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School of Mechanical and Industrial Engineering

Evaluation of quality management system practices' effect in the operational performance Garment Industry: A case of Shints garment PLC

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DECLARATION

I would like to declare that the work which is being presented in this thesis entitled "**Evaluation of Quality management system practices' effect in the operational performance garment industry: A case of Shints garment PLC"** is my own original work and that all the sources of materials used for this study have been identified and acknowledged as complete references. This research study has not been previously submitted in full or partial fulfillment for any degree in this university or any other recognized education institution. This research study is being submitted in partial fulfillment of the requirement for Degree of Master of science in Industrial Engineering.

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Approval Page

This is to acknowledge that the thesis entitled: "**Evaluation of Quality management system practice effect in the operational performance garment industry: A case of Shints garment PLC"** submitted by Abinet Dejene, in partial fulfilments of the requirements for Master of Science Industrial Engineering Addis Ababa Institute of Technology.

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Abstract

In today's manufacturing sector, almost all companies try to address a number of systems in order to improve their performance. Shints Garment is one of the manufacturing companies found in Ethiopia that addresses the international organization for standardization 9001 quality management system. Even though the company addresses international organization for standardization quality management system it is struggling with the challenges of weak operational performance. This study stands to evaluate the actual effects of quality management system practice on the operational performance of Shints Garment Company. To achieve the evaluation, this study carried out correlation analysis in order to check the linear relationship between quality management system practice and operational performance dimensions. After this, multiple regression analysis and structural equation modeling was undertaken to evaluate the effect of quality management system practice on each of the operational performance dimensions. The correlation analysis indicates there is a positive and linear relationship between quality management system practice and operational performance dimensions. The analyzed regression model shows that out of the seven quality management system principles, three of them top management commitment, engagement of people, and evidence-based decision making have significant effects, whereas four of them customer focus, supplier management, process approach, and continuous improvement have weak effects on the operational performance dimensions. The documented numerical report data and, from the interviewer's point of view, the operational performance dimensions of on-time delivery, cost of production, repairing defects, and efficiency show a lack of achievement according to the company target and schedule. From the enquiry, the effect of QMS practice on operational performance in average is 84.7%. This integrated analysis outcomes of the interview, questionnaire, and documented report of this study, conclude that the unachieved list of operational performance dimensions is due to weakly practiced QMS principles.

Key words: Quality management system, operational performance, Effect evaluation, Structural Equation modeling

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List of Acronyms

List of Abbreviation	Descriptions
ANOVA	Analysis of Variance
CF	Customer Focus
CI	Continuous Improvement
CFA	Confirmatory Factor Analysis
C	Cost
CEO	Chief Executive Officer
EBDM	Evidence Based Decision Making
EOP	Engagement of People
EM	Employees Moral
E	Efficiency
ISO	International Organization for Standardization
OTD	On- Time Delivery
OP	Operational Performance
PA	Process Approach
PQ	Product Quality
QMS	Quality Management System
QM	Quality Management
RU	Resource Utilization
R	Rework
SM	Supplier Management
SPSS	Statistical Package for Social Science
SEM	Structural Equation Modeling
TMC	Top management Commitment

Chapter One

1. Introduction and Problem Justification

1. 1 Introduction

At this time, both in the manufacturing and service sectors, addressing or obeying the QMS standards is one of the advertising mechanisms used to attract customers interest in the market. It also serves as a controlled guideline for sector owners in order to get a good-quality product with profitability or a satisfied service with profitability. According to Martin (2017) Companies that implemented the ISO 9001 standard in their respective sectors observed improvements in their cultures of decision-making, ability to satisfy customers, and manufacturing process capability. Dimitrios (2015) research investigation shows the effectiveness of manufacturing companies' operations and the quality of generated products are directly affected by the ISO 9001 standard. Also, Pankaj (2018) the effect of QMS on the manufacturing performance becomes the concerned topics for the new researcher's interest.Awasthi (2017) Based on the proposed hypothesis, the study investigates the effects of QMS on business performance. The outcome of the study shows the institution uses the QMS as a modification to enhance the problems concerned with the quality of the operation. As the QMS has a significant effect on the manufacturing firm its practice which is QM practice has also an impact on the manufacturing firm performance. Koilakuntla (2017) The empirical study result reveals that infrastructure practice has an indirect effect on quality performance. Whereas the core QM practice has a significant direct effect on the quality performance in the study comparing the infrastructure QM practices and core QM practices on the quality performance.

Even though most of the companies addressed ISO QMS, some of the companies' operational performance did not improve. Standing on these facts, this study evaluates the actual effect of the ISO QMS on the case company Shints. Thus, thinking about QMS's operational performance and practice from the company's perspective is very important. Multiple regression and structural equation modelling were used to evaluate the effect and level of QMS practice on the operational performance of the company.

1.2. Background and Justification of the Study

Measuring the effects of QMS practice on the performance of both manufacturing and service sector is very important in order to know the exact level of company's current performance status in order to know and measure the performance level in terms of their QMS practice meany studies suggest their own method of implementation for the company's performance measurement dimensions with known measurement unit. Alem (2017) Assessment based study about the competitiveness performance problem of Ethiopian garment enterprises quality related problems as compare with turkey and Bangladesh relatives. The purpose of this study is in order to propose a suitable quality enhancement model to increase the performance of the sector. The model establishes based on plan, Do, check and Act (PDCA) cycle approach with requirement of ISO – 9001 standard systems.

The interest of this study is evaluating the effect of QMS practice on the operational performance in the manufacturing sector specifically in the apparel or garment manufacturing company. SarahJinhui (2019) analyzes the effect of quality management practice on the operational performance in China manufacturing firms. As the result of the analysis show each of the QM practice show an improved direct effect on operational performance of the firm. HuyTruong (2014) the relationship between the impacts of QM practice on the operational performance of the Vietnamese garment company as the result show there is an integrated significant importance of QM practice on the operational performance of the company.

This study is needed in order to evaluate the effect of QMS practice on the manufacturing sector specifically in the Ethiopian garment company the case company Shints Garment PLC is selected due to the company is worldwide known export-based company of best functional and highly technical garment products. Shints Garment PLC is a Korean own Ethiopian based company established in the year 2015 in Bole lemi Industrial Park in Addis Ababa. Have around 3700 employees from the company data base (2022) and address 9001:2008 ISO QMS principles.

During the overall working and visiting time in this case company the big challenges of the company is even though the company produced different types of products with numbers of quantities the company is suffering of producing quality of products on time. Due to this the objective of this study is evaluating the performance of the company through its QMS practice.

1.3. Statement of the Problem

The developments of apparel garment manufacturing industries have been increasing in Ethiopia since recent years. Most of these industries produce different types of clothes with a large number of quantities even though they produce a number of quantities most of the company's performance is not that much satisfied because of the poor-quality management practice (A.Demissie, 2017). the case company Shints garment PLC is selected based on data collected as shown in Fig 1.1 and Table 1.1 even though the company has QMS manual which address the ISO 9001 standard the company didn't even address the updated version of ISO9001:2015. As listed at their last revision date of Dec-2019 QMS manual this study evaluates the practice of QMS and its effect on the operational performance of the case company.

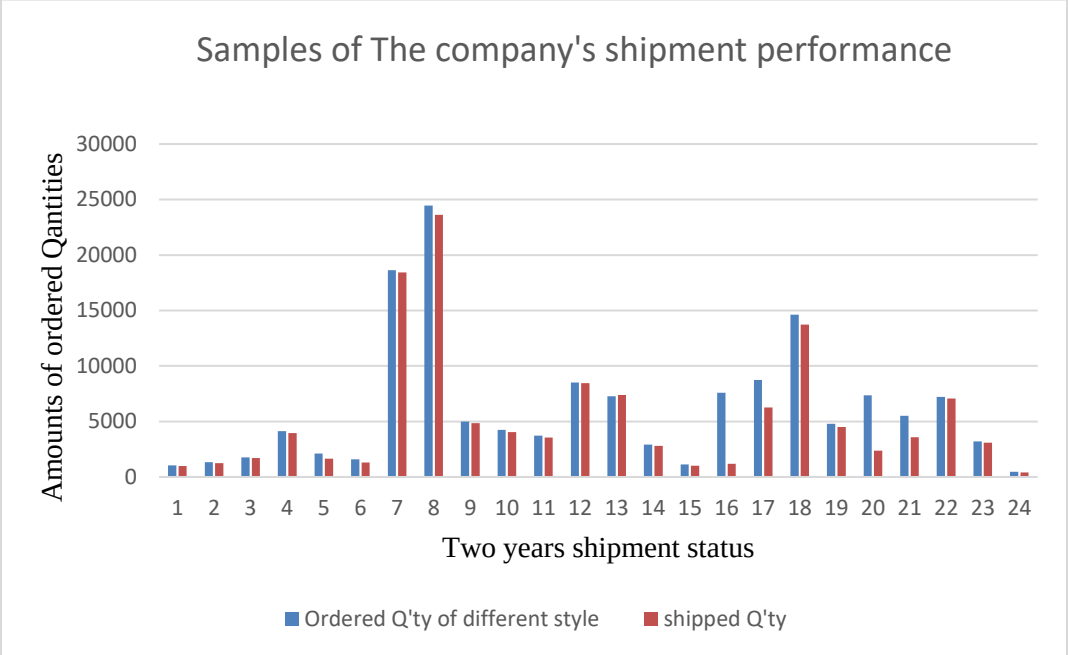

Figure 1.1 Sample Shipment Status

Source: from the company's shipment status report (2022)

Fig 1.1 shows, the company's shipment performance status sample of around two years shipment program that compare between ordered quantities of different styles with the actual shipped quantities until final of estimated shipment date. As we have seen in Fig 1.1 there are remaining quantities which does not produced on the scheduled time. Therefore, this seems there is a late time delivery performance problem of the ordered quantity of the products.

Table 1.1: Remarks of late delivery of the produced quantities as a sample of different order styles

Source: from the production shipment status report of the company (2022)

Sample of Four times shipment status of different order styles					
No	**Style**	**Ordered Q'ty**	**SHIPPED**	**BALANCE**	**Re-mark of late shipment**
1	NH - 20FW Jacket	11924	10847	-1077	120damage and due to repairing other defects
2	CH-BP91-Baseball pant	42253	32346	-9907	450 Damage and others defect
3	Ty-sleeveless t-shirt	64594	62944	-1650	154 Damage and others defects
4	LS – Men Short	28527	21041	-7486	367 damage and others defect
	Total	147298	127178	-20120	

In Table 1.1, the negative sign in the balance column of the table shows the remain quantities which did not export or deliver on time to the ordered customers. This is due to a number of defects or damage products are produced therefore to repair(rework) them or replace them by the new ones it takes time. In addition to this, an additional cost of quality are expenses due to repairing or replacing the defective and damage part of the clothes. Also, sometimes if the problem of late delivery time becomes long there is an agreement in which the shipment cost of the products is covered by the company for late deliver products.

Table 1.2: Cost expenses of the different product covered by the company

Product type	CMP/piece	FOB cost/piece	Additional cost Expenses
NH-jacket	$8	$5.30	$6,668
CH-pant	$1.40	$2	$20,444
TY-t-shirt	$7	$9	$15,928
LS-short	$2.50	$3.10	$24,124
Total			**$67,164**

Key: CMP=cut make price, FOB=fee on board (total cost of the company up to board of the buyer) Source: from the company finance status report (2022)

As shown in Table 1.2, the cost expenses of the different product types for an additional cost of the company in order to replace the damage parts of the clothes and to cover the shipment cost of the product up to the boarder of the buyers are the duty of the company for late produced products. At least when calculate the additional cost expenses of only for the damage products of the FOB cost of the above different products.

At least 67,164.2$ much additional amount of cost is spent by the company in order to replace the damage Products and in Order to deliver the remaining order quantities of the product to the buyers. Proper Resource utilization problems are also one of the problems in which the company are suffered like improper cutting, reworking time and working with a variety of colors.

By considering this fact, this study focused on evaluating the existing actual effect of quality management system and its practice on the operational performance of the company.

1.3 Research Questions

After completion of this study, it is expected to answer the following questions.

What seems the relationship between QMS practice and operational performance dimensions in SHINTS?

How to Evaluate the effects of QMS practice on the operational performance dimensions?

1.4 Objective

1.4.1 Main Objective

The general objective of this study is to evaluate the effect of QMS and its practices on the operational performance of the Shints Garment PLC.

1.4.2 Specific Objective

- To identify the character of the relationship between QMS and its practice with the operational performance dimensions
- To measure and show the relationship of QM practices with operational performance dimensions
- To identify and analyze the effect of QMS practices on the operational performance dimensions
- To evaluate the measure effect of QMS constructs on the operational performance.

1.5 Significance of the Study

One of the basic measurement parameters of a company is its level of performance achievement. Therefore, this study stands to evaluate the actual effect of QMS and its practice on operational performance. The case company or any other interested manufacturing or service sectors can use this study to check or evaluate the effect of their QMS practices on operational performance. This study might also serve as reference material for either pronouncements about the QMS and its practice or for the students in educational research.

1.6 Scope of the Study

This study focuses on evaluating the effect of QMS and its practices on operational performance in the case of Shints Garments PLC, located in Addis Ababa. The study seeks to identify the causes of the poorly performed operational performance dimensions.

1.7 Limitation of the Study

Due to the scope of this study is limited to the case of one garment company because of the objective of the study and due to the limitation of time and resource constraints from the other companies which address QMS principle of ISO 9001. and it was not easy to get documented data and meet informants whom the researcher had to mandatorily disuse with focused groups due to these this study is limited to one case company.

1.8 Organization of the Study

The thesis consists of five chapters and organized as follows Chapter one presents the introduction for the main part of the thesis paper Chapter two discusses about literature review on the effect of QMS on operational performance. In addition to this, it also explains the evaluation methods of QMS. Chapter three presents different methods of data analysis and research design. Chapter four were all about detail analysis and modeling, result and discussions on the effect of QMS practice on operational performance. Chapter five presents conclusions and recommendation for future investigation.

Chapter Two

2. Literature Review

2.1. Introduction

The focus of this chapter is to give the study detail information about the research concern. It contains works of literature from books, journals, articles, reports and previous studies that are relevant to the quality management system practice and operational performance dimensions. The theoretical and empirical literature review are presented regarding QMS practices and operational performance dimensions. The theoretical review provide understanding about the current knowledge of QMS practices and operational performance. whereas the empirical literature review provide understanding about findings of related studies based on observations and measurement levels. This chapter also contain conceptual framework to show the relationship between the QMS practice as independent variable and operational performance dimensions as dependent variable after identifying the uniqueness or gaps of the research.

