University
College of Business and Economics

Department of Management

Assessment of ISO 9001:2008 implementation at Engineering company

A Master's Thesis Submitted to the Department of Management in Partial Fulfillment for the Award of Master of Arts Degree in Business Administration (MBA)

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, Tigray, Ethiopia

Declaration

I, Gizaw Bezabih, hereby declare that the thesis entitled “Assessment of ISO 9001:2008 implementation at Engineering company” Submitted to the College of Business and Economics, University, in partial fulfillment of the requirement for the award of the degree of masters in business administration, is my original work and it has not been presented for the award of any other degree, diploma, fellowship or other similar titles of any other universities or institution.

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Certification

This is to confirm that this thesis entitled "Assessment of ISO 9001:2008 implementation at Engineering company" submitted in partial fulfillment of the requirements for the award of the degree of Masters of Business Administration with specialization in International Business to University, College of Business and Economics, the Department of Management. It is an original work carried out by Mr Gizaw Bezabih, Id. No CBE/PE: 013/04 under our guidance. To the best of our knowledge and belief, the matter embodied in this thesis has not been submitted previously for award of any degree or diploma.

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Abstract

Engineering company plc Get ISO certification from BSI eight years ago to meet the objectives of achieving institutional ownership and to participate on MEGA tender of Government which demand ISO certificate. Therefore, the purpose of this study was to determine the implementation of ISO 9001 by MIE against ISO requirements and to identify the critical factors that hinder the proper implementation. To do this research both qualitative and quantitative research methods was applied by respondents selected based on judgmental sampling related to subject matter. Accordingly the primary data collected from MIE plc of total 32 management and senior staffs by developing the questionnaires into four parts practice related to process and principles, benefits and challenges related to QMS implementation and analyzed and concluded as follows, The quality management practices are weak and benefits attained by manufacturing sectors are low due to the following main challenges like:-Lack of awareness, knowledge and Lack of ownership to QMS system in general, and Lack of accountability of process owners and Lack of top management commitment and support. And finally the researcher recommends that MIE management should change the current weak practice of QMS implementation to exist and continue as business firm on the today's strong global competition.

Key words: *quality management system, quality management process, quality management principles and ISO9001:2008.*

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Abbreviations and Acronyms

BSI	British standard institution
CERCO group	Comité Européen des Responsables de la Cartographie Officielle group.
CSF	Critical success factors
DGM's	Deputy general managers
EQA	The Ethiopian quality award
EFFORT	Endowment fund for rehabilitation of Tigray
GM	General Manager
GTP	Growth and transformation plan
ISO	International Organization for Standardization
KPI	Key Performance Indicator
KGI	Key strategic goals
Kurt	Kurtosis
Max	Maximum
MR	Management representative.
MIE	Engineering company Plc.
Min	Minimum
OHSAS	Occupational Health and Safety
PDCA	Plan, do, check and act or
PDSA	Plan, do, study and act.
PLC	Private limited company.
QA	Quality assurance
QC	Quality Control
QMS	Quality management system
QM	Quality management.
QSAE	Quality and standards authority of Ethiopia
SKEW	Skewness
SPC	Statistical process control

Std.div	Standard deviation
TQC	Total quality control
TQM	Total Quality Management
HAVAC	Heat, Ventilation, Air Conditioning
R & D	Research and development
U.S	united States

CHAPTER-ONE

INTRODUCTION

1.1. Background of the study

The growing liberalization of trade and the globalization of market present a formidable challenge to companies in developing countries in order to survive in today's global market. On the other hand, increasing number of organizations insists that their suppliers should comply with ISO management system standard requirements.

According to ''*Quality Management: Then, Now and Toward the Future''* (white paper). Retrieved from http://WWW.PP-S.COM:-

Early 1950s American gurus Deming and Juran took Quality concept to Japan and Late 1950s Japanese developed new Concepts in response to American quality concept. In the 1970s, American industry leaders were forced to take note of Japanese successes.

Particularly in the automobile and electronics sectors, Japanese products started to overtake American market share offering higher quality products at a lower cost. In response to what became an economic crisis, U.S. corporations joined the quality movement, expanding on the theories and methods.

