environmental procedures are implemented and maintained according to the policy.	1	2	3	4	5
Management review meeting can identify the variation from currently set objectives and can suggest necessary correction in policy, objectives, and procedures	1	2	3	4	5
Occupational Health and Safety (OH&S) Management (*please do not answer to the questions of this section if you have not implemented Occupational Health and Safety individually or integrated way*)	Almost not at all	A little	Moderately	Much	A great deal
Present OH&S management policy is helpful to achieve better health and safety performance at work in all aspects.	1	2	3	4	5
Current OH&S objectives can reduce all negative impacts on human health and improve safety measures at work.	1	2	3	4	5
OH&S management system has clearly assigned role, authority, responsibility for each function.	1	2	3	4	5
Consequences of OH&S hazards (like work related injuries, incidents, ill health) are measured and analyzed on regular basis.	1	2	3	4	5
Work environment (layout, temperature, noise, humidity etc.) is monitored on regular basis.	1	2	3	4	5
Emergency response practices (fire drill) are performed on regular basis.	1	2	3	4	5
All OH&S monitoring and measurement records are commonly shared and are made available at point of use.	1	2	3	4	5
Organization reviews whither all OH&S procedures are implemented and maintained according to the policy.	1	2	3	4	5
Operating procedures are updated in accordance with lesion learned from (i.e., difficulties found in) previous emergency response practices.	1	2	3	4	5
Social Responsibility Management (*please do not answer to the questions of this section if you have not implemented Social Responsibility individually or integrated way*)	Almost not at all	A little	Moderately	Much	A great deal

Present social responsibility policy is helpful for increasing benefits on society in all aspects (social security, ecology, and facility).	1	2	3	4	5
Current objectives of social responsibility cover well-being of the society in all aspects (social security, societal health, and ecology).	1	2	3	4	5
The management system has clearly assigned role, authority, responsibility for each activity.	1	2	3	4	5
Organization determines whether the impacts of their business decision act in favour of societal well-being.	1	2	3	4	5
Organization evaluates whither all procedures of social responsibility are implemented and maintained according to the policy.	1	2	3	4	5
All records of socially responsible practices (regular payment, work load, no child labor, new job creation, expansion of community education, skills, and medical facility etc.) are commonly shared and are made available at point of use.	1	2	3	4	5
Social Responsibility Management (*please do not answer to the questions of this section if you have not implemented Social Responsibility individually or integrated way l*)	Almost not at all	A little	Moderately	Much	A great deal
Operating procedures are modified in accordance with feedback from monitoring activity social responsibility.	1	2	3	4	5
Management review meeting can identify the current status of achievement against social responsibility objectives and can recommend necessary correction.	1	2	3	4	5

Part C: Current status of performance achievement of different international management standards.

Performance achievement *(Please indicate the level of performance achievement for any of the following practices in your organization)*	Significantly increased	Somewhat increased	No Change	Somewhat decreased	Significantly decreased
After implementation of quality management system our defective production rate has	1	2	3	4	5
After implementation of quality management system our average outgoing quality level has	1	2	3	4	5
After implementation of environmental management system our air pollution level has	1	2	3	4	5
After implementation of environmental management system our water contamination level has	1	2	3	4	5
After implementation of OH&S management system number of work-related injuries has	1	2	3	4	5
After implementation of OH&S management system number of work-related illness has	1	2	3	4	5
After implementation of social responsibility management system our absenteeism rate has	1	2	3	4	5
After implementation of OH&S management system our work overload has	1	2	3	4	5

Part D: Intended goals on performance achievement of different international management standards

Performance achievement *(Please indicate the level of performance achievement for any of the following practices in your organization)*	No Change	25% from now	50% from now	75% from now	Elimination (100%)
We would like to reduce defective production rate at a level of	1	2	3	4	5
We need to improve average outgoing quality at a level of	1	2	3	4	5
Our intention is to reduce air pollution to a level of	1	2	3	4	5
We would like to reduce water contamination to an extent of	1	2	3	4	5
We need to reduce work related injuries to an extent of	1	2	3	4	5
Our intention is to reduce work related illness to a level of	1	2	3	4	5
We would like to reduce absenteeism rate at a level of	1	2	3	4	5
We need to reduce work overload to an extent of	1	2	3	4	5

Part E: Perception on ITQM system that can assist performance improvement of an organization in the field of quality, environment, occupational health & safety, social responsibility.