2.2. Quality Management System

Based on a survey study to analyze the quality management practice in the Ethiopian manufacturing industries this study reviews several studies. Mohammad (2016) Quality of the garment product is measured in terms of their raw material utilized level of quality. In Bangladesh, different garment industries have different quality management system which is based on their addressed quality management approaches. But it is not documented and practiced in a proper way. Therefore, their garment industries should have a better-Quality Management by considering the needs of their valued customers.

Sizwe (2017) investigate a case for having a problem of suitable quality management and ensuring its practice in the clothing manufacturing of a co-operative small enterprise. For this problem the studies plan to identify the sewing areas which require an intensive quality control system. Through an analysis of the causes, the study team reaches for an improving way for the enterprises QM problems first each enterprise becomes better to use new resource or limited resource and to use the updated quality management trends. However, in this 3study there should be better to focus on the evaluation of quality practice in sewing co-operatives.

Ramzana (2017)Examine the concept of quality, practice of QMS and the cost of quality phenomenon in the apparel manufacturing sector in the developing country of Pakistan. After an

intensive questionnaire survey the study describe that the majority of the firms have QM practice but they wish to have ISO certification.

Through systematic integration of the important aspect of six-sigma project of each process steps with beneficiary aspect of QMS principles. the integration aspects become have a number of importance for the organization to have a standard working procedure and measure during projects, to identify the improvement section, running the project with well-structured documentation it implements with limited efforts in small and medium companies (Tilo, 2014).

Hernad (2013) try to show the method of implementing properly the ISO- 9001:2008 QMS by using a six-step implementation mechanism which are define the document specification, evaluate the current implementing system, maintain and continuously implement the new QMS, this step achieves to optimally implement the QMS.

2.3. Operational Performance

Elson (2018) Identify the optimization factors on the operational performance of the construction industry in case of Kenya companies and to propose an optimization practice of sensitization program. The study team done an intensive pilot study in order to test the desired constraints by the help of lean theory. Study undertakes a regression analysis to analyze the effectiveness of the optimization practice on the operational performance of the construction industry. The result show there is a positive effect of the optimization practice on the operational performance of the industry therefore the study suggests both for the industry as well as for the government to undertake the sensitization program of optimization practice.

vindo, danuta, & uma, (2019) Examine the impact of cleaner production practice on the large textile industries economic, environmental and operational performance. Within this the study undertakes an expert analysis and survey study in more than 100 companies and to analysis the data structural equation modeling is carried out. The result of this study shows during the implementation of clear production practice with in the sample companies indicates a positive impact because it optimizes the use of raw material minimize the environmental pollution of companies and increase product quality of the case companies.

Cesar da Silva (2021) Examine the relationship with in the sales and operational planning practice on the manufacturing operational performance of the selected sample manufacturers from 34 countries. The study undertakes a sequence contribution like examine the relationship of sales and operational planning factors and its relationship with performance and effect on the operational

performances. In order to analyze this effect, the study team use a step wise multiple regression analysis was done then the construct validated with structural modeling. After this the result of the study shows sales and operational practice have a positive effect on the different performance dimensions. Properly implemented lean practices have a significant impact on the improvements of operational and business performances of Indonesian manufacturing companies (Gusman & kong, 2013).

2.4. QMS Practice on Performance of Manufacturing Firms

In order to examine and evaluate the effect of QMS and its practice on the performance of manufacturing sectors many researchers try to define their contribution in different countries and formulate their working model. Lalith (2020) The impact of QM practice which are Top Management Commitment, Supplier Quality Management and process management on the business performance of manufacturing firms in srilanka. Researcher used a well-structured Likert scale questionnaire. Systematic Random sampling techniques were followed in order to select manufacturing firms which address the ISO 9001 QM practice. After data collection, the researcher used SPSS software in order to analyze the collected data then multiple regression analysis carried out to test the hypothesis. Using this different analysis, the researcher found that Top management QM practices have the first highest positive contribution and the process management take the second highest contribution on the business performance moreover it was better when the research focused on one specific manufacturing firm for gathering an appropriate data and will be used a moderating or mediating variables applied.

According to Dimitrios (2015) study try to give additional information about the effectiveness of ISO 9001 QMS which are the objective of ISO 9001, Continuous improvement, Prevention of non-conformities and Customer satisfaction focus impact on the firms' performance of product quality, operational performance and business performance in the Greek manufacturing firms. In order to undertake this study, the research use survey question analysis to obtain relevant information from the manufacturing firms. To analysis data the study uses EFA (exploratory factor analysis), CFA (confirmatory factor analysis) and SEM (Structural equations modeling) using this study result analysis show only the product quality of operational performance are directly affected by QMS of ISO 9001. However, in this study even if they proceed a well-organized method the result shows there is a drawback, they did not question out other operating performance such as delivery

performance problem, defective product rate, lead time of the organization which were have more effect of ISO 9001 impact.

Pankaj (2018) gives some explanations about different world-wide most addressed QMS (TQM, TPM, Six-Sigma quality and ISO 9001QMS lean manufacturing) with their dimensions like principles, tools, methodologies and impact of their models on the performance of firms using research articles done by extensive review between 2000 to 2017 published journals paper show the remark of QMS with respect to different study of QMS.

Maryum (2017)indicate the QM practice of requirements of QMS, management responsibility, resource management, product realization, Measurement, Analysis and Improvement on the organizational performance of the manufacturing sector of Pakistan in the four randomly selected companies.as a basic data collection mechanism the study team uses self-administered questionnaire distributed to randomly selected employees .The study used explanatory, quantitative and utilized research approach methods. In order to analyze the collected data descriptive statics and correlation matrix with the help of regression analysis were carried out. The result of the study shows the manufacturing sector is concerned about their performance therefore the sectors are continuously improved their quality products.

Devadasan (2015) Examine the impact of QM practices Strategic quality planning, Supplier quality, Process monitoring and Strategic QM with the performance parameter of quality performance and financial performance was undertaken in the Indian manufacturing firm. A method of hypothetical model linking formulated between critical QM practice and performance factors are empirically tested. In order to examine the hypothetical model and evaluate the impact level between QMS practice and performance factors numerical evaluation questionnaire data were collected from manufacturing companies. Using testing result model of partial least square path (PLS) software the outcomes show a positive relationship between QMS practice and the performance. However, in this research the research did not analysis the indirect effects between the construct.it becomes better to assess the dominant quality practice that involve over a considerable time in the companies.

2.5. Effect of Quality Management Practice on Operational Performance

Rahma (2020) analyze the effect of ISO 9001QMS with in the Indonesian automotive component manufacturing company operational and business performance. The manufacturing company is relatively unable to compete with the Malaysian and Thailand Company which address ISO 9001

QMS with in their companies. After implementing the ISO QMS, the study applies the multiple regression analysis in order to identify the major obstacles. The implementation of IS0-9001:2015 becomes show a positive impact on both operational and business performance of the company. Therefore, this study proof on implementing QMS has a great role for the company's performance. Sadikoglu (2014) impact of TQM practice on the turkey manufacturing firms various performances and its practice challenges after cross – sectional survey of the selected Sample firms. The study addresses exploratory factor analysis and multiple regression analysis in order to allocate the impact value of TQM practice improve firm's performance even though the leadership didn't affect performance; however, the study used subjective measure which doesn't give accurate measurement.

SarahJinhui (2019) Analyze the synergistic effect of quality management practice like Top management leadership, External and internal quality practices, Training and teamwork on the operational performance of China firms. Using a survey data of questionnaire and regression analysis model the study analyzes the collected data. The result shows each of the QM practice have a direct effect on the operational performance parameters. In addition to that the accuracy of the measurement becomes improve when the researcher takes predictors and criterion variables from different sources.

To enhance the manufacturing performance, lean manufacturing is one of the improvement programs. From this improvement program, VSM (value stream mapping) is one of the effective enablers of lean manufacturing in order to improve the operational performance of the industry during its implementation within the PDCA cycle. The correlation result between the VSM and operational performance indicators have a positive relationship. After this the implementation of VSM proofs a reduction of inventory, lead time and man power in case study of Indian industry as (Kumar, 2016).

A.B (2014) Examine the effectiveness of implementing QMS beside financial and organizational performance on the operational performance. The study uses structural equation modeling techniques in order to identify the effect of QM practice (ISO 9001:2008) on the operational performance. The study gives stable and proactive standard operating steps for the corporate knowledge and identifies the key process and section for the managers as well as for employees to be competitive across the industries. Mulugeta & Sandeep (2019) examine the effect of TQM

practice on the performance specifically on the operational performance of ISO certified companies with in Ethiopian industrial manufacturing companies.

Abu (2014) Identify the effect level of QMS dimensions on firm operational performance dimensions of rework process and improvement of business firms for those who changes their hard techniques of QMS to easy techniques of QMS which is ISO 9001. To perform this task the researcher undertakes collecting data and compiled in SPSS, the result of this analysis shows the determinants of QMS have a positive impact and the determinants' function embedded every employee's mind rather than fancy slogan. Fuzi Meftah Abusa (2013) Examine the effect of TQM practice on the developing countries companies' operational performance for both companies which have ISO certificate and absence of ISO certification.

2.6 Effect of QMS practice on Operational Performance of Garment Companies

Emrul Kays (2019) Investigate the applicability of VSM and yamazumi chart lean tools in order to improve the operational performance of RMG (Ready-made garment) industry of Bangladesh .by balancing the cycle time the operational performance of RMG become enhanced in order to evaluate the practice on a three sewing production line. Yamazumi chart is used in order to identify the non-value adding activities and methods of balancing the working cycle time and combining multiple workstations in to one and also operational performance of the production line improved. The manufacturing firm or sector mainly practiced a number of operations with in a complicated way and also most of the manufacturing firms working manually or labour intensive for achieving their quality performance goals.

FMEA (failure mode and effect analysis) technique is a successful method for detect, analyze and eliminate the possible and definite failure problem of a production system. This method was applied to apparel production line in order to increase the productivity, reduction of expense and defect products through simulation-based optimization quality control model plan. After implementing this method, the product defect reduced by at least 5% from the previous value, increase the production process, decrease cost of quality as well as increase customer satisfaction as (Pazireh, 2017).

Yusof (2015) Investigate which types of quality approach techniques did the Malaysian garment manufacturing companies follow. Based on quality system tools, quality control and types of inspection with procedural steps for quality inspection methods. during this study most of the companies didn't follow certified quality system and for some which address ISO 9001:2008 as

the study becomes more better when they address WRAP and OEKO-TEX because due to the garment industry is labor-intensive and safety and health is more concerned.

Demissie (2017) examine the quality related performance problems like response rate, statistical analysis, available time and survey cost of 11 sample Ethiopian garment companies and to create a suitable model to improve the performance of the enterprises. After collecting the relevant data, the researcher performs a preliminary gap analysis in order to compare the QMS of the companies with ISO 9001 current QMS requirements. The result of the comparison with in the companies are performing below the required level of QMS due to improper management system, poor support by the required finance and cost of poor quality to overcome this problem. The researcher proposes an improvement model which has seven components with the help of primary step. The proper implementations of the model improve the cultural transmission of the companies.

Huy Truong (2014) confirm the impacts of four main QM practices which are top management support, human resource management, reporting and analysis of quality data, product design and process management on the operational performance by preparing a descriptive statistic research model in the Vietnamese garment enterprise. The result of this integrated research model tells the operational performance is influenced by the QM practice. After considering this significant impact of the QM practice on the operational performance the researcher formulates a structural model which used as a guide line to the implementation of QM practice. Furthermore, this study didn't include other factor that have effect on the operational performance such as QMS variable.

2.7 Effect Analyser Evaluation Methods

IBM SPSS is a widely used statistical calculating tool to calculate different algorithms of descriptive statistics, any inferential statistics, discriminant function analysis, factor analysis, and also any predictive techniques such as t-tests, ANOVA, correlation analysis, linear regression, etc. AMOS is an analysis of moment structures, is a statistical program. AMOS is a modern SPSS model that is used specifically for confirmatory factor analysis, path analysis, and structural equation modeling. It is often referred to as causal modeling software or analysis of covariance. AMOS is a visual structural equation modeling it create graphical representations of models. (Mohamad Zaid, 2020).

Structural equation modeling is a technique used to measure and analyze the effect of exogenous or independent variables on the dependent or indigenous variables. CFA or measurement model is used to test model that explain the relationships between latent variable with its indicators. to be

aware that model fit simply indicates the acceptance or rejection of the proposed model, not the value of the model's path coefficients. The model path coefficient is determined by the factor loading or the regression weight value at the stage of CFA or measurement model the estimation value is equal to 1 with in the process or running stage of SEM the value have to > 0.5 to become significant (Sedat, 2015).

The evaluation of model fit part of SEM is the basic measurable part its standard limit values is express by different researchers. For instance, it indicates chi-square p-value > 0.05 and chi-square per degree of freedom CMMIN/DF < 5 and Comparative Fit Index (CFI) > 0.9 recommended (Sedat, 2015). the Root Mean Square Error of Approximation (RMSEA) < 0.8, Relative Fit Index (RFI) > 0.9, Incremental Fit Index (IFI) > 0.9, and as well as Standardized Root Mean Square Residual (SRMR) < 0.09 recommended by (Lai, 2018). and one of the baseline fit index Normed fit Index (NFI) > 0.9, recommended.

Research Gap

In this study, the evaluation of the effect analysis is carried out by correlation analysis, regression analysis and structural equation modelling with the help of SPSS, AMOS soft wares and other descriptive statistics. The uniqueness or argument of this study from other revised articles is that this study proposes an integrated evaluation method using interview, questionnaires and documented reports for evaluating the effect of quality management practices on the operational performance of the case company. The integrated analysis method contains a sequence of different operational research methods for the different measurable dimensions of operational performance through the quality management system's practice of the case company.

2.7. Conceptual Framework of the Study

Tables 2.1 and 2.2 shows the summarized review of the literature review part of different authors reviews for each of QMS principles and operational performance dimensions based on their level of measurement points. Based on these reviews this study found each principle of QMS and each dimension of operational performance with their referenced sources this is important for this study in order to construct the conceptual frame work of the study.