Berahanu and Daniel (2014) points out the quality institution development as follows:

Ethiopian government started quality management since 1940's. by considering quality as a development infrastructure for agricultural products export and starting from that the Ethiopia quality institute are developed as following consecutive five periods:-

1. Pre-Ethiopian standard institute.
2. Ethiopian standard institute.
3. Ethiopian Authority for standardization.
4. Quality and standards authority of Ethiopia (QSAE).
5. Post QSAE, The Ethiopian quality award (EQA) established in the year 2007. (p. 689)

As per the report on three year (2014/15-2016/17) business plan for the expansion and diversification of MIE:-

Engineering company PLC (MIE) was established in 1993, with the objectives of manufacturing engineered metal products and started operation with reconditioned machine shop. However, since then MIE has exhibited a remarkable and continues expansion as a result of which currently, MIE has become one of the leading metal engineering companies in Ethiopia.

Nevertheless, even though MIE has been expanding its product mix through time, in terms of revenue generation the company still depends on few products. During the period 2007-2013 on average the annual revenue generated by MIE amounts to Birr 397.25 million, of which the great majority i.e. 66.09% is accounted by trucks and trailers bodies. All the remaining products and service accounts for 33.91% of the total average annual revenue.

Engineering company plc also certified by BSI ISO organization and awarded the certificate of ISO9001:2000 for the first time on year 2007, January, 31 for the objectives to ensure the EFFORT strategic pillar issued like ensure institutional ownership and to fulfill the requirements of Ethiopian Government tender.

1.2. Statement of the problem

As per the statement extracted from the report of MIE management'' … Even though the implementation of QMS by MIE is about 8 years after certified by BSI and the re-audited continually per three years once by BSI and recertified accordingly …the system lacks the top management commitment and continual improvement with dynamic customer requirements change and global competition to exploit the benefits as was expected…''

MIE was started trailer related fabrication starting from 1997 G.C and its total revenue was generated from local sales only and not at all from export sales. But the main benefit of the ISO certification is to enter to the export market that was not achieved totally by MIE.

Generally as per the statement extracted from report of MIE and the not achieved main benefit of the ISO certification, the researcher initiated to conduct this research on the implementation practice, the benefits attained by certification and the challenges faced during implementation of ISO 9001:2008 by Engineering company PLC.

1.3. Objective of the study

General Objective

- The general objective of the study is to assessment ISO 9001:2008 implementation at Engineering company PLC

Specific objectives

- To review practice and benefits of ISO 9001:2008 implementation in Engineering company PLC.
- To determine the implementation stage of ISO 9001:2008 by MIE against ISO requirements.
- To identify the critical factors those hinder the proper implementation of ISO 9001:2008 by MIE.

1.4. Research Questions

1. How does the Engineering company PLC implement the quality management process standard requirements?
2. How does the Engineering company PLC implement the quality management principles?
3. What are the benefits attained by implementing the quality management system principles?
4. What are the challenges faced during the implementation of quality management system principles?

1.5. Scope of the study

Conceptually, from general categories of Quality management systems standards this study was confined to the ISO 9001:2000-2008 standards only and not includes other standards. And the variables considered are the quality management system standard processes practice and quality management system principles(practice, benefit attained by implementing the principles and benefit attained during implementation) and Due to time and budget limitation the researcher delimited to the Design, manufacture, supply & service of low bed semi-trailers dry & liquid cargo truck trailers and semi-trailers only among the following MIE Management certified to ensure uniform quality relating to:-

- Design, manufacture, supply & service of low bed semi-trailers dry & liquid cargo truck trailers and semi-trailers
- Manufacture, erect & supply of petroleum liquid reservoirs including electrical & instrumentation system
- Manufacture & supply of fabricated products for industrial application
- Supply, erection & testing of HVAC system &Vehicle equipment maintenance & renting service; and also not addressed other barriers was identified by different research mainly cultural difference of Global countries with good implementation practiced against Ethiopia culture not addressed in this study also.

Geographically, even if MIE have head office and 2 branches with regards to the scope of the trailer related products, the study focused on assessment of the practice, benefits and challenges of ISO 9001 implementation on Engineering company PLC in city and branch office only and it was not covered the subsidiary branch.