Please indicate the extent to which your organization conceived/practiced/implemented the following statements					
Quality Management Sub-System	Almost not at all	A little	Moderately	Much	A great deal
ITQM policy provides an integrated approach (considering the impacts of product and production process on human health and environment) which is helpful to attain continuous quality improvement.	1	2	3	4	5
ITQM policy is helpful to set measurable objectives for minimization of major quality related problems.	1	2	3	4	5
Clear assignment of role, authority, responsibility for each function in ITQM system is helpful for achieving quality objectives.	1	2	3	4	5
Integrated approach is helpful to identify all potential quality related problems.	1	2	3	4	5
Sharing of all records in ITQM system is helpful for preparing an effective plan for corrective and preventive actions.	1	2	3	4	5
An integrated approach of findings from previous quality nonconformities can help ITQM system to update operating procedures.	1	2	3	4	5
An integrated approach of conducting management review meeting based on shared data is helpful to attain continuous quality improvement.	1	2	3	4	5
Environmental Management Sub-System	Almost not at all	A little	Moderately	Much	A great deal
ITQM policy provides an integrated approach (considering the impacts of all activities on environment) which is helpful to improve environmental performance in all aspects (indoor and outdoor environment).	1	2	3	4	5
ITQM policy is helpful to set measurable objectives for minimization of major environmental impacts.	1	2	3	4	5

Clear assignment of role, authority, responsibility for each function in ITQM system is helpful for achieving environmental objectives.	1	2	3	4	5
Integrated approach is helpful to identify all potential environmental emergency situations and make plans accordingly.	1	2	3	4	5
An integrated approach for preparing corrective and preventive action plan will facilitate better environmental performance.	1	2	3	4	5
Sharing of all records in ITQM system is helpful for easy decision making.	1	2	3	4	5
An integrated approach of conducting management review meeting based on shared data is helpful for continuous improvement of different environmental issues.	1	2	3	4	5
Occupational Health and Safety (OH&S) Management Sub-System	Almost not at all	A little	Moderately	Much	A great deal
ITQM policy provides an integrated approach (considering the impacts of poor working environment and work stress on human health and safety) which is helpful to minimize all possible hazards and risks associated with OH&S.	1	2	3	4	5
ITQM policy is helpful to set measurable objectives for minimization of major risks associated with OH&S.	1	2	3	4	5
Clear assignment of role, authority, responsibility for each function in ITQM system is helpful for achieving OH&S objectives.	1	2	3	4	5
Integrated approach is helpful to identify all potential OH&S emergency situations and make plans accordingly.	1	2	3	4	5
Common sharing of all records in ITQM system is helpful to evaluate OH&S performance.	1	2	3	4	5
Lessons learn from previous emergency practices (an integrated approach) can help ITQM system to update operating procedure on regular basis.	1	2	3	4	5
Social Responsibility Management Sub-System	Almost not at all	A little	Moderately	Much	A great deal
ITQM policy incorporates an integrated approach (considering social security, ecology, and facility all together) which is helpful to provide benefits to the society.	1	2	3	4	5
ITQM policy is helpful to set measurable objectives for the well-being of the society in all aspects (social security, societal health, and ecology).	1	2	3	4	5
Clear assignment of role, authority, responsibility for each function in ITQM system is helpful to achieve objectives.	1	2	3	4	5
Sharing of all records in ITQM system is helpful to evaluate the attitude and commitment of an organization towards social well-being.	1	2	3	4	5
Lessons learn from previous monitoring activities on social responsibility can help ITQM system to update operating procedure on regular basis.	1	2	3	4	5
An integrated approach of conducting management review meeting based on shared data is helpful for continuous welfare of the society on different issues.	1	2	3	4	5

Part F: Business Performance of RMG factory

Financial Performance

Please indicate the level of improvement (perceived/ actual) in any of following metrics in your factory compared to 3 years ago