Table 2.1: The seven Quality Management System principles source: Own source (2022)

Principles	Sources	Measurement
Top management commitment (Leadership)	(Lalith,2020), (Fuzi Meftah Abusa, 2013), (Mulugeta & Sandeep, 2019)	-Level of contribution on the development of firm's business performance., (Lalith,2020), -in order to achieve the quality goals and policy., (Chin K. , 2002), - in accepting quality responsibility and performance., (Fuzi Meftah Abusa, 2013), -efforts to improve quality and motive employees to solve quality problems and meet quality goals (Mulugeta & Sandeep, 2019).
Customer Focus	(Rebcca,2017), (Fuzi Meftah Abusa, 2013), (Mulugeta & Sandeep, 2019)	-Based on their feedback and level of satisfaction (Rebecca, 2017)., -Their current demand and future needs., -Their complaints and guidelines., - their requirements and satisfaction level
Supplier Management	(Lalith,2020), (Fuzi Meftah Abusa, 2013), (Mulugeta & Sandeep, 2019)	-Level of contribution on the development of firm's business performance., -in terms of corporate quality plans., -judging their performance and participating with their quality programs., -supplied product quality to give feedback.
Process Approach	(Fuzi Meftah Abusa, 2013), (Mulugeta & Sandeep, 2019)	-Smoothness of process and based on workers performance., -detection of defects and saving quality costs. -neat and clean working place and maintaining production plan. -production process to meet as planned ones.

Continuous Improvement	(H. james,2015), (Fuzi Meftah Abusa, 2013), (Mulugeta & Sandeep, 2019)	-Based on performance of leadership and employee's moral and the difficult of production process. -product and internal operating process, measurement of product and process quality., -managing decisions on improving quality improvement objectives.
Engagement of people	(Osborne & Hammond, 2017), (Fuzi Meftah Abusa, 2013), (Mulugeta & Sandeep, 2019)	-Based on importance of the issue and its outcome. -participation to quality improvement, employee's satisfaction and quality responsibility., - their suggestions and problem-solving system
Evidence Based Decision Making	(Vishwanath,2012), (Mulugeta & Sandeep, 2019)	-Based on reliability of data and skill of top management., - level of judgment to check quality objectives., -use quality management tools and specific skills to quality control awareness.

Table 2.2: Operational performance dimensions

Dimensions	Sources	Measurement
On time Delivery	(Mulugeta & Sandeep, 2019), (Gusman & kong, 2013)	-Can be measured based on precision of schedule, speed, easy ordering., -order processing time and insuring on time delivery time., level of fast delivery.
Cost	(Mulugeta & Sandeep, 2019), (Gusman & kong, 2013),	-In terms of initial, operating and maintenance costs., -based on production cost., -unit manufacturing cost., -distribution, manufacturing, inventory and overhead cost.
Resource Utilization	(Mohammed, 2016),	-Based on time, cost and quality of utilization system., -labour, machine and capacity utilization.

Rework	(Abu, 2014),	-On the employees' opinions., -based on percentage of defect required rework.
Product Quality	(Mohammed, 2016), (Mulugeta & Sandeep, 2019), (Gusman & kong, 2013),	-Raw material utilized., -performance attributes, reliability, conformity, durability, utility, esthetics, and perceived quality., -based on defect rate and product and process quality., -product and service quality., customer satisfaction.
Customer satisfaction	(Gusman & kong, 2013) , (vindo, danuta, & uma, Impact of TQM on company's performance, 2019)	-Based on prices of Products, speed of delivery, friendliness and quality of product., -quality of product and competitive price., -their complaints.
Employee Moral	(vindo, danuta, & uma, Impact of TQM on company's performance, 2019)	-Based on performance of an organization, - level of absenteeism and participation for company's goal.
Efficiency	(Ariyaratha and joseph,2016) (Muchiri, 2011)	-Based on profitability and level of production output., time spent - level of allocating tasks with

As in the conceptual model analysis of this study shown in the Figure 2.1, the analysis shows the relationship between both QMS and its practice as an independent variable and the operational performance measurement dimensions indicators as a dependent variable. The study analyzes the design and practice of the QMS in order to recheck the proper design and implementation of the system and evaluate the consequences of the system and its practice on the operational performance of the company.

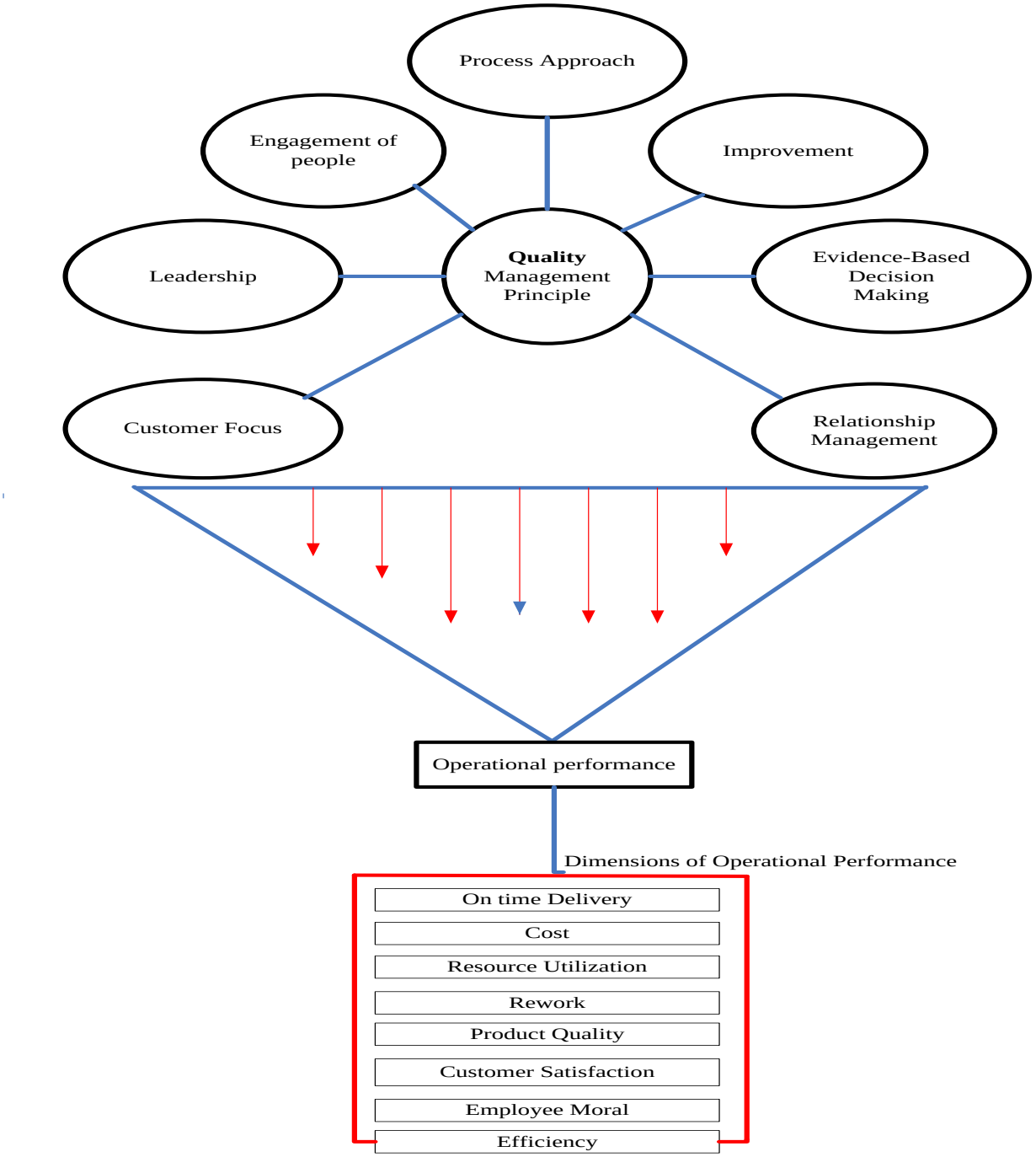

Figure 2.1 Conceptual model
Source: Own survey (2022)

Chapter Three

3. Methodology

It contains Description of the study area, research design, research approach, data collection instrument, procedures and analysis have been discussed.

3.1. Research Design

In this research design descriptive statistics is used in order to analyze the QMS ‘s Practice and operational performance dimensions in numerical form. And to explore the data obtained from the descriptive statics this Study use exploratory research in order to explore in detail the main aspect of the problem of the effects of QMS and its practice on the operational performance dimensions.

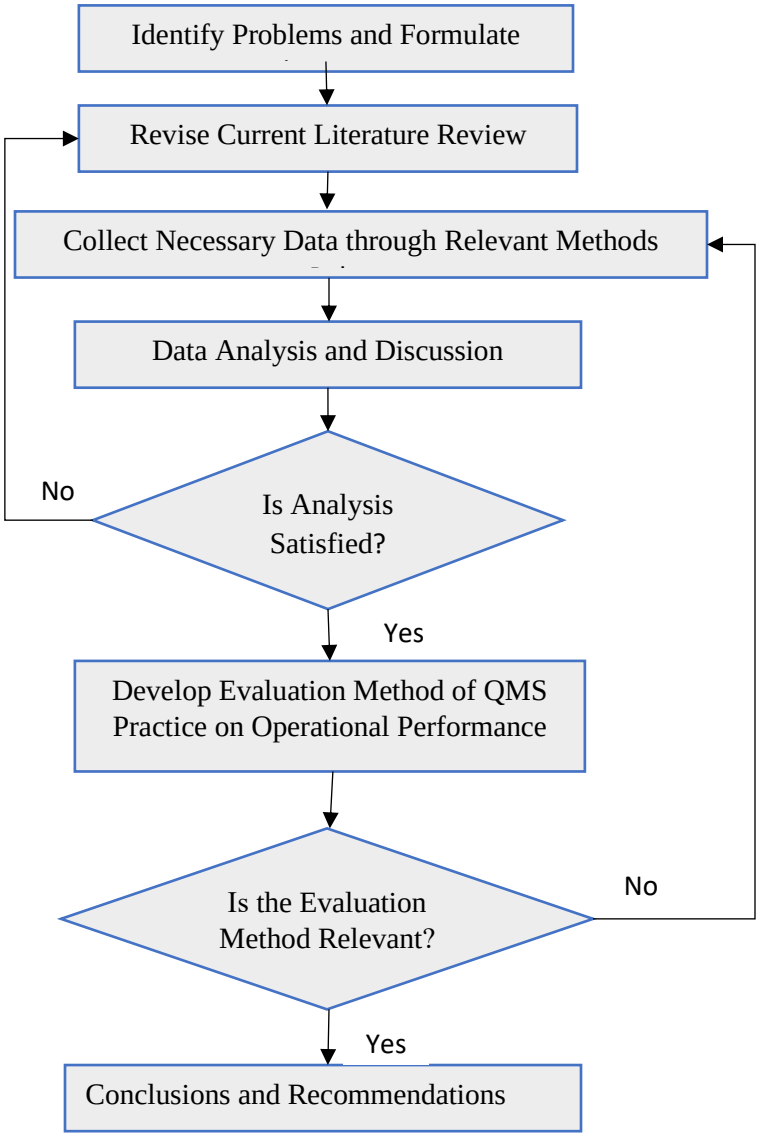

Figure 3.1 Research design source; Own source (2022)

In figure 3.1 of This study shows first of all wants to pursue an understanding about the relationship of QMS and its practice with operational performance dimensions. By considering this in to account the qualitative and quantitative research are used but due to the nature of the study quantitative approach is used in most dominantly.

3.2. Sampling Design

3.2.1. Target Population

The total population of the company is around 3700 number of workers' source: company data base (2022) using purposive sampling techniques from the selected relevant departments this study focused on around 450 of workers. From this the target population of this study is in particular employees those their educational level is above 10 grades source of own survey (2022) which have ability of reading, understanding and awareness about the questions in the questionaries. This requirement is needed in order to understand properly the questions and to give an appropriate response due to this the size of the selected sample size is neither be excessively large, nor too small it is optimum.

3.2.2. Sampling Technique

Because of the study is concern selectively on the quality, production and management related departments from the various organizational departments of the company's as shown in the table 3.1 is 450 numbers of population are selected from the relevant departments using purposive sampling techniques. A purposive or judgmental sampling technique select target population based on characteristics of a population and on the objective of the selected study (Singh, 2014) After this simple random sampling technique is carried out in order to determine fairly and to give an equal chance for relevant department of the population and due to the nature of the study is concerned with in one company or homogenous.

Table 3.1: Sample size

Relevant Departments	**Numbers of populations**
General Manager/HR Team	20
Quality Department	238
Production Department	150
Expert/Technicians	42
Total	**450**

Source: Company database (2022)

In order to determine the sample size (n) for the relevant population of N=450 the sample size become using the formula for finite number of populations (Singh, 2014).

$$n = \frac{\frac{Z^2 * P(1-P)}{e^2}}{1 + \left(\frac{Z^2 * P(1-P)}{e^2 N}\right)}$$

Where n is the sample size

N= Population size

P=percentage or proportion

e = sample error or margin of error

Z= z-score

Desired confidence level=95%

Therefore, using this formula, the sample size becomes n=207

3.3. Method of Data Collection

3.3.1. Primary Data Collection

Visual Observation: - Through visual observation the study pursues an understanding about emotions and commitment of employees to their work and visually observe some aspect of QMS practice and operational performance dimensions working procedures.

Interview: -During this data gathering method semi structured interview questions are organized and conducted from the relevant working section managers and production analyzer of the company. In order to conduct basic concept about QMS practice and operational performance dimensions actual status from experts' opinion of the company.

Questionnaire: - Self-administered questionnaire is used in order to easily and carefully question out the questions to the respondent. Closed-ended questions of well-structured questionnaire is prepared and quantitative data is taken physically from randomly selected workers of relevant departments. The form of questionnaire contains questions related with the background of the worker, QMS's practice and the operational performance dimensions measurement questions, also the respondent responding place is 1-5 level of Likert scale.

3.4. Reliability and Validity Test

In order to check the types of the questions used in the study can describe the objective of the study properly and to check the biasness of the response from the collected questionary data from the respondent. In order to check the study under take a 20-sample pilot test.

3.4.1. Reliability Test Analysis

The Table 3.1 show the reliability analysis of the Cronbach's alpha coefficient value of QMS variables and the operational performance dimensions of the study.

Table 3. 2: Reliability Test

QMS principles	**Cronbach's Alpha**	**No of Items**
Top management commitment	0.947	6
Customer Focus	0.826	6
Supplier Management	0.955	6
Process Approach	0.926	6
Continuous Improvement	0.941	6
Engagement of people	0.909	6
Evidence Based Decision Making	0.87	6
Overall Cronbach's Alpha of QMS	**0.98**	**42**
Operational Performance Dimensions		
On time Delivery	0.902	5
Cost	0.823	3
Product Quality	0.958	4
Resource Utilization	0.855	4
Rework	0.934	4
Customer satisfaction	0.927	4
Employee Moral	0.711	4
Efficiency	0.902	4
Overall Cronbach's Alpha of Operational performance Dimensions	**0.969**	**32**

Source: Own survey (2022)

Mohsen (2011) states that an alpha coefficient value below 0.7 is not accepted as reliable because a value below 0.7 can be due to poor consistency between the items or a low number of questions in the study. According to the table, the Cronbach's alpha coefficient value ranges from 0.711 to 0.958 for both variables of the QMS and variables of the operational performance dimension. This test result was obtained from the 20-pilot sample survey questionnaire of the study. Therefore, the reliability test analysis is acceptable for further analysis.