Finally, methodologically the study employed descriptive survey, from among the different research designs such exploratory research studies, research design in case of descriptive and diagnostic Research studies and research design in case of hypothesis-testing research studies, by more relevant data obtained from managers and senior staffs of Engineering company of head office and branch. To attain the sufficient precision, the selected descriptive study demands the relevant data collection. If not done carefully, the study may not provide the desired result.

1.6. Limitation of the study

This study was delimited geographically, timely and methodologically. Geographically, it is only limited to Head office and branch only. Timely, the researcher takes data starting from MIE's implementation of ISO 9001:2008. Methodologically, the though census is presumed to have highest accuracy, because of time and money limitation, it is found beyond the reach of the researcher. Therefore, this study was conducted based on the deliberate or a judgmental sampling survey and the analysis and interpretation was done for Minimum and Maximum Mean results and summary result only. Hence, generalizing about the population based on the judgmental sampling study itself is one limitation and other limitation also the generalizing about the population based on the results of summary, Minimum and Maximum.

1.7. Significance of study

Conducting research on the benefits and challenges of QMS implementation in manufacturing sector of Ethiopia in particular in case of MIE has the following four major benefits.

First, to indicate weather MIE's existing QMS is effective or not based on standard requirements.

Second, it will help MIE management to understand the current position of QMS implementation as well as challenges that hinder for successful implementation of QMS, and will help to put strategy how to overcome that challenges.

Third, it will help to give focus on the successful implementation of QMS to exploit the abundant market opportunities created by Government GTP-1 and 2.

Fourth, the study may serve as starting ground for further research in this area.

1.8. Organization of the Paper

This study was organized in to five chapters. The first chapter incorporated basic definition, background of the study, statement of the problem and objectives of the study, significance of the study, scope and limitation of the study, and organization of the paper. The second chapter reviews the theoretical literatures, empirical literatures and conceptual frame work related to the study. Third chapter deals with the research design and methodology of the study in which introduction, research strategy and design, data type and source, method of data collection, Population and sampling techniques and data processing and method of data analysis are included. Fourth chapter provide

data, result and discussion. Finally, the fifth chapter presents conclusions, recommendations and recommendations for further work of the study.

CHAPTER-TWO

LITERATURE REVIEW

2.1.Theoretical frame work

2.1.1. Basic Definition

2.1.1.1. Quality management system (QMS)

As per the handbook prepared by CERCO Working Group on Quality (2000) a quality management system defined as follows:-

A Quality Management System can be seen as a complex system consisting of all the parts and components of an organization dealing with the quality of processes and products. A QMS can be defined as the managing structure, responsibilities, procedures, processes, and management resources to implement the principles and action lines needed to achieve the quality objectives of an organization.

On the handbook QMS also defined in two parts – its objectives, and the main components for achieving these objectives.

The objectives are:

1. Customer focus – actively reviewing customer needs through dialogue; making customers aware of new products and services; ensuring the organization is aware of customer needs; corrective action when the service fails to meet expectations.
2. Continual improvement – of products, services, working environment, staff development, and management and production processes.
3. Reduced waste – a reduction in wasted products, repeated or corrective work and unnecessary processes.

The main components are:

- The active and positive commitment of senior management.
- Good two-way communication throughout the organization that encourages a culture of initiative and improvement.

- Simple, efficient monitoring systems that enable all levels of management to identify bottlenecks and waste. Staff development that provides the correct level of competence for each job, and provides staff with opportunities to progress.
- Documentation that supports the above (PP.7-8).

2.1.2. Quality management philosophy

2.1.2.1. Total quality management (TQM)

Russell and Taylor (2011) define total quality management as:-

It was (and still is) a philosophy for managing an organization centered on quality and customer satisfaction as the strategy for achieving long-term success. It requires the active involvement, participation and cooperation of everyone in the organization, and encompasses virtually all of its activities and processes.