	Deteriorated more than 10%	Stayed about the same	Improved 10–30%	Improved 30–50%	Improved more than 50%.
Sales revenue of your organization has	1	2	3	4	5
Return on Asset (ROA) indicator of our organization has	1	2	3	4	5

Non-financial performance

Please indicate the level of improvement (perceived/ actual) in any of following metrics in your factory compared to 3 years ago

	Not at all	Little	Some	Greatly	Extremely
Defective production rate	1	2	3	4	5
Air pollution level	1	2	3	4	5
Water contamination level	1	2	3	4	5
No of occupational injuries has decreased	1	2	3	4	5
No of occupational illness has decreased	1	2	3	4	5
Employment rate of local people	1	2	3	4	5
Absenteeism rate has decreased	1	2	3	4	5

NB: Return on Asset (ROA)= $\frac{Operating\ income}{Total\ asset}$**,** Return to Scale (ROS) is a rate by which output increases relative to increase in input. Work over load is measured by employee's overtime record. Air pollution level is measured fromCO_2emission test report. No of occupational injuries is measured from injury record. Prolusion/ contamination level is measured from wastage water and air emission test report.

Part G: Benefits to Implement IMS

Statements *Please indicate the degree to which you experience/would expect to experience with the following benefits of IMS implementation*	No benefit	Minor benefit	Moderate benefit	Substantial benefit	Very substantial benefit
Eliminate redundancy among the management standards	1	2	3	4	5
Reduction of duplication efforts	1	2	3	4	5
Business sustainability	1	2	3	4	5
Better communication	1	2	3	4	5
Better relationship among stakeholders	1	2	3	4	5
Unification of audit	1	2	3	4	5
Better decision-making	1	2	3	4	5
Lowering the implementation and management cost	1	2	3	4	5
Improve productivity	1	2	3	4	5
Improve process performance	1	2	3	4	5
Organization's reputation improvement	1	2	3	4	5
Precise clarification of authority and responsibility	1	2	3	4	5
Better utilization of control records	1	2	3	4	5
Unification of external audit	1	2	3	4	5
Organization's collaboration improvement	1	2	3	4	5
Better employee motivation	1	2	3	4	5
Ability to add a new management standard	1	2	3	4	5
Compatibility improvement of management systems	1	2	3	4	5
Organizational culture improvement	1	2	3	4	5
Greater robustness and agility	1	2	3	4	5

Statements *Please indicate the degree to which you experience/would expect to experience with the following benefits of IMS implementation*	No benefit	Minor benefit	Moderate benefit	Substantial benefit	Very substantial benefit
Better alignment of objectives	1	2	3	4	5
Improvement of compliance legislation	1	2	3	4	5
Better utilization of creativity and innovation	1	2	3	4	5
Unification of training activities	1	2	3	4	5
Integrated risk management in business	1	2	3	4	5
Competent workforce	1	2	3	4	5
Optimum use of various resources (physical, economic, human).	1	2	3	4	5
Synergies of different management policies	1	2	3	4	5
Better capacity of achieving organization's objective	1	2	3	4	5

SECTION 3

Part A: Major Reasons of Implementing IMS

Please tick relevant factors which are best represent the major reasons that indicate your organizational aimed. (You can tick more than one answer)

No	Factors	(✓)
1.	Stakeholder's requirement	
2.	For marketing purpose.	
3.	Increasing the image of the organization	
4.	For improving information sharing.	
5.	For improving effectiveness of the process	
6.	For business sustainability.	
7.	Optimization of resources (physical, economic, human)	
8.	For reduction of duplication efforts.	
9.	For enhancing legal compliances	
10.	For minimization of ecological causality (accident)	
11.	Increasing firm performance at various management disciplines	
12.	Resources and time saving through audit unification	
13.	Bringing synergy at multi-levels (strategic, tactical, and operational)	
14.	For management cost reduction.	
15.	For better risk management	
16.	For better achievement of objectives	
17.	To reduce inter-departmental barrier	
18.	For reduction of bureaucracy in management system	
19.	For effective control of organizational structure	
20.	To improve organizational culture	
21.	Others, please specify:	