3.4.2. Validity Test

Checking the validity of the data collection instrument addressed by the study, in this case the questionnaire, is important to the study in order to ensure the questions meet the requirements of the study objective. Roktaria (2018) validity of the instrument determines how accurately it measures what it has to measure. The validity of the instrument can be supported by revising

relevant literature related to the purpose of the study (Sira Barros, 2014). Face validity represents the measure of clarity of variable estimation according to the purpose of the instrument; this can be reviewed by experts. In the case of content validity, the estimation is concerning the priority of how the content is presented. The measure of validity can be carried out by a pilot test and expert opinion. Construct validity measures the priority of the constructs in the instrument; this can be carried out by explaining the variance of responses to survey variables (Roktavia, 2018). In addition to the 20-sample pilot test, different relevant literature was reviewed and discussed with company managers, quality and production-related workers, and advisors in this study. The test result shows the distribution sample is valid and can proceed to the next step.

3.4.3. Secondary Data Collection

Revising the company's Documents: - in order to get sufficient information about the company's QMS practice and to know if there is a problem in their QMS manual. And to be familiar with their production or shipment status in terms of operational performance dimensions. The numerically or theoretically documented data of the company which were obtained in the form of excel file, document file and in the form of figures can be used as input data for this study.

Reviewing different Literatures: To be aware of the concepts and consider the effect analysis method. This study revises different researches, journals, articles, dissertations and conferences in order to use as an input reference for evaluating the effect of QMS practice on the operational performance.

3.5. Data Analysis

Using the questionnaire data, interview response and documented reports after collecting the data from respondent of the quality and production related department. Any required Descriptive and exploratory analysis is carried out using statistical control tools and software like SPSS and AMOS through intensive data analysis technics.

3.5.1 Descriptive Analysis

Descriptive statistics is a univariate descriptive analysis which focus only one variable at a time. Using multiple measures of central tendency and dispersion, this study used descriptive statistics to quantitatively or visually summarize and analyze Likert scale data from each variable of the QMS and the operational performance survey of respondents' questionary responses separately.

3.5.2 Correlation coefficient

Correlation coefficient is a measure of the strength of a relationship between two constraints. This study used correlation analysis in order to check the level of linear relationship between each of QMS practice with each of operational performance dimensions. and in order to identify the types of the relationship or are they have positive or negative relationship with respect to the degree of significance. After correlation analysis quantifies the level of relationship regression analysis is performed.

3.5.3 Regression analysis

Regression analysis is used to analyze the effect of one variable which called independent variable on the other variable which is dependent variable. This study used multiple regression analysis in order to analyze the effects of QMS variables on each of operational performance dimensions. The result of the regression analysis shows the level of the significance with respect to the effect coefficient value of QMS practices on the each of operational performance dimensions.

3.5.4 Structural equation modeling

Structural equation is used to measure the linear causal effect relationship between variables. This study used SEM in order to analyze the effects of QMS practice on the operational performance using measurement model to show the relationship between latent variable and indicators and to test their covariance. And SEM perform estimation of significance, the effects of mediators and generally the effects of the model on the operational performance.

3.5.5 Interview questions analysis

According to the objective of this study the interview questions carried out questions which integrate with questionaries and company's reported document. The interview questions addressed opinion of relevant department experts for this study.

3.5.6 Company's Document analysis

The data collected from the document reports of the company analyzed based on each operational performance dimension. The analyzed documents are presented in the form of graph or using any other needed statistical quality tools. After the document analysis this study get the indirect effect of QMS' practice on the operational performance dimensions through the analyzed result level of degree of performance and it shows the actual current operational performance of the company.

After completing the indirect effect of QMS' practice the study carried out the effect evaluation of the analyzed documents with integration of interview and questionary analysis.

3.6 Ethnical Consideration

The ethnical issue of this study is guaranteed as Poth (2020) explain the ethical considerations in mixed method of research is based on numbers of data collection, data collection method, more intensive over short period of time and on the participant expectations. due to this research under take mixed method of data collections method of questionnaire, interview and documented reports. The study's uniqueness has been kept, and all references to previous studies, facts, and literature that were included into this study were properly recognized with their respective authors. Before distributing questionnaires and conducting interviews, all research participants in this study were formally informed about the aim of the research and asked for their willingness and consent to be documented.

Chapter Four

4. Results and Discussions

4.1. Introduction

In this chapter part of the study there are some sections which present the analysis of the data and findings from primary existing data. The first section is about the profile of the respondent which means about the respondent educational back ground, the current working position and year of experience in the company. The rest part of the chapter is about the detail analysis of the study. Descriptive and further study analysis are included.

4.2 Background Profile of the Respondent

Before distribute the questionnaire paper to the respondent selecting and knowing the back ground of the respondent is very important in order to make the collected data more actual, accurate and in order to know the relationship between the questions and the respondent level of understanding and their working positions.

The educational qualification level addressed in this survey of the study tries to include all qualification levels in order to get the exact opinion and understanding level of the respondent. According to this the minimum percent of the respondent is 3% where the respondent's qualification level was master's degree holders and the maximum percent of qualification level is 48% where the respondents were diploma holders. Others qualifications level was between this ranges as shown in the Table 4.1.

Table 4.1: Frequency of educational qualification level of respondents

Education Level of respondent	**Measure**	**frequency**	**Percentage**
	Below Diploma	33	16%
	Diploma	99	48%
	Degree	69	33%
	Master Degree and above	6	3%
	Total	207	

Source: Own Survey 2022

The working positions of the respondent selected purposefully for the relevance of the study because of this the study want the respondent who are working in the position related with in quality management and performance and who have basic awareness about the concept of QMS. According to this the positions listed in the Table 4.2 are valid for this study.

Table 4. 2: Frequency of working position of respondent

Current Working Position	Measure	frequency	percentage
	General Manager/HR	8	4%
	Quality Assurance / control	88	43%
	Production Analyzer/team	78	38%
	Expert/Technician	33	16%
	Total	207	

Source: Own Survey 2022

Year of experience has shown in Table 4.3 the significant impact of the respondents the more the respondents have experienced the better understanding they have got. Due to this in this study the frequency year of experience shows less than 2 years 15%, between 2 to 5 years 46% and more than 5 years 39%. According to this result the study try to cover all years of experience respondents within the company and more frequency of respondents are listed between 2 to 5 years and above 5 years this is a good indication in which the study undertakes experienced respondents.

Table 4.3: Frequency of year of experience in the company

year of experience in the company	Measure	frequency	percentage
	Less than 2 years	31	15%
	Between 2 to 5 years	95	46%
	More than 5 Years	81	39%
	Total	207	

Source: Own Survey 2022

4.3.1 Descriptive Analysis of Quality Management System

As shown in Table 4.4, the analyzed result of respondent view of response implies the descriptive analysis of Quality management practices. From these Supplier management has the maximum Mean value of 2.82 with the standard deviation value of 1.11. While engagement of people has a minimum Mean value of 2.45 with standard deviation of 1.12. The other Quality Management practice Mean values are between these two values. Therefore, from the respondent point of response supplier management principle is the most practiced element in the company where as an engagement of people is least practiced principle in the company as the respondent point of response.

Table 4.4: Descriptive statistics for Quality Management system

QMS principles	No	Mean	S. D
Top management commitment	207	2.52	1.16
Customer Focus	207	2.80	1.06
Supplier Management	207	2.82	1.11
Process Approach	207	2.73	1.15
Continuous Improvement	207	2.72	1.16
Engagement of people	207	2.45	1.12
Evidence Based Decision Making	207	2.51	1.01

Source: Own Survey 2022

4.3.2 Interview Analysis of QMS Principles

Top management commitment

Top managers follow day-by-day reports of each department, especially production and quality reports, and give directions and warnings for the next day of production. This meeting is held in order to review the effectiveness of the QMS and quality policy and to satisfy customer needs.

Quality policies and strategies are the ways in which the company can reach its goal. The company's quality policy has been established and approved by the CEO, and in accordance with the policy, measurable departmental quality objectives are defined.

Higher management teams in the company address the necessary resources needed for production and ensures the customer’s needs and expectations are met according to the company’s policies through management review and communication with relevant departments. Beside this, some of the interviewers blame the top management for their lack of strong participation in order to achieve or succeed the company’s quality goals rather than simply passing the orders.

Customer Focus

Customer complaints and comments are regularly discussed in the management meeting. The corrective and preventive action procedure can also be applied to future requirements through consumer feedback.

The company's MD (merchandising) department tries to ensure the customer requirements, such as the quality of the produced product, timely delivery of the product Even if the customers have high level of quality desire the company moderately achieve their needs.

Supplier Management

There are joint efforts or a good relationship between the company and suppliers in order to improve the quality of supplied products and reduce the cost of products. Mostly, the company selects its main suppliers through the main office in South Korea. Due to this, the main suppliers are from foreign countries, especially from the countries that the customers need. therefore, the company does not have any complains on suppliers' management.

Process Approach

In the company, processes needed for the realization of products have been identified, established, and monitored to achieve the desired goal. The appropriate departments are in charges of accepting standards of process and products.

In the working procedure, firstly, the required fabric, accessories, detail sizes, quantities, delivery dates, and any other requirements are clearly stated before production. Even if there are a number of customer orders and a number of defects that need to be repaired, the company tries to perform the production in a good manner.

Continuous Improvement

The company is committed to continuously improving the production and quality of its products in order to deliver better products to its customers. In order to achieve these target goals, departmental quality objectives are monitored and analyzed regularly, and corrective and preventive action is taken based on the result data generated through all these systems, which are reviewed during management meetings in order to allocate any additional resources required for improvement of the quality system.

Due to unsatisfactory payment, a lack of skilled personnel from the management level down to the laborers, as well as difficulty in fulfilling customer orders and demands, are the company's key challenges in reaching higher improvement as per its plan.

Engagement of people

Employees and other staff members each contribute something unique to the company's production process. The human resources, or HR, department is responsible for communicating any orders or regulations to employees. But, in this organization, a major issue is that employees must only accept the company's rule of law rather than accept their suggestions, issues, and engagement in improving the quality system.

Evidence Based Decision Making

In this company even if the management teams of different departments lack experience and internal auditors. They try to pass decisions of reliable and consistent as much as possible in a moderate way.

4.3.3 Descriptive Analysis of Operational Performance

As it can be seen in the Table 4.5, the descriptive statistic value of operational performance dimensions, the average mean value of 2.9 is the maximum mean value, which is customer satisfaction with a standard deviation value of 1.21, and cost has the minimum mean value of 2.54 with a 1.18 standard deviation value. The other operational performance dimensions have values between these two. As in the analyzed respondent response about the performance of the company, customer satisfaction was a well-performed performance of the company, while cost was the least-performed performance of the company.

Table 4.5: Descriptive statistics for operational performance

Operational performance Parameters	No	Mean	S. D
On time Delivery	207	2.71	1.15
Cost	207	2.54	1.18
Resource Utilizatio0n	207	2.61	1.09
Rework	207	2.60	1.07
Product Quality	207	2.76	1.22
Customer satisfaction	207	2.9	1.21
Employee Moral	207	2.67	1.16
Efficiency	207	2.57	1.24

Source: Own survey (2022)

4.3.4 On time Delivery

By considering the delivery status of more than a year's worth of orders from different types and styles of buyers that have already completed their due dates, as seen in Fig 4.1. none of the delivered orders exceeded 76%, even if the delivery status achievement rate exceeded 60%. This indicates the company needs to implement a pre-correction approach. Due to this, the company spent additional shipping costs as well as any additional buyer’s crises for any of the remaining orders that were late or undelivered until the due date. In order to minimize this cost of crises, the company needs to improve its rate of on-time delivery.

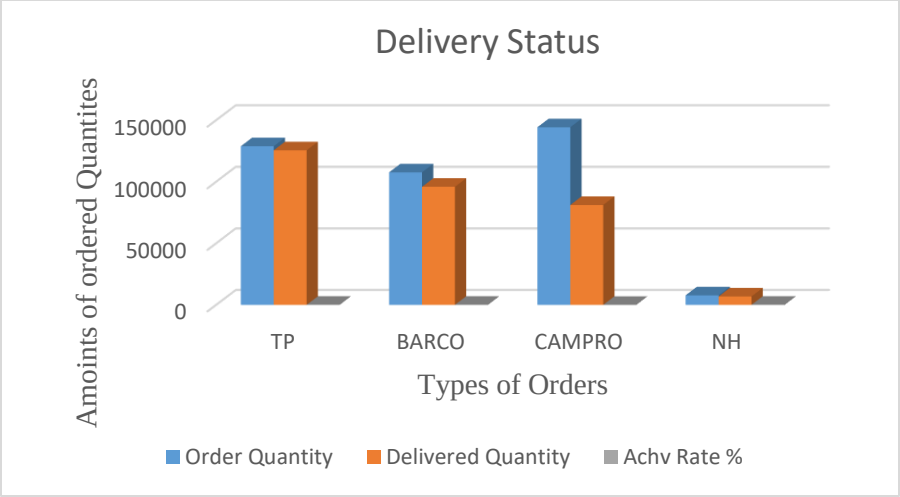

Figure 4.1: Delivery status

Source: company's shipment reports (2022)

Most interviewers express their concern about the company's ability to deliver on time. The company spent the majority of its production time replacing damaged parts and reworking the defective ones due to the endless interest and quality of the customer's demand. Because of this, the company tried its best but still didn't deliver most of the customer's order on time.

4.3.5 Production Cost Analysis

Fig 4.2 shows, the company can determine its monthly needed production cost by taking into account the number of products produced during the month and the needed production cost for any orders produced. This study compares the needed production cost with the actual spent production cost by taking a year's worth of each month's cost. The expected exact amount of monthly production costs is known to check the company's production cost status. The fact that the company spent more on production costs during the comparison period than the exact amount of production cost needed for the produced products this shows the company spent additional costs than was needed. The reason behind this is due to lost materials, replacing damaged or reworked materials, and improperly utilizing resources.