To achieve and sustain this pervasive focus on quality requires a significant long-term commitment on the part of the organization's leadership. Deming's 14 points and the philosophies and teachings of the early quality gurus are clearly embodied in the basic principles of TQM:

1. Quality can and must be managed.
2. The customer defines quality, and customer satisfaction is the top goal; it is a requirement and is not negotiable.
3. Management must be involved and provide leadership.
4. Continuous quality improvement is "the" strategic goal, which requires planning and organization.
5. Quality improvement is the responsibility of every employee; all employees must be trained and educated to achieve quality improvement.
6. Quality problems are found in processes, and problems must be prevented, not solved.
7. The quality standard is "no defects."
8. Quality must be measured; improvement requires the use of quality tools, and especially statistical process control (P.67).

2.1.2.2. Quality management system (QMS)

David (2001) summarized the QMS philosophy as ‘’it is not part of the management system, Rather it is a set of interrelated or interacting process that achieve the quality policy and quality objectives’’ (P.63).

Russell and Taylor (2011) also define quality management system philosophy as follows:-

It outlines the policies and procedures necessary to improve and control specific (but not all) processes that will lead to improved business performance.
An important component of any QMS is the company’s ability to measure customer satisfaction; to “hear” what the customer wants (p.67).

2.1.3. What are quality management system standards?

According to the international organization for standardization (2008) the standards of quality management system is as follows:

Quality management system (QMS) standards establish a framework for how a business manages its key processes. They can help whether your business offers products or services and regardless of your size or industry. They can also help new businesses start off on the right foot by ensuring processes meet recognized standards, clarifying business objectives and avoiding expensive mistakes.

QMS standards

- The ISO 9001:2008 standard
- The ISO 9004:2009 standard
- OHSAS 18001:2007 - ISO Standard for occupational Health and Safety
- ISO 14001 is to the Environment’’.

2.1.4. ISO 9001 2008, ISO 9001 Standard

According to the international organization for standardization (2008) the standards of quality management system is as follows:-

ISO 9001:2008 is the world's foremost quality management standard, used by hundreds of thousands of companies in over 170 countries around the world.

This quality management standard provides a framework of specific requirements for a quality management system which can be applied to any organization, regardless of type, size and product/service provided.

ISO 9001:2008 is fundamentally concerned with how a company meets customer requirements, enhances customer satisfaction and pursues continuous performance improvement. The requirements of the standard are set out in a number of clauses and are further broken down into sub clauses. A company who is aspiring to become ISO 9001:2008 certified must fulfill all of the requirements set out in each of the clauses.

There are five clauses in the standard that specify activities that need to be considered when implementing your system. They are as follows:-

- Overall requirements for the quality management system and documentation
- Management responsibility, focus, policy, planning and objectives
- Resource management and allocation
- Product realization and process management,
- Measurement, monitoring, analysis and improvement…

Other benefits include:

- Enhances professional image
- Improves business processes
- Improves client satisfaction
- Competitive advantage

- Consistent quality
- Increased employee satisfaction
- Focused leadership
- Involvement of people
- Continually improve the effectiveness and efficiency of your business performance
- Mutually beneficial supplier relationships
- Improved and transparent internal work practice

It also contains information on managing for sustained success. This can benefit not only your customers but also:

- Employees
- Owners
- Suppliers
- Society in general

By measuring these groups' satisfaction with your business, you'll be able to assess whether you're continuing to improve

The application of a system of processes within an organization, together with the identification and interactions of these processes, and their management, can be referred to as the “process approach”.
An advantage of the process approach is the ongoing control that it provides over the linkage between the individual processes within the system of processes, as well as over their combination and interaction.
The model of a process-based quality management system shown in Figure illustrates the process linkages presented in clauses 4 to 8. This illustration shows that customers play a significant role in defining requirements as inputs. Monitoring of customer satisfaction requires the evaluation of information relating to customer perception as to whether the organization has met the customer requirements. The model shown in Figure covers all the requirements of this International Standard, but does not show processes at a detailed level.