Part B: Understanding of IMS

Please tick relevant statements which are best represent your understanding regarding IMS. (You can tick more than one answer)

No	Statements	(✓)
1	Combining all related components	
2	Sequential implementation of management standards	
3	Tools and technique to improve operation	
4	Toyota Production System	
5	The integration of JIT, TQM and TPM	
6	Production planning and control system	
7	Total Management System	
8	Others. Please Specify:	

Part C: Understanding of TQM

Please tick relevant statements which are best represent your understanding regarding TQM. (You can tick more than one answer)

No	Statements	(✓)
1	Total Management System	
2	Continuous quality improvement	
3	Toyota Production System	
4	Tools and technique to improve process	
5	Employee empowerment	
6	Combining all related components	
7	Others. Please Specify :	

ANNEXURE-2

List of Experts

Experts	Designation	Address
Jiju Antony	Professor	Dept. of business management, Heriot-Watt University, Edinburgh, Scotland, UK
Gilberto Santos	Professor	Design School, Polytechnic Institute Cavado Ave, Barcelos, Portugal
Shamsuddin Ahmed	Professor	Dept. of Mechanical and Chemical Engineering, Islamic University of Technology, Dhaka, Bangladesh
Elizabeth A. Cudney	Professor	Engineering Management and Systems Engineering, Missouri University of Science and Technology, Rolla, Missouri, USA
Md. Mozibul Haque Arif	GM (Health & Safety)	Liz Fashion Industry Ltd. Sofipur, Gazipur, Dhaka. Bangladesh
Jogesh Chandra Shaha	Asstt. Manager (Safety)	Liz Fashion Industry Ltd. Sofipur, Gazipur, Dhaka. Bangladesh
Md. Hemayet Uddin	GM (Quality)	Liz Fashion Industry Ltd. Sofipur, Gazipur, Dhaka. Bangladesh
Md. Mominul Haque	Manager (Health &Safety)	Gildan Activewear Bangladesh Ltd. Ashulia, Savar, Dhaka, Bangladesh
Md. Farukul Islam	GM (Quality)	Gildan Activewear Bangladesh Ltd. Ashulia, Savar, Dhaka, Bangladesh

ANNEXURE-3

List of Companies trying to implement IMS

SL NO.	Name of the Companies	Region	Address
1.	Liz Fashion Industry Ltd.	Gazipur	Sofipur, Kaliakoir, Gazipur, Dhaka
2.	Gildan Activewear Bangladesh Ltd.	Savar	Palashbari, Ashulia, Savar, Dhaka
3.	FCI (BD) Ltd.	Savar	Dhaka EPZ, Ganakbari, Savar, Dhaka
4.	Epillion style Ltd.	Gazipur	Bahadurpur, Vhawal Mirzapur, Gazipur
5.	Green textile limited	Bhaluka	Bhaluka, Mymensingh
6.	Ever Smart Bangladesh Ltd.	Gazipur	Begumpur, Mirzapur, Gazipur
7.	Viyellatex Ltd.	Gazipur	Khairtul, Tongi, Gazipur
8.	Axis Apparels Ltd	Gazipur	Dager chala, Joydebpur, Gazipur
9.	Good Luck Fashion Ltd	Savar	Sayed Ali Mansion, Ashulia, Savar, Dhaka
10.	Local Boyz Fashion Ltd	Savar	Tongi EPZ road, Savar, Dhaka
11.	Divine Textile Ltd	Gazipur	Chandra, Kaliakoir, Gazipur

ANNEXURE-4

List of Companies surveyed

SL NO.	Name of the Companies	Region	Address
1.	Liz Fashion Industry Ltd.	Gazipur	Sofipur, Kaliakoir, Gazipur, Dhaka
2.	Gildan Activewear Bangladesh Ltd.	Savar	Palashbari, Ashulia, Savar, Dhaka
3.	FCI (BD) Ltd.	Savar	Dhaka EPZ, Ganakbari, Savar, Dhaka
4.	Epillion style Ltd.	Gazipur	Bahadurpur, Vhawal Mirzapur, Gazipur
5.	Green textile limited	Bhaluka	Bhaluka, Mymensingh