According to the interviewers, the company chose the order quantity with the higher production cost over the order number with the lower production cost because the higher production cost would result in greater revenue for the company. The company attempted to reduce its production costs but was unable to do so due to the cost of replacing damaged parts and other related expenses.

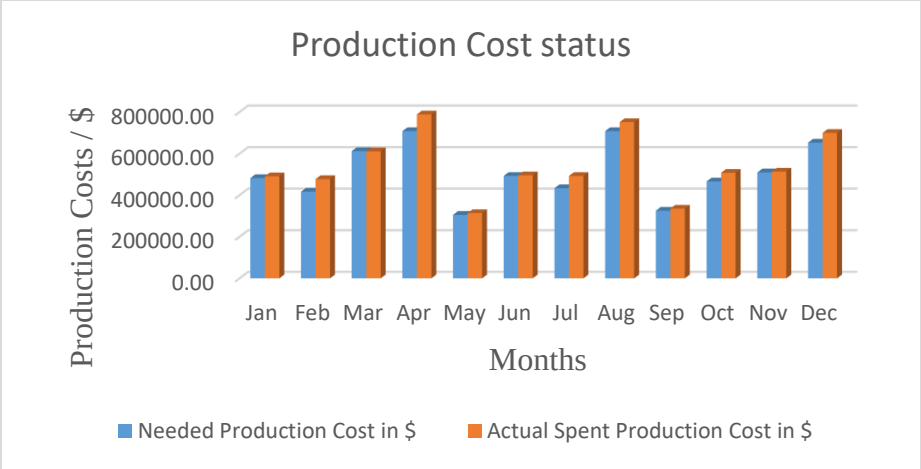

Figure 4.2: Production cost repot

Source: company's financial reports (2022)

4.3.6 Resource Utilization

As shown in Fig 4.3, the resource utilization is one of the basic parameters to check the company's performance. Of the many utilized resources, the material required to produce a product is the most basic resource. This study focuses on comparing the planned required material with utilized material of different orders along with their quantities. During the comparison, for almost all of the orders, the company utilized its materials as its planned materials, even though some additional materials were utilized in order to replace damaged or reworked parts.

As most of the interviewers say, the basic resource utilization concept in this company is mainly related to the utilities needed to produce a product, such as labor, time, and so on.

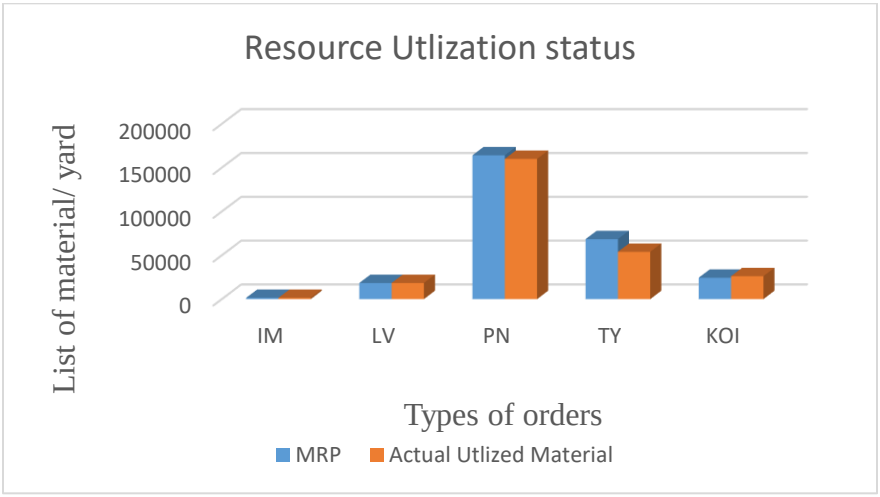

Figure 4.3: Resource utilization status

Source: company's Material Requirement Plaining department (2022)

The company has a control team or material requirement plan team to monitor each resource properly and utilize each resource properly.

4.3.7 Reworked Defect Analysis

As shown in Fig 4.4, in each month of a year during inspection, there are a number of defect reports from the finishing department by the buyer's quality controller or by the company's finishing department quality workers before packaging the finished products that need rework. Even if there is an acceptable or allowable amount of defect rate for the garment company, it is below 5% (Shrestha, 2019). Most of the monthly inspected defect rate for the company is above 5%. Therefore, the company spent most of its production time reworking the defects. From the interviewer's side, as the company produces export-standard products and all its buyers are from different foreign countries, they need neat, good-quality products. To achieve this quality, the company's workers become very difficult to manage due to this. To deliver this order, there are several defects and damages that need rework.

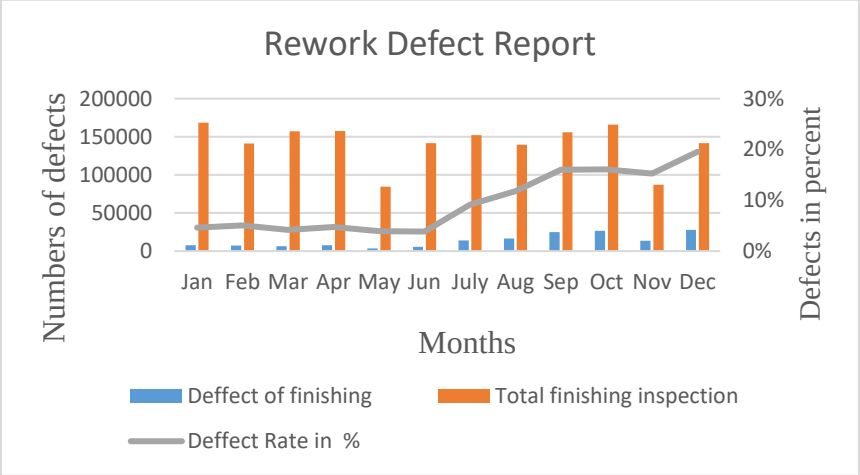

Figure 4.4: Defect status

Source: company's quality department (2022)

4.3.8 Employees Moral

Employee moral can be expressed or depends in a variety of ways, including incentives, monthly salary increases, and other methods of rewarding top performers. This is an external push or from the company side, even if the company has this system to motivate employee morale. This study wants to check the employee's morale based on their own interest in working for the company or their working position. This can be carried out by checking their monthly attendance over the

course of a year in order to check their absenteeism. By comparing how many times the employees are absent with relevant or significant reasons, which are due to sickness, permission, annual leave, etc., and absenteeism of employees without any reasons in each month, as show in Fig 4.5 that in each month there are employees who are absent from their working place without any reasons.

From the interviewer's opinion, keeping employees' morale high requires that employees with good productivity and discipline without absenteeism are awarded with monthly incentives and salary increments to keep their morale as high as possible. For this reason, the company keeps employee's morale high.

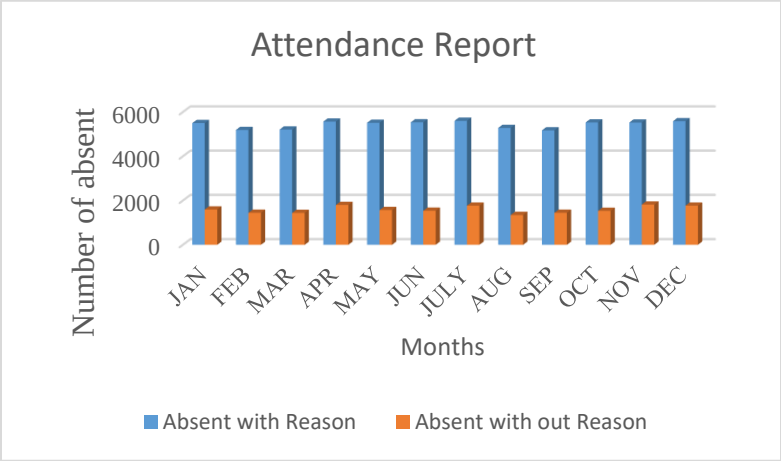

Figure 4.5: Attendance report

Source: company's database (2022)

4.3.9 Efficiency Analysis

The monthly efficiency report of the company as show in Fig 4.6 of each month of a year indicates the company's achievement rate is below its monthly target efficiency. Even if their achievement rate of the target efficiency of each month shows above 50%, none of the monthly reports achieve above 71%; therefore, this shows the company's efficiency is at an average level or the company's degree of performance is in average. Even though the company receives a large number of orders with varying styles and has a large number of workers and efficient resources, the company try but not achieve its tasks as much as possible.

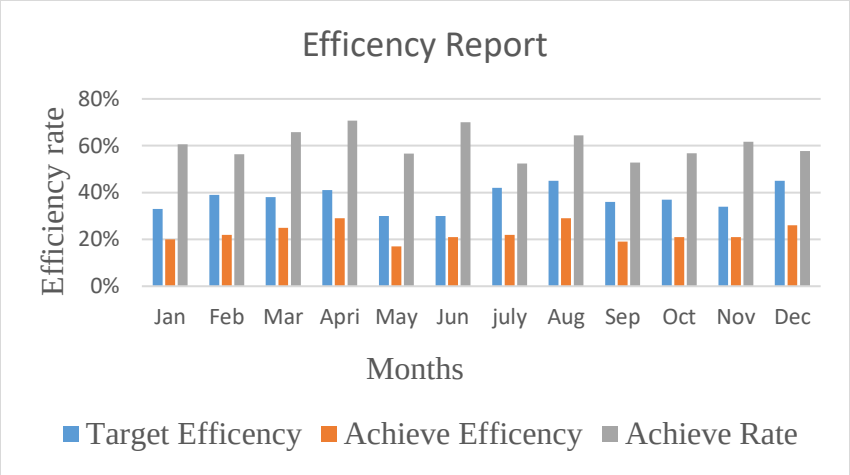

Figure 4.6: Efficiency status

Source: company's production reports (2022)

4.3.10 Product Quality

From the interviewer's point of view the company implemented a three-stage quality checking process in the working lines, final inspection process, and finishing department before dispatching or packing to meet the standard quality level requirements of customers' interest. Even if the company has a number of defects, it repairs each defect to get a good quantity of product. Most of its buyers are satisfied with the products because of their good quality even if it takes a lot of time to deliver the orders on time.

4.3.11 Customer Satisfaction

The company serves its customers by continuously assessing their needs and demands. Since customer satisfaction is not a one-time job, the company is always alert to ask for feedback across all its customers and share it with the concerned departments. Following customer demand and feedback to work on improvement is the company's strategy and the satisfaction performance level is moderately.

4.4 Correlation Analysis

Bivariate correlation explores the relationship between two variables. It examines the strength of the linear relationship between the variables. The strength of the correlation is explained by the calculated correlated coefficient, which is between -1 and +1. The Pearson coefficient 'r explains the direction and strength of the relationship between variables. A positive sign (+) indicates there is a positive relationship, while a negative sign (-) indicates a negative relationship between variables (patrickschober, 2018). If Pearson 'r becomes 0, there is no relationship between

variables; the absolute value of Pearson ‘r from 0–0.3 indicates a weak linear relationship; values between 0.3–0.7 indicate a moderate linear relationship; and the absolute value of 1 indicates a perfect linear relationship. As one variable increases, the other variable increases in value, but most of the time the value of 1 appears from the correlation of one variable by itself (Ratner, 2009). On the other hand, the correlation is significant at $p < 0.01$ from both sides, or 2-tailed.

Table 4.6: Correlation between variables

		TMC	CF	SM	PA	CI	EOP	EBDM	OTD	Cost	PQ	RU	R	CS	EM	E
TMC	Pearson-r	1														
CF	Pearson-r	.756**	1													
SM	Pearson-r	.725**	.726**	1												
PA	Pearson-r	.680**	.625**	.695**	1											
CI	Pearson-r	.664**	.610**	.664**	.761**	1										
EOP	Pearson-r	.662**	.568**	.630**	.714**	.763**	1									
EBDM	Pearson-r	.584**	.560**	.601**	.682**	.672**	.741**	1								
OTD	Pearson-r	.667**	.624**	.603**	.611**	.625**	.579**	.636**	1							
Cost	Pearson-r	.648**	.578**	.639**	.674**	.696**	.687**	.682**	.657**	1						
PQ	Pearson-r	.669**	.600**	.601**	.632**	.678**	.668**	.642**	.672**	.755**	1					
RU	Pearson-r	.643**	.578**	.640**	.681**	.667**	.690**	.658**	.633**	.744**	.737**	1				
R	Pearson-r	.613**	.525**	.564**	.536**	.568**	.599**	.551**	.586**	.595**	.692**	.679**	1			
CS	Pearson-r	.567**	.507**	.543**	.581**	.636**	.644**	.602**	.620**	.576**	.637**	.616**	.704**	1		
EM	Pearson-r	.539**	.462**	.524**	.561**	.479**	.580**	.528**	.525**	.486**	.460**	.539**	.595**	.699**	1	
E	Pearson-r	.556**	.471**	.521**	.552**	.548**	.613**	.545**	.560**	.564**	.634**	.642**	.689**	.726**	.707**	1

**. Correlation of variables (2-tailed significant at the 0.01 level and N=207) Source: Own survey (2022)

Key: TMC (Top Management Commitment), CF (Customer Focus), SM (Supplier Management), PA (Process Approach), CI (Continuous Improvement), EOP (Engagement of People), EBDM (Evidence Based Decision Making), OTD (On-Time Delivery), PQ (Product Quality), RU (Resource Utilization), R(Rework), EM (Employees Moral), and E (Efficiency).

As shown in the Table 4.6, correlation test result of this study concerns the correlation test analysis of the two unlikely inconsistencies that are between the QMS parameters and the operational performance dimensions. Between these two components, there is a positive linear relationship. When it comes to the magnitude of the relationship, the result of the correlation between the QMS parameters and the operational performance dimensions ranges from r = 0.462 between customer focus and employee morale to r = 0.696 between continuous improvement and cost. According to the interval relationship of the correlation coefficient, the result for this study is within a moderately positive linear relationship.

4.5 Regression Assumption Tests

The objective of the study is to evaluate the effects of QMS practices on the operational performance of the case company. In order to achieve this objective, correlation and regression analysis must be performed. To ensure that the acquired data and the assumption model are valid, accurate, and reliable before conducting these analyses, the following assumption tests must be carried out: The multicollinearity test is required to assess the degree of collinearity between the study's independent and dependent variables; the normality test is required to assess the normality of the distributed data; the linearity test is required to assess the degree of change between the independent and dependent variables; and the autocorrelation test is required to assess the independence of the QMS practice.