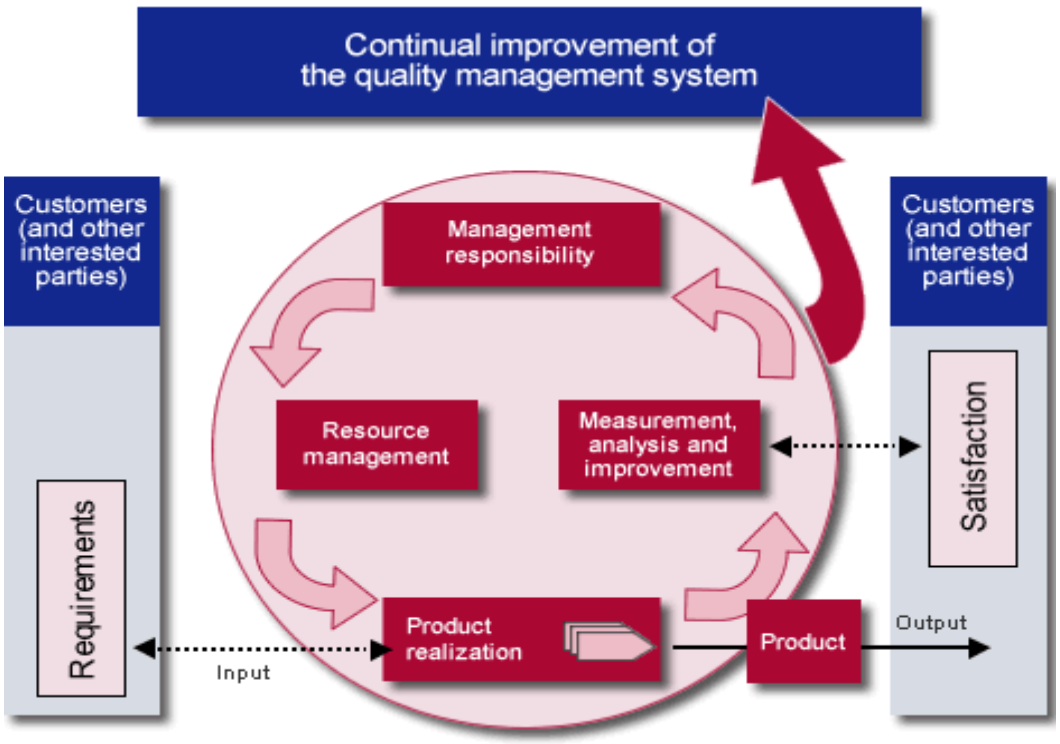


Figure 2.1 Model of a process based quality management system

Source: **ISO 9001:2008 international standard (2008)**

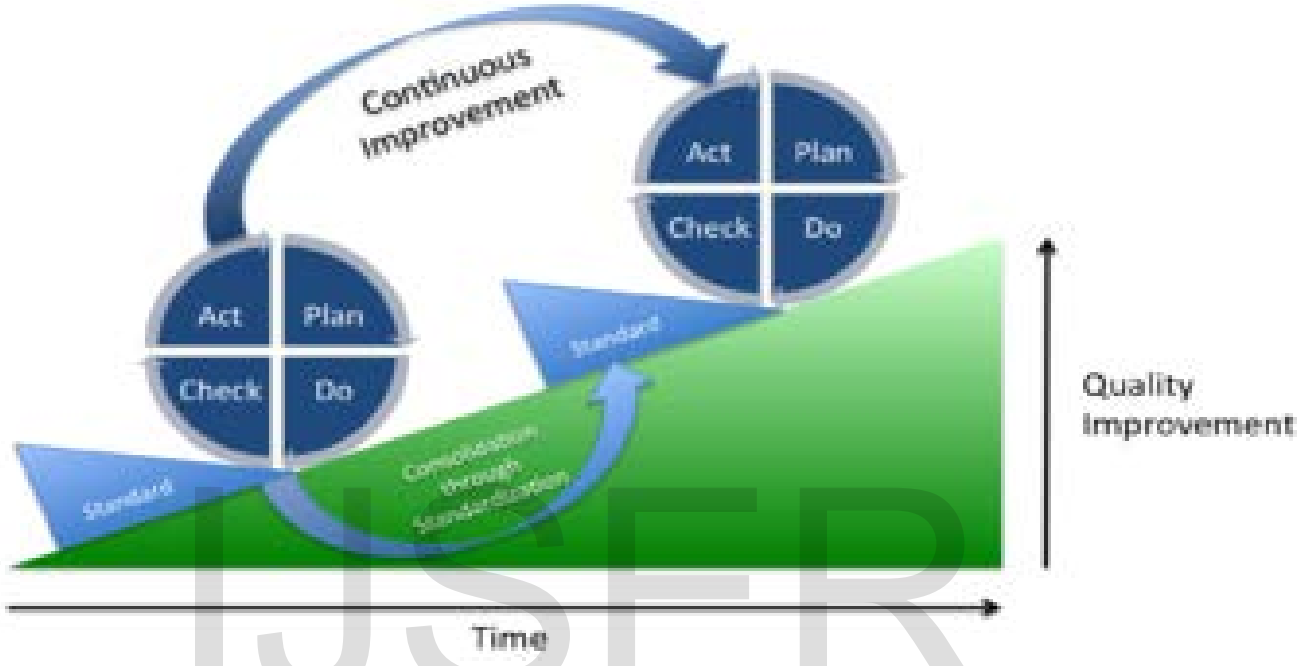
To achieve the result of continual improvement the Plan-Do-Check-Act (PDCA) methodology applied to all processes.