ANNEXURE-5

List of personal contacted for survey

Experts	Designation	Address
1.Sam Yu Sum	Asstt. Country Manager	Liz Fashion Industry Ltd. Sofipur, Gazipur, Dhaka. Bangladesh
2. Md. Abu Sayed	Director (Operations)	Liz Fashion Industry Ltd. Sofipur, Gazipur, Dhaka. Bangladesh
3.Md. Mobarak Hossain	Chief Commercial	Liz Fashion Industry Ltd. Sofipur, Gazipur, Dhaka. Bangladesh
4.Md. Shofiqul Islma	Director (Quality)	Liz Fashion Industry Ltd. Sofipur, Gazipur, Dhaka. Bangladesh
5.Md. Mominul Islam	Director (Compliances)	Liz Fashion Industry Ltd. Sofipur, Gazipur, Dhaka. Bangladesh
6.Md. Farhad Hossain	Director (Admin)	Liz Fashion Industry Ltd. Sofipur, Gazipur, Dhaka. Bangladesh
7.Md. Kawsar rahman	Director (Logistics)	Liz Fashion Industry Ltd. Sofipur, Gazipur, Dhaka. Bangladesh
8. Md. Morshed Alam	Chief Medical officer	Liz Fashion Industry Ltd. Sofipur, Gazipur, Dhaka. Bangladesh
9. Md. Wadud Sarkar	Director (Operations)	Gildan Activewear Bangladesh Ltd. Ashulia, Savar, Dhaka, Bangladesh
10. Shyamal Biswas	Director (Finance)	Gildan Activewear Bangladesh Ltd. Ashulia, Savar, Dhaka, Bangladesh
11. Mozasser Rahman	Director (Health & Safety)	Gildan Activewear Bangladesh Ltd. Ashulia, Savar, Dhaka, Bangladesh
12. Md. Solaiman	Director (Admin)	Gildan Activewear Bangladesh Ltd. Ashulia, Savar, Dhaka, Bangladesh
13. Md. Keshab Chandra	Chief Medical officer	Gildan Activewear Bangladesh Ltd. Ashulia, Savar, Dhaka, Bangladesh
14. Md. Tareq Hasan	Director (Operations)	FCI (BD) Ltd. Dhaka EPZ, Ganakbari, Savar, Dhaka
15. Md. Jamal Khan	Director (Finance)	FCI (BD) Ltd. Dhaka EPZ, Ganakbari, Savar, Dhaka
16. Md. Abdur Rahman	Director (Compliances)	FCI (BD) Ltd. Dhaka EPZ, Ganakbari, Savar, Dhaka
17. Md. Mahabubur Rashid	Chief Medical officer	FCI (BD) Ltd.

Experts	Designation	Address
		Dhaka EPZ, Ganakbari, Savar, Dhaka
18. Md. Mortoza	Security officer	FCI (BD) Ltd. Dhaka EPZ, Ganakbari, Savar, Dhaka
19. Md. Mostofa Kamal	Director (Operations)	Epillion style Ltd. Bahadurpur, Vhawal Mirzapur, Gazipur
20. Md. Razib Uddin	Director (Finance)	Epillion style Ltd. Bahadurpur, Vhawal Mirzapur, Gazipur
21. Md. Abdul Quddus	Director (Health & Safety)	Epillion style Ltd. Bahadurpur, Vhawal Mirzapur, Gazipur
22.Bhaskar Saha	Manager (Human resource)	Epillion style Ltd. Bahadurpur, Vhawal Mirzapur, Gazipur
23. Sayed kamrul hasan	Chief Medical officer	Epillion style Ltd. Bahadurpur, Vhawal Mirzapur, Gazipur
24.Md. Ahsanul Hasan	Asstt. Country Director	Green textile limited Bhaluka, Mymensingh
25. Md. Nurul Islam	GM (Operations)	Green textile limited Bhaluka, Mymensingh
26. Md. Raihanul Kabir	GM (Finance)	Green textile limited Bhaluka, Mymensingh
27. Md. Alauddin Al Azad	GM (Compliances)	Green textile limited Bhaluka, Mymensingh