4.5.1 Normality Test

This study checks the normality test of the distributed data using the two widely known and most of the research performed the assumption test: the Z-value and the histogram graphical representation methods. The Z-score or value test is one of useful methods to test the normality of distributed data. This value is obtained by dividing the skewness and kurtosis values by their standard errors (Kim, 2013). Skewness tells about the symmetry of the distributed data, whereas the kurtosis provides information about the peak of the distribution. For a small sample size ($n<50$), a Z-value between +/-1.96 is enough to say the distribution is normal, whereas for a sample size

between 50 to 300, a Z-value between +/-3.29 is enough to say the distribution of the data is normal. (Mishra, 2019).

As in Table-4.7 shows, the normality test result of this study the Z-values for the skewness ranges from 0.556 to 2.173 where as for the kurtosis the Z-value ranges from 0.401 to -2.160 therefore according to this method the normality test of assumption for this study is achieved.

Table 4.7: Normality test

		Skewness			Kurtosis		
	N	Statistic	Std. Error	Z-Value	Statistic	Std. Error	Z-Value
TMC	207	0.350	0.169	2.071	-0.625	0.337	-1.857
CF	207	0.331	0.169	1.957	-0.643	0.337	-1.911
SM	207	0.094	0.169	0.556	-0.721	0.337	-2.144
PA	207	0.277	0.169	1.639	-0.725	0.337	-2.154
CI	207	0.349	0.169	2.066	-0.626	0.337	-1.860
EOP	207	0.364	0.169	2.154	-0.390	0.337	-1.159
EBDM	207	0.360	0.169	2.132	0.135	0.337	0.401
OTD	207	0.354	0.169	2.097	-0.688	0.337	-2.045
C	207	0.342	0.169	2.025	-0.651	0.337	-1.935
PQ	207	0.334	0.169	1.976	-0.714	0.337	-2.123
RU	207	0.367	0.169	2.173	-0.668	0.337	-1.985
R	207	0.280	0.169	1.656	-0.646	0.337	-1.920
CS	207	0.284	0.169	1.680	-0.590	0.337	-1.753
EM	207	0.356	0.169	2.105	-0.694	0.337	-2.062
E	207	0.328	0.169	1.939	0.727	0.337	2.160

Source: Own survey, 2022

The histogram is the next well-known method to test the normality of the distributed data. Data visualization, which is presented in a graphical way, is a useful tool for communicating research findings. If the graph is approximately bell-shaped, we can say the data are normally distributed. (p.Armitag, 2002). As shown in Fig 4.7 the histogram looks approximately bell-shaped and the data are distributed symmetric to the center therefor the residuals are normally distributed. Due to this the normality test of assumption is fulfilled.

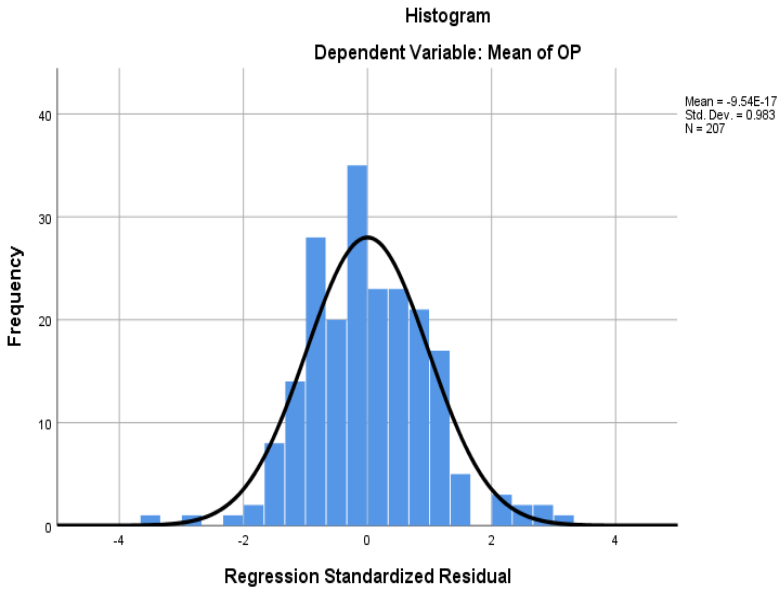

Figure 4.7: Normality test

Source: Own survey, 2022

4.5.2 Linearity Test

Linearity measures the degree of the change in the dependent variable on the independent variable. In the normal P-P (probability-probability) plot diagonal line, the standard residuals are compared with the normal distribution presented by the straight diagonal line. If the dependent and independent variables have a linear relationship, the distributed data appear along the straight diagonal line. (Mishra, 2019). As shown in the Figure 4.8 P-P plot diagram, the required linearity test of the assumptions in the case of this study is fulfilled. On the other side, the most commonly known linearity test of the assumption method is by observing the scatter plot diagram. If in the scatter plot most of the data appears around the center of the plot, linearity is achieved (pallent, 2010). As shown in Appendix 1, the scatter plot of this study supports the assumption of linearity.

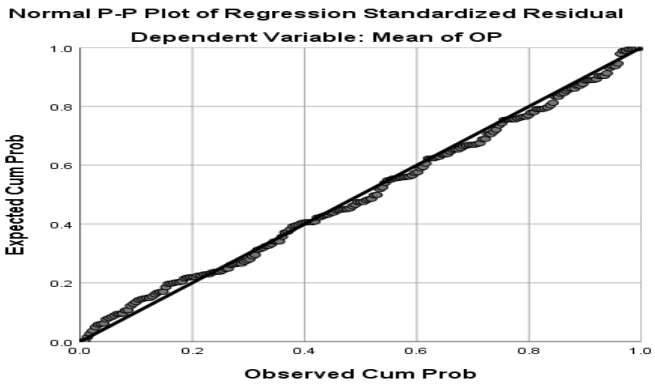

Figure 4.8: Linearity test

Source: Own survey, 2022

4.5.3 Multicollinearity Test

Multicollinearity is the test of the relationship between predictor or independent variables with one another in the case of multiple regression. This problem of multicollinearity occurs when independent variables become highly correlated with each other above the limit range, causing inaccurate variance and an unstable approximation. In order to measure these assumptions, there are two known methods: the tolerance value measure and the variance of inflation (VIF) (Pallant, 2015). In the case of the tolerance measure, the tolerance value of each independent variable should not be below 0.10. whereas for the method of VIF, for the result of predictor VIF values up to 4, it becomes accepted because there are no collinearity problems, for the result from 5 to 10, there is a little collinearity problem but it is accepted because it is not a serious multicollinearity problem, but if it is > 10, there is a serious multicollinearity problem and the result is not accepted (Habshah, 2010).

Table 4.8: Collinearity Test

	Collinearity Statistics	
	Tolerance	VIF
TMC	.314	3.187
CF	.353	2.830
SM	.343	2.919
PA	.314	3.182
CI	.304	3.286
EOP	.298	3.353
EBDM	.390	2.563

Source: Own survey, 2022

As in Table 4.8, the multicollinearity test result of this study indicates that the tolerance value of this study is above 0.10 and the VIF value of the study is below 4, which implies that there is no collinearity between independent variables. Therefore, the multicollinearity assumption is fulfilled, and there is no multicollinearity problem.

4.5.4 Autocorrelation Assumption Test

Autocorrelation or independence of observation test assumption is the measure of the independence of the residuals from one another, or the errors should not be correlated. The autocorrelation assumption test can be checked by using the Durbin–Watson method. The Durbin-Watson values are between 0-4. If the result is 2, there is no autocorrelation problem and the residuals or error terms are not correlated. If the Durbin-Watson result is between 0 and 2, the autocorrelation is positive, whereas from 2.1 to 4.0, the negative autocorrelation becomes accepted from 1.5 to 2.5 (Yanguang, 2016).

Table 4. 9: Autocorrelation Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.864[a]	.746	.737	.494	1.697

a. Predictors: (Constant), EBDM, CF, CI, SM, TMC, PA, EOP

b. Dependent Variable: OP

Source: Own survey 2022

As shown in Table 4.9, the autocorrelation assumption of this study shows that the Durbin-Watson value is 1.697, according to Durbin-Watson, and that the value is between the accepted ranges of 1.5-2.5, which is close to 2. Therefore, there is no autocorrelation problem and the study can proceed to the regression analysis.

4.6 Regression Analysis

In the multiple regression analysis, the study analyzes the effect of QMS practice on each of the operational performance dimensions. The correlation analysis did not tell the effect of one variable on the other; it only told the relationship. Whereas in the regression analysis, there is dependence between one variable on another. Multiple regression analysis analyzes the effect of two or more independent variables on the one dependent variable through different kinds of inferential statistical tests, like the R-value, which tells the correlation relationship between variables. The

ANOVA test to check the significance of the regression model the coefficient part is used to measure the level of effect of independent variables on the dependent variable (Dhakal, 2018).

4.6.1 Regression Analysis Results of QMS Variables on Time Delivery

Table 4.10 shows, the result of the regression model analysis of QMS on on-time delivery performance shows that the model is significant at $P < 0.05$. The correlation coefficient value of R=0.751 shows there is a positive relationship between independent and dependent variables. The R-Square = 0.563; this value represents the predictor variables together are responsible for 56.3% of the variance in the on-time delivery performance of the dependent variable. Whereas the adjusted R-squared value of 0.548 specifies the addition of another unobserved predictor in the dependent variable.

The analysis of variance, or ANOVA, test is used to check the significance of the regression model to the data. Used to test the model, the F-test or ratio is preferred, as shown in the Table 4.10 of the ANOVA, part F-ratio = 36.680 with a significant value of 0.000, which is less than 0.05. This implies the regression model is good enough to fit the sample data. And the on-time delivery performance of the company is dependent on its quality management practices.

The coefficient part of the Table 4.10 indicates the test value of each QMS predictor's statistically significant prediction values on the dependent variable of on-time delivery. From the test result, the variables "top management commitment ($\beta = 0.275$) and "evidence-based decision making ($\beta = 0.334$) are statistically more significant at $P< 0.05$ therefore, these practices of QMS variables have a greater effect on the on-time delivery performance of the case company. The multiple regression analysis for the rest of the QMS variables on the remaining operational performance dimensions coefficient analysis part is listed in Appendix B.

Table 4.10: Regression analysis of QMS on time delivery

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.751[a]	.563	.548	.774

Where, EBDM- is evidence-based decision making, CF-customer focus, CI-continuous improvement, SM-supply management, TMC-top management commitment, PA-process approach and EOP-engagement of people.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	153.812	7	21.973	36.680	.000[b]
	Residual	119.212	199	.599		
	Total	273.024	206			

Were, OTD-on time delivery

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.291	.169		1.725	.086
	TMC	.275	.083	.277	3.316	.001
	CF	.157	.085	.145	1.843	.067
	SM	.034	.082	.033	.418	.677
	PA	.042	.083	.042	.506	.614
	CI	.158	.084	.160	1.889	.060
	EOP	-.081	.088	-.079	-.919	.359
	EBDM	.334	.085	.295	3.928	.000

a. Dependent Variable: OTD

Source: Own survey 2022

4.7 Structural Equation Model

Structural equation modeling is a multivariate statistical analysis that is used to measure and evaluate the relationship and effects between latent variables. Through the combination of factor analysis and multiple regression. Due to the objective of this study is to evaluate the effects of QMS practice on the operational performance the main role of structural equation modeling in this study is in order to estimate and evaluate the effect of QMS practice on the operational performance by using statistical data and mediators of supplier management and engagement of people with in measurable error. Before modeling structural equation, testing the model between latent variables and their indicators as well as the correlational relationship between the latent variables is important the known factor analysis used to this simultaneous test is confirmatory factor analysis or measurement model.

4.7.1 Measurement Model

Measurement models (confirmatory factor analysis) describe or are used to measure test models that specify the relationship between indicators and their latent variables and the correlational relationship among latent variables. In this study, the relationship between the measured variables and their latent variables is significant, which means the standardized factor loading or the regression weight values are > 0.5 as shown in Figure 4.9. Whereas in the estimate part of the CFA result, the unstandardized regression weight and standardized regression weight values both have significant values, even the $p < 0.001$, the standardized value of covariance, which is the correlation between latent values, is significant, and most of the values are approaching 1.

In the model fit part of the CFA of this study, the chi-square value of $p < 0.05$ is significant, but it is expected to be insignificant, or the p-value has to be > 0.05 because as the chi-square value decreases, the model indicators improve, but in this study due to the larger sample size, it impacts the p-value. The value being that much did not make a problem because the study got a good significant chi-square per degree of freedom value of 2.325, which is <5. The NFI = 0.769 and the CFI = 0.847, which is approaching 0.9. The RMSEA = 0.080 is moderately fit because it is approaching 0.08, where the RMR = 0.0525 is accepted because it is < 0.09.

Reliability and Validity Tests

Reliability and validity tests are used to test the factors' relationships in the CFA model before constructing structural equation modeling. The type of validity test used to test this kind of model is construct validity, which includes both convergent and discriminant validity. Convergent validity is used to test how close together the indicators are in their latent variables in order to carry out this test. AVG (Average Variance Extracted) should be calculated for each latent variable with its indicators, and its value of AVE must be 0.5 or more than 0.5. In the case of this study, the value of the AVE for each of the variables is greater than 0.5. Discriminant validity is used to test whether the items or indicators of a latent variable can be discriminated from the items of other latent variables. In order to check its validity, the square root of AVE must be greater than the latent variable correlation.

In this study the required values are fulfilled. Composite reliability used to test how consistent the measuring needs or used to indicate the shared variance among the observed variables of a latent construct. The value of composite reliability should be 0.7 or higher in this study the value of

composite reliability of each of the latent variables is more than 0.7. therefore, the CFA of this study is suitable in order to construct SEM.