And according to ISO 9001:2008 PDCA briefly described as follows:-

- Plan: establish the objectives and processes necessary to deliver results in accordance with customer requirements and the organization's policies.
- Do: implement the processes.
- Check: monitor and measure processes and product against policies, objectives and requirements for the product and report the results.
- Act: take actions to continually improve process performance.

According to free encyclopedia (2015) the PDCA improvement diagram and meaning of PDCA further stated as follows:-

Continuous quality improvement with PDCA



Meaning

PLAN

Establish the objectives and processes necessary to deliver results in accordance with the expected output (the target or goals).

DO

Implement the plan, execute the process, and make the product. Collect data for charting and analysis in the following "CHECK" and "ACT" steps.

CHECK

Study the actual results (measured and collected in "DO" above) and compare against the expected results (targets or goals from the "PLAN") to ascertain any differences. Look for deviation in

implementation from the plan and also look for the appropriateness and completeness of the plan to enable the execution, i.e., "Do". Charting data can make this much easier to see trends over several PDCA cycles and in order to convert the collected data into information. Information is what you need for the next step "ACT".

ACT

If the CHECK shows that the PLAN that was implemented in DO is an improvement to the prior standard (baseline), then that becomes the new standard (baseline) for how the organization should ACT going forward

To operate a quality management system and represents international best practice for managing quality, ISO 9001 provides a set of requirements was built around eight management principles

2.1.5. Quality management principles

According to ISO Central Secretariat (2012) the quality management principles are stated as follows:-

This document introduces the eight quality management principles on which the quality management system standards of the ISO 9000 series are based. These principles can be used by senior management as a framework to guide their organizations towards improved performance.
The principles are derived from the collective experience and knowledge of the international experts who participate in ISO Technical Committee ISO/TC 176, Quality management and quality assurance, which is responsible for developing and maintaining the ISO 9000 standards. The eight quality management principles are:-

- Customer focus
- Leadership
- Involving people
- Process approach
- Systems approach
- Continual improvement
- Factual decision making

- Mutually beneficial supplier relationships

Organizations depend on their customers and therefore should understand current and future **customer** needs, should meet customer requirements and strive to exceed customer expectations.

Key benefits

- Increased revenue and market share obtained through flexible and fast responses to market opportunities
- Increased effectiveness in the use of the organization's resources to enhance customer satisfaction
- Improved customer loyalty leading to repeat business.

Applying the principle of process approach typically leads to:

- Researching and understanding customer needs and expectations
- Ensuring that the objectives of the organization are linked to customer needs and expectations
- Communicating customer needs and expectations throughout the organization
- Measuring customer satisfaction and acting on the results
- Systematically managing customer relationships
- Ensuring a balanced approach between satisfying customers and other interested parties (such as owners, employees, suppliers, financiers, local communities and society as a whole).

Leaders establish unity of purpose and direction of the organization. They should create and maintain the internal environment in which people can become fully involved in achieving the organization's objectives.