ANNEXURE-6

Pilot Test of TQM Questionnaire for Survey

Description of each construct items	Cronbach's Alpha
Employees are actively involved in decision making to solve problem	0.870
Employees in your organization are trained on TQM or quality management systems	0.869
In your organization employees accept culture changes	0.868
Your organization encourages teamwork to solve problems	0.872
Your organization has an effective staff performance appraisal system	0.873
Your organization monitor/reviews the current processes regularly	0.875
Your organization has cross-functional teams	0.871
Various departments in your organization actively participate in monitoring/ reviewing the current process	0.872
Your organization has clear statements of quality policies and objectives to ensure effective quality management systems	0.867
Your organization has an effective communication system among departments	0.868
All processes in your organization are simple and easy to control	0.869
Your organization pays more attention to processes improvement	0.866
Process control is effective in your organization	0.865
Most of the employees in your organization are aware of the cost of poor quality	0.864
Your organization performs benchmarking regularly	0.870
Top management always emphasizes on the importance of quality	0.872
Leaders motivate the people to establish a quality perfection culture within the organization	0.869
Management has a responsibility to set quality mission and vision for the organization	0.872
Evolution of quality perfection culture is not affected by mid and low-level management turnover	0.870
The organization regularly seeks customer input to identify their needs	0.873
The structure of your organization is simple and flexible	0.871
Sufficient physical resources are provided to help the organization run quality management system effectively	0.875
In your organization, the quality management system is successfully implemented because of effective communication	0.876
Sufficient funds are provided to help the organization run quality management system effectively	0.874
Rework is usually done in your organization	0.868
Customer satisfaction has increased	0.870
Employee satisfaction has increased	0.868
Quality of the product has increased	0.871
Amount of employee involvement has increased	0.873
Information sharing has increased	0.872

ANNEXURE-7

Pilot Test of Questionnaire for Survey of ITQM System

Description of each construct items	Cronbach's Alpha
ITQM policy is helpful to set measurable objectives for minimization of major quality related problems.	0.860
Integrated approach of findings quality nonconformities can help ITQM system to update operating procedures.	0.861
Sharing of all records in ITQM system is helpful for preparing an effective plan for corrective and preventive actions.	0.861
Top management is committed to establish integrated management system in the organization	0.852
Clear assignment of role, authority, responsibility for each function in ITQM system is helpful for achieving quality objectives	0.854
ITQM policy is helpful to set measurable objectives for minimization of major environmental impacts	0.855
Integrated approach is helpful to identify all potential environmental emergency situations and make plans accordingly	0.853
An integrated approach for preparing corrective and preventive action plan will facilitate better environmental performance	0.848
Top management encourages to make a decision at field level	0.853
Involving employee in continuous improvement activities	0.851
ITQM policy is helpful to set measurable objectives for minimization of major risks associated with OH&S	0.848
Integrated approach is helpful to identify all potential OH&S emergency situations and make plans accordingly	0.846
A training unit/department has been established for the purpose of organizing and conducting training program.	0.846
Lessons learn from previous emergency practices (an integrated approach) can help ITQM system to update operating procedure on regular basis.	0.845
Employees are rewarded for giving improvement suggestion	0.846
ITQM policy is helpful to set measurable objectives for the well-being of the society (maintaining social security, societal health, and ecology)	0.845
Sharing of all records in ITQM system is helpful to evaluate the attitude and commitment of an organization towards social well-being	0.846
Conducting management review meeting based on shared data is helpful for continuous welfare of the society on different issues.	0.844
Employee turnover hampers the implementation of individual management system or integrated management system	0.847
Continuous improvement is a high priority in the organization	0.844
Sales revenue of your organization has deteriorated extremely /deteriorated little/ stayed same/ improved little/ improved greatly	0.847
Defective production rate has improved not at all/ little/ same/ greatly/ extremely	0.846
Air pollution level has improved not at all/ little/ same/ greatly/ extremely	0.846
No of occupational illness has decreased not at all/ little/ same/ greatly/ extremely	0.850
Employment rate of local people has improved not at all/ little/ same/ greatly/ extremely	0.851