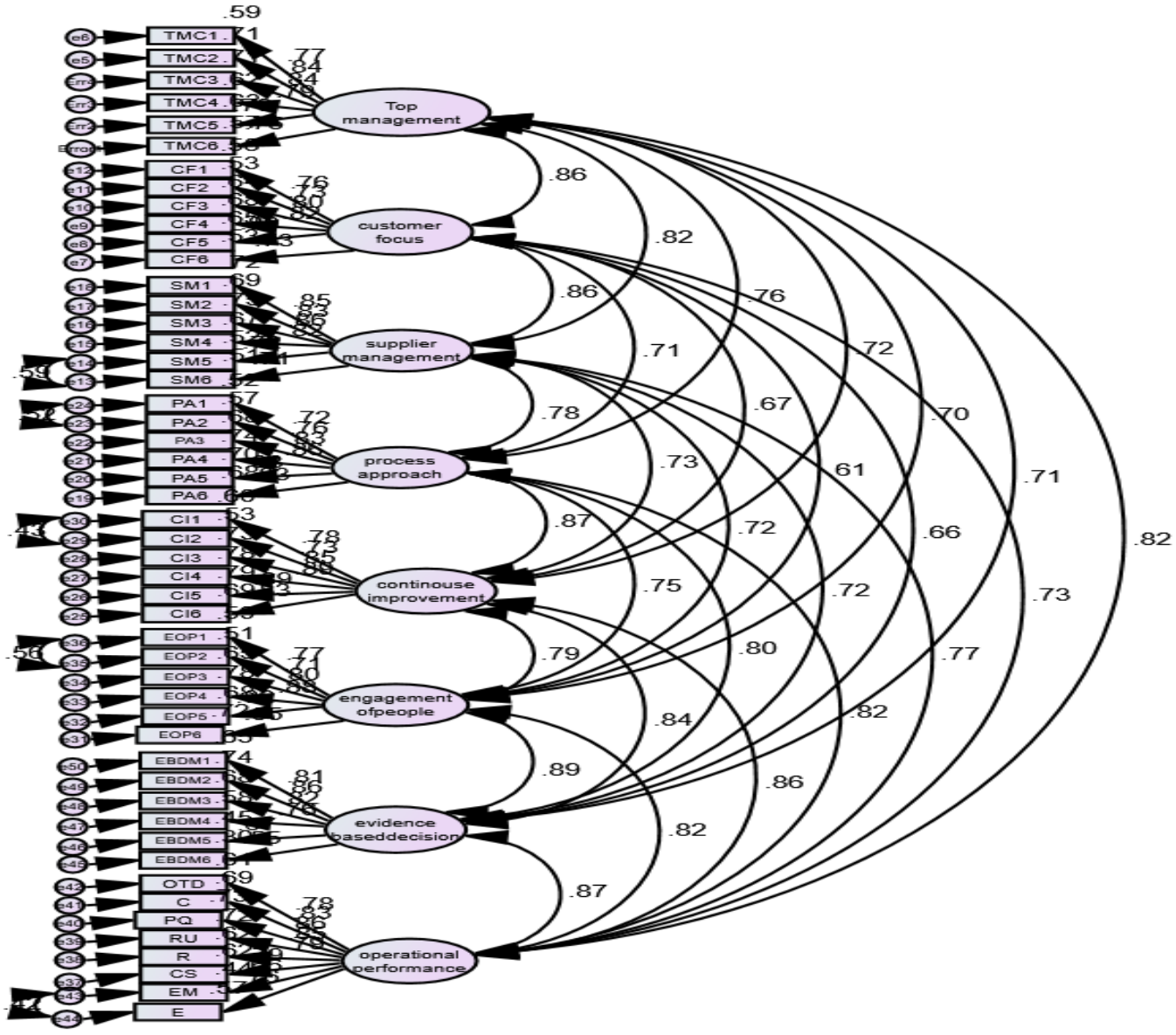

Figure 4.9: Confirmatory factor analysis

Source : Own survey, 2022

4.7.2 Structural Equation Modeling

Structural equation modeling is used to evaluate the causal effect relationship between exogenous and endogenous variables. In this study, the exogenous or independent variables are the QMS practices, and the endogenous or dependent variables are the operational performance. In order to explain the way an independent variable influences an outcome on the dependent variable, this study used Two mediator variables from QMS principles that have a maximum and minimum mean value from descriptive statistics are supplier management and employee engagement of people.These mediators are used in order to compare the output effect through these two mediators.From the regression weight value of structural equation modeling, there is no need to check the factor loading regression value because it has already been discussed in the measurement model analysis part. In this analysis part of the study, the study only discuss the relationship between constructs or latent variables. If the p-value is < 0.05, the relationship between the constructs is significant, and the critical ratio value > |1.96| means the causal effect relationship is significant. The regression weight value result between the constructs of this study is explained.

Table 4.11: Estimate of regression weight on SEM [Source: Amos V23 software (own survey 2022)]

Constructs	Path	Constructs	Estimate	S.E.	C.R.	P	Label
SM	<---	TMC	0.138	0.111	1.251	0.211	Top management commitment on supplier management
SM	<---	CF	0.536	0.114	4.704	***	Customer focus on supplier management
SM	<---	PA	0.261	0.13	2.002	0.045	Process Approach on supplier management
SM	<---	CI	0.021	0.129	0.166	0.868	Continuous improvement on supplier management
SM	<---	EBDM	0.112	0.103	1.091	0.275	Evidence based decision making on supplier management
EOP	<---	TMC	0.24	0.1	2.41	0.016	Top management commitment on Engagement of people
EOP	<---	CF	-0.151	0.096	-1.565	0.117	Customer focus on engagement of people
EOP	<---	PA	-0.023	0.115	-0.199	0.843	Process Approach on engagement of people
EOP	<---	CI	0.258	0.116	2.224	0.026	Continuous improvement on engagement of people

EOP	<---	EBDM	0.677	0.105	6.433	***	Evidence based decision making on engagement of people
OP	<---	SM	0.257	0.054	4.714	***	Supplier management on operational performance
OP	<---	EOP	0.552	0.067	8.237	***	Engagement of people on operational performance

The intercept of predicting estimation when Top Management's commitment goes up by regression weight value 1 for supplier management goes up by 0.138, which means the probability of getting a critical ratio as large as 1.251in absolute value is 0.211. In other words, the intercept in the equation predicting the regression weight for top management commitment in the prediction of supplier management is not significantly different from zero at the 0.05 level. The other constructs, though under SM mediation there are significant values for CF on SM, are significant at the 0.001 or *** level by a 4.704 C.R. value. PA and EBDM on SM are significant, whereas CI on SM is not. As shown in Table 4.11, the constructs under the EOP mediation significance level are the regression weights for CF and PA in the prediction of EOP, which are not significantly different from zero at the 0.05 level with the in-shown C.R. values. where the regression weights for TMC, CI, and EBDM in the prediction of EOP are significantly different from zero at the 0.05 level.Both the mediation construct variables SM and EOP there regression weight value in the prediction of OP is significantly different from zero at the 0.001 or *** level with in shown C.R value of 4.714 and 8.237.As the model fit part summarize even if the significance of chi-square $p < 0.05$ its chi-square per degree of freedom CMIN/DF=2.429 is significant because it is < 5. For baseline comparsion the NFI=0.749 , IFI = 0.835 and the CFI =0.834 this values are almost significant because the values are approaching to 0.9. the others basic model fit values RMSEA = 0.083 which is moderately fit approaching to 0.08 and the RMR = 0.0543 is acceptable because the value is < 0.09. for further out put model result please reffere to appeindix-C part of SEM.

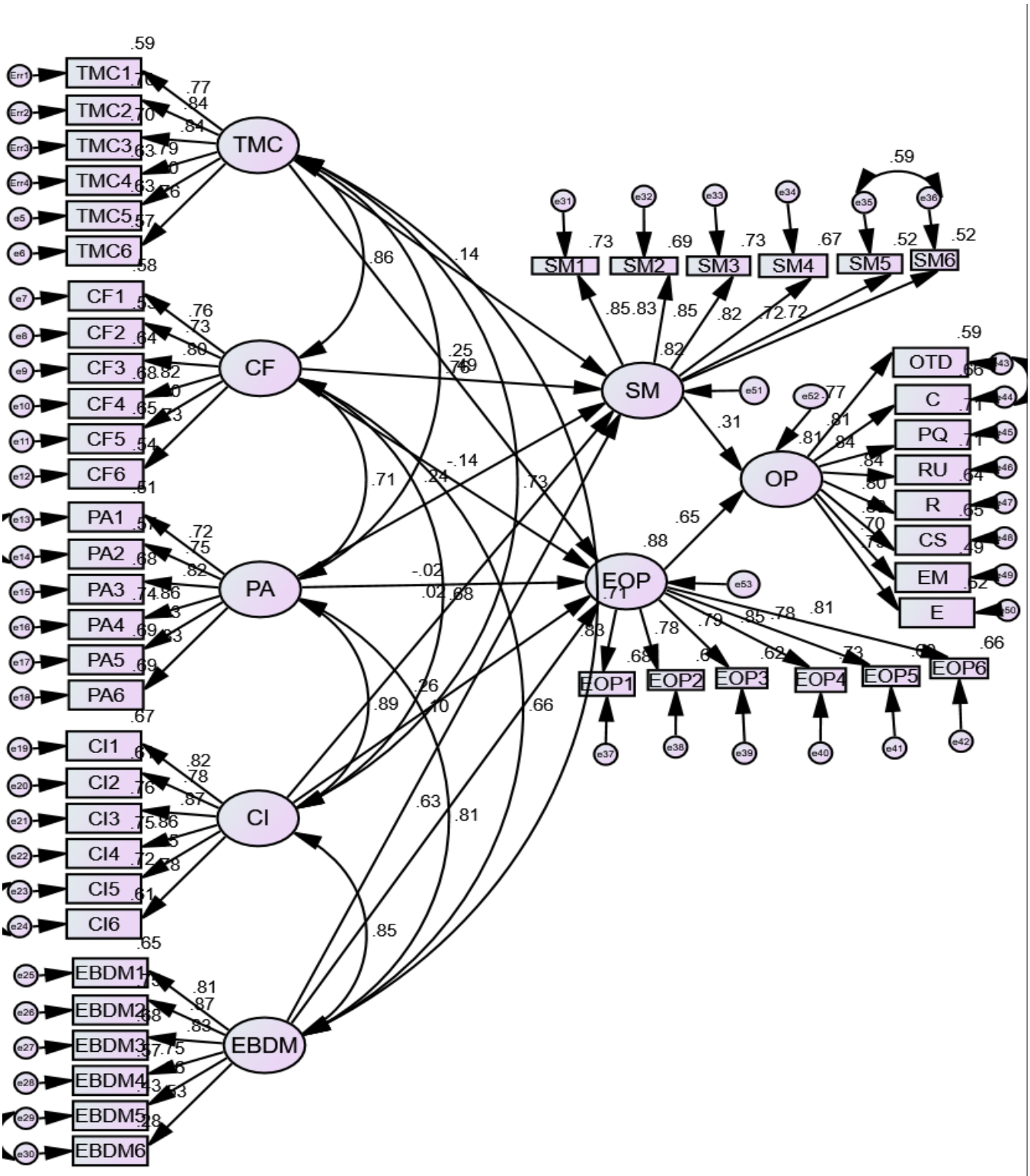

Figure 4.10: Structural equation modeling (Source: Own Survey, 2022)

The effects of exogenous (independent) variables on the endogenous (dependent) variable in this study through the two mediators are shown in Fig 4.10. The effect of QMS constructs on operational performance is explained by covariance or squared-multiple correlation analysis output. As a result, it is estimated that the predictors of EOP explain 87.6% of its variance, or the error variance of EOP is approximately 12.4% of the variance of EOP itself. The estimated predictors of SM explain 81.8% of its variance, and the error variance of SM is approximately 18.2% of the variance of SM itself.

Finally, in order to conclude the mediator's effect of the constructs on the operational performance, it is estimated that the predictor of OP explains 81.1% of its variance with an estimated error of 18.9%, or 81.1% of the variances of OP are explained by the model shown in the Fig 4.10 through the mediation of the two mediators, SM and EOP.

4.8 Discussion

A correlation analysis is carried out in order to check the relationship between QMS practice and operational performance dimensions. Based on the analysis result, there is a positive linear relationship between QMS practice and operational performance. Because the significance of the Pearson correlation values between variables is $p > 0.5$. Also, in the measurement model analysis part of SEM, there is proof that there is a significant positive relationship between latent variables and their indicators.

In order to identify and analyze the effects of QMS practice on the operational performance dimensions, the study undergoes some methods and gets its own results, as shown in the above result section of the study. This regression analysis is one of the effect analyzers; from this analysis, the study found the direct effect of each QMS practice on each of the operational performance dimensions. As seen from the coefficient part of the regression analysis result section, the seven QMS practices can have a significant effect if the significance value is $p < 0.05$. Due to this Top management commitment and evidence-based decision making have a significant effect on on-time delivery performance. Top management commitment, evidence-based decision making, and continuous improvement have a significant effect on cost and product quality in operational performance. Process approach, engagement of people, and evidence-based decision making have a significant effect on resource utilization. Top management commitment and engagement of people have a significant effect on rework and efficiency. Continuous improvement, engagement of people, and evidence-based decision making have significant effects on customer satisfaction.

Finally Process approach and engagement of people have a significant effect on employees' morale.

Interview is one of the direct effect analyzer methods this study used as a general discussion from the interviewer's point of view. As seen in the QMS interview results section, the level of QMS practice is based on the degree to which the majority of respondents agree. These principles of supplier management and process approach are properly practiced. Top-level management commitment, customer focus, and evidence-based decision making are moderately practiced. Finally, continuous improvement and engagement of people are the least practiced principles of QMS, as explained by interviewers.

The document analysis result shows the indirect effect of QMS practice. The analyzed and documented data shows the company's operational performance degree of achievement status, as seen in the result section of the analyzed and documented report. The yearly reports of shipment status imply that the achievement rate of the delivery status is not more than 76%. This implies the company needs additional effort to exceed its achievement at least up to 90% because one of the customer's needs is to receive its product on time. The cost operational performance analyzed report shows the company spent additional cost of production for replacing the damaged orders. The report's analysis of resource utilization shows the company utilizes its materials according to its plan. The big challenges of the company are to improve its rework performance. As seen in the rework analysis document in the result section, the defect rate of the company is more than 5%, which is higher than the estimated range. This study measures the employee's morale based on their interest in working for this company or their working position based on their absenteeism during this period. The result shows there are a number of employees absent without any reason. Finally, the analyzed efficiency result shows none of the monthly reports achieve above 71% efficiency, which means the company's efficiency is at a moderate level.

The structural equation modeling result analysis of this study shows in the result section of the SEM analysis there is an aggregate effect of QMS practice on the operational performance through the two comparing mediators supplier management and engagement of people. From this result, the study proves that the QMS practice, through the mediators of supplier management, has an 81.8% effect on operational performance with a measurable error of 18.2%, whereas the QMS practice, through the mediator of engagement of people, has an 87.6% effect on operational performance with a measurable error of 12.4%.

Chapter Five

5. Conclusions and Recommendations

5.1 Conclusion

Proper practice of QMS plays a significant role in achieving the company's performance goal. This study stands to evaluate the actual effect of QMS practice on the operational performance of Shints Garment PLC. In order to properly evaluate the effect, the study used appropriate methods. The correlation analysis result implies there is a positive and linear relationship between QMS practice and operational performance dimensions. This means whenever there is any change to the QMS practice, it can change or affect the operational performance dimensions.