Key benefits

- People will understand and be motivated towards the organization's goals and objectives
- Activities are evaluated, aligned and implemented in a unified way
- Miscommunication between levels of an organization will be minimized.

Applying the principle of leadership typically leads to:

- Considering the needs of all interested parties including customers, owners, employees, suppliers, financiers, local communities and society as a whole
- Establishing a clear vision of the organization's future
- Setting challenging goals and targets

- Creating and sustaining shared values, fairness and ethical role models at all levels of the organization
- Establishing trust and eliminating fear
- Providing people with the required resources, training and freedom to act with responsibility
- and accountability
- Inspiring, encouraging and recognizing people's contributions.

Managers must ensure that there is Involvement of People at all levels in the organization. This includes ensuring that there is an awareness of the importance of meeting customer requirements and responsibilities in doing this, and people are competent, on the basis of appropriate training and experience.

Key benefits:

- Motivated, committed and involved people within the organization
- Innovation and creativity in furthering the organization's objectives
- People being accountable for their own performance
- People eager to participate in and contribute to continual improvement.

Applying the principle of involvement of people typically leads to :

- People understanding the importance of their contribution and role in the organization
- People identifying constraints to their performance
- People accepting ownership of problems and their responsibility for solving them
- People evaluating their performance against their personal goals and objectives
- People actively seeking opportunities to enhance their competence, knowledge and experience
- People freely sharing knowledge and experience
- People openly discussing problems and issues.

A desired result is achieved more efficiently when activities and related resources are managed as a process.

Key benefits:

- Lower costs and shorter cycle times through effective use of resources
- Improved, consistent and predictable results
- Focused and prioritized improvement opportunities.

Applying the principle of process approach typically leads to :

- Systematically defining the activities necessary to obtain a desired result
- Establishing clear responsibility and accountability for managing key activities
- Analyzing and measuring of the capability of key activities
- Identifying the interfaces of key activities within and between the functions of the organization
- Focusing on the factors – such as resources, methods, and materials – that will improve key activities of the organization
- Evaluating risks, consequences and impacts of activities on customers, suppliers and other interested parties.

The understanding of the many interrelationships between these processes demands that a Systems Approach to management is adopted.

Key benefits

- Integration and alignment of the processes that will best achieve the desired results
- Ability to focus effort on the key processes
- Providing confidence to interested parties as to the consistency, effectiveness and efficiency of the organization.

Applying the principle of system approach to management typically leads to:

- Structuring a system to achieve the organization's objectives in the most effective and efficient way
- Understanding the interdependencies between the processes of the system
- Structured approaches that harmonize and integrate processes
- Providing a better understanding of the roles and responsibilities necessary for achieving common objectives and thereby reducing cross-functional barriers
- Understanding organizational capabilities and establishing resource constraints prior to action
- Targeting and defining how specific activities within a system should operate
- Continually improving the system through measurement and evaluation.

Continual improvement of the organization's overall performance should be a permanent objective of the organization.

Key benefits:

- Performance advantage through improved organizational capabilities
- Alignment of improvement activities at all levels to an organization's strategic intent
- Flexibility to react quickly to opportunities.

Applying the principle of continual improvement typically leads to:

- Employing a consistent organization-wide approach to continual improvement of the organization's performance
- Providing people with training in the methods and tools of continual improvement
- Making continual improvement of products, processes and systems an objective for every individual in the organization
- Establishing goals to guide, and measures to track, continual improvement
- Recognizing and acknowledging improvements.

For this to be achieved, attention needs to be given to both the voice of the customer - through complaint analysis, opinion surveys and regular contacts – and the voice of the processes – through measurement, monitoring and analysis of both process and product data. This will result in Factual Decision Making

Key benefits:

- Informed decisions
- An increased ability to demonstrate the effectiveness of past decisions through reference to factual records
- Increased ability to review, challenge and change opinions and decisions.

Applying the principle of factual approach to decision making typically leads to:

- Ensuring that data and information are sufficiently accurate and reliable
- Making data accessible to those who need it
- Analyzing data and information using valid methods
- Making decisions and taking action based on factual analysis, balanced