The regression analysis result indicates the extent to which QMS practice has an effect on operational performance dimensions. Top management commitment, evidence-based decision-making, and engagement of people have a significant effect at least on five operational performance dimensions. Continuous improvement and process approaches have a significant effect on two operational dimensions. Customer focus and supplier management practices have no significant effect on any of the eight operational performance dimensions. This result indicates the company has a lack of taking or practicing equally all seven QMS principles.

From the interviewer's point of view, the study concludes that the company lacks continuous improvement and equally participating employees in any discussion or decision, as well as an experienced internal auditor. The result of the analyzed documented report shows a lack of strong performance in delivering the ordered quantity on time, optimizing the company's production cost, minimizing the reworked defect, and improving working efficiency. From this, the study concludes that beyond this lack of achievement, there is improper practice of QMS because, as seen from the correlation analysis result, there is a direct relationship between QMS practice and performance. As the structural equation modelling result shows, the aggregate effect of QMS practice on operational performance through supplier management mediators is 81.8%. and through the engagement of people, the mediator is 87.6%. the average effect of QMS practice on the operational performance dimensions is 84.7%. so, the company under the study cannot make analysis like this. Making QMS practice from this point of view is necessary for the development of the company's performance.

5.2 Recommendations

Afterward, this thesis dealt with solving the company’s performance evaluation problems. The company has to evaluate its performance status at regular intervals of time. Because the weak performance of one operational performance dimension becomes the consequence of the other operational performance, so that the company should seriously be concerned about each performance achievement level. On the other side, the company must follow clear standards of QMS principles as working methods and provide immediate remedial solutions for quality performance problems. In addition to this, giving better attention to its customers' feedback, a proper response, and having experienced technical experts transform knowledge and experience for the rest of the workers will improve the company's performance.

5.3 Suggestion for Future Research

The future researchers can work on other companies in order to provide more convenient and better analysis. Also, future researchers can evaluate the effect of QMS practice on the company rather than operational performance like business, finance, and organizational performance in the case of garments and any other manufacturing and service sector companies. Using different software or any other mathematical equations, future researchers can analyze the effect level of QMS practice on other variables at the numerical level or the degree of effect. This study can only achieve the numerical analysis of the operational performance dimension, not the QMS principle.

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Appendix-A

Questionnaires format for QMS and its practice

Top management commitment (Leadership)	**1**	**2**	**3**	**4**	**5**
1,Top management establish comprehensive organization's vision, policy and goals for quality program of the company					
2,Top management of major department heads of our company accept their responsibility for quality					
3,Our top management are committed to quality improvement as a way to increase profit					
4,Top management reviews company's QMS at planed intervals to ensure acceptability, continuity and effectiveness					
5,Top management gives an understanding about quality policies throughout the company					
6, Top management strongly encourages employees involvement in making decisions on quality issues.					
Customer focus	1	2	3	4	5
1, The company regularly consider customer's needs during design of the products					
2, we frequently communicate closely with the customer to identify their needs and expectations					
3, customer complaints handled positively and recorded quickly					
4, customer complaints are used as an input to improve the process					
5, The company gives immediate proper response for the complaints and measure customers satisfactions					
6, Our company announce customers current and future needs and expectations to our employees properly					
Suppliers' management (relationship management)	1	2	3	4	5

1, our company always has a requirement regarding product quality for selecting suppliers					
2, the company has a strong long-term co-operation with the supplier's performance through giving feed back					
3, our company evaluate the product quality of suppliers and sub-sup-suppliers through test equipment					
4, our suppliers contribute an input for our production of quality product development project					
5, the company's suppliers have a certification or are qualified for quality					
6, our company regularly collect and evaluate suppliers' quality audit					
Process approach (process management)	1	2	3	4	5
1, Production process of the company are well organized in order to achieve quality of process					
2, our company gives clear standards of working methods and process instructions to employees					
3, in order to manage risks, we analyze the effect of modifications to single process on the all-system process					
4, we control our production process using statistical process control tools					
5, our company gives immediate corrective response for identified process quality problems					
6, critical process is selected and systematically improved their process sequences to achieve better product quality					
Continuous improvement	1	2	3	4	5
1, Our company has continuous improvement of quality system in all working process					
2, workers of the company have a chance of continuous training to improve internal quality performance					

3, we frequently measure and improve quality systems and its practice to improve performance					
4, there is continuous review of product quality and delivery time efficiency through internal quality audit					
5, quality audit is undertaken through ISO certification requirement					
6, the company benchmark other companies which have best practice of quality management					
Engagement of people (employees)	1	2	3	4	5
1, Our company involve employees in quality management development and implementation					
2,Our company address training program for employees to improve their skills, experience and performance					
3,The company gives rewards and incentives to motivate employees for improving quality management practice					
4, Employees have a direct involvement in quality improvement decision making activities					
5, Employees satisfaction is properly and regularly measured					
6, The company gives a right of freedom to employees to use their creativities to delivery product on time					
Evidence based decision making	1	2	3	4	5
1, All staff members empowered to take decisions					
2, Employees are involved in decision making of all quality issues					
3, The company have a team of skilled manpower which undertake at the top decision-making problems					
4, The company undertake a guidance or training to the employees to be more capable of making decision					
5, Decision making participation valued and give improvement for future product quality					

Questionnaires format for operational performance

On time Delivery	**1**	**2**	**3**	**4**	**5**
1, The company deliver its product on time to customers					
2, The company establish a fast delivery performance system					
3, our company improve its production lead time					
4, the company participate and receive opinion of employees in minimizing production ideal time					
5, the company cover all crises of its customers for lead time delivered products					
Cost	**1**	**2**	**3**	**4**	**5**
1, the company reduce its production cost					
2, our company improve employee's productivity					
3, our company reduce cost of inventory and quality through different methods					
Product quality	**1**	**2**	**3**	**4**	**5**
1, our company produce consistent good quality product					
2, our company improve critical performance product characteristics					
3, all employees have good awareness level about the quality requirement of the produced products					
4, the company regularly measure and improve the quality of products					
Resource utilization	**1**	**2**	**3**	**4**	**5**
1, the company properly utilize each resource					
2, the company has properly organized material requirement plan control team					

3, each and every worker with in the company becomes responsible for its utilized resource at the production time					
4, the company optimize the utilized resource and measure its performance through time, cost and based on quality					
Rework	**1**	**2**	**3**	**4**	**5**
1, the company try to address the zero defect or other principles in order to minimize the rework					
2, the company utilized an additional resource for reworking the defective or damaged products					
3, the company try to minimize the causes for rework through its own controlling system					
4, employees become intensively trained in order to minimize the critical causes for rework					
Customer satisfaction	**1**	**2**	**3**	**4**	**5**
1, the customers are satisfied as being the customer of this company Based on prices of Products, speed of delivery, friendliness and quality of product.					
2, the company regularly measure the satisfaction level of its customers					
3, our company properly handle and give a relevant correction action for the feedback of unsatisfied customers					
4, each top management gives first priority and put it as a policy the satisfaction of customers					
Employees moral	1	2	3	4	5
1, employees are proud as being the company's employee					
2, a number of employees are absent per day without critical resource or evidence					
3, employees are committed to work overtime and have an interest of working difficult tasks					

4, the top management motivate the employee's moral through giving incentives					
Efficiency	1	2	3	4	5
1, the company measure its efficiency at a regular interval of time					
2, employees are trained intensively on quality issue to increase the efficiency of the company					
3, top management create a quality system in place to support the efficiency of the company					
4, there is maximum use of potential capability to deliver the product on time					

Semi-structured interview questions

1. What benefit has the company got due to addressing ISO: 9001Quality management system requirements? And what kinds of barriers the company faced during implementation of QMS (ISO: 9001)?

2. Have you been taking any training program related to Quality management system or any training program if you take what seems its benefit on improving the company's performance?

3. How the company satisfy its customer and what are the measure of their satisfaction level?

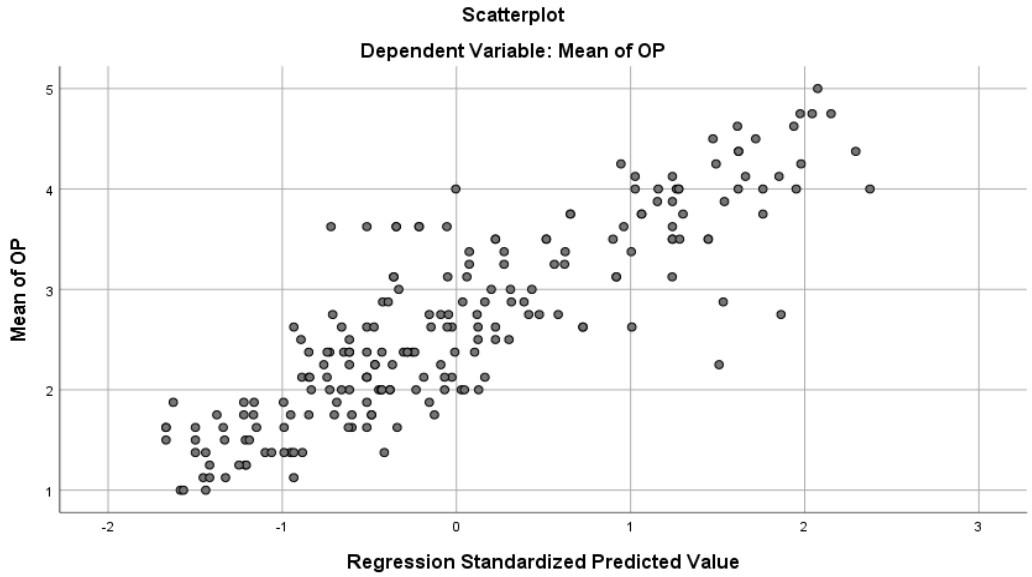
4. By what requirement the company select its suppliers? And what seems their effect on the company's performance?

5. How the company revise and documented properly reports related to operational performance and quality?

6. How the company evaluate its operational performance in terms of each dimension with in fixed interval of time?

7. How do you explain the impact of quality management system or principles on the operational performance of the company?

Appendix-B



Regression Analysis Results of QMS Variables on Cost

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.003	.162		.019	.985
	Mean of TMC	.156	.080	.154	1.959	.052
	Mean of CF	.000	.082	.000	.003	.998
	Mean of SM	.120	.079	.113	1.507	.133
	Mean of PA	.093	.080	.091	1.166	.245
	Mean of CI	.197	.080	.195	2.453	.015
	Mean of EOP	.126	.084	.120	1.498	.136
	Mean of EBDM	.281	.082	.241	3.434	.001

a. Dependent Variable: Mean of Cost

Regression Analysis Results of QMS Variables on Product Quality

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		

1	(Constant)	.222	.174		1.274	.204
	TMC	.254	.085	.241	2.974	.003
	CF	.097	.088	.085	1.109	.269
	SM	.010	.085	.009	.118	.906
	PA	.019	.086	.018	.217	.828
	CI	.225	.086	.215	2.612	.010
	EOP	.147	.090	.135	1.623	.106
	EBDM	.230	.088	.191	2.627	.009

a. Dependent Variable: Mean of PQ

Regression Analysis Results of QMS Variables on Resource Utilization

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.296	.154		1.925	.056
	TMC	.127	.076	.134	1.677	.095
	CF	.016	.077	.016	.210	.834
	SM	.127	.075	.130	1.693	.092
	PA	.148	.076	.156	1.953	.052
	CI	.091	.076	.097	1.191	.235
	EOP	.187	.080	.192	2.342	.020
	EBDM	.193	.078	.179	2.495	.013

a. Dependent Variable: RU

Regression Analysis Results of QMS Variables on Rework

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.670	.174		3.852	.000
	TMC	.257	.085	.279	3.010	.003
	CF	.016	.087	.016	.182	.856
	SM	.113	.085	.118	1.328	.186
	PA	-.040	.086	-.043	-.464	.643
	CI	.081	.086	.089	.941	.348
	EOP	.186	.090	.196	2.057	.041
	EBDM	.140	.088	.133	1.601	.111

Regression Analysis Results of QMS Variables on Customer Satisfaction

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.614	.192		3.197	.002
	TMC	.120	.094	.114	1.267	.207
	CF	.027	.097	.024	.278	.781
	SM	.047	.094	.043	.499	.618
	PA	.017	.095	.016	.177	.860
	CI	.230	.095	.221	2.419	.016
	EOP	.236	.100	.218	2.369	.019
	EBDM	.210	.097	.175	2.170	.031

Regression Analysis Results of QMS Variables Employees Moral

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.727	.197		3.680	.000
	TMC	.166	.097	.165	1.709	.089
	CF	-.015	.099	-.014	-.156	.876
	SM	.131	.096	.126	1.362	.175
	PA	.210	.097	.208	2.159	.032
	CI	-.163	.098	-.164	-1.667	.097
	EOP	.298	.103	.288	2.906	.004
	EBDM	.136	.100	.118	1.361	.175

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.727	.197		3.680	.000
	TMC	.166	.097	.165	1.709	.089
	CF	-.015	.099	-.014	-.156	.876
	SM	.131	.096	.126	1.362	.175
	PA	.210	.097	.208	2.159	.032
	CI	-.163	.098	-.164	-1.667	.097
	EOP	.298	.103	.288	2.906	.004

	EBDM	.136	.100	.118	1.361	.175

Regression Analysis Results of QMS Variables on Efficiency

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.436	.209		2.091	.038
	TMC	.196	.102	.182	1.912	.057
	CF	-.021	.105	-.018	-.197	.844
	SM	.085	.102	.076	.837	.403
	PA	.085	.103	.079	.827	.409
	CI	.028	.103	.027	.275	.783
	EOP	.324	.108	.293	2.992	.003
	EBDM	.141	.105	.114	1.339	.182

Appendix-C

Structural Equation Model part

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	177	2788.294	1148	.000	2.429
Saturated model	1325	.000	0		
Independence model	100	11108.779	1225	.000	9.068

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.749	.732	.835	.823	.834
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.937	.702	.782
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	1640.294	1489.266	1798.958
Saturated model	.000	.000	.000
Independence model	9883.779	9550.015	10224.067

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	13.535	7.963	7.229	8.733
Saturated model	.000	.000	.000	.000
Independence model	53.926	47.980	46.359	49.631

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.083	.079	.087	.000
Independence model	.198	.195	.201	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	3142.294	3258.771		
Saturated model	2650.000	3521.935		
Independence model	11308.779	11374.585		

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	15.254	14.521	16.024	15.819
Saturated model	12.864	12.864	12.864	17.097
Independence model	54.897	53.277	56.549	55.216

HOELTER

Model	HOELTER .05	HOELTER .01
Default model	91	94
Independence model	25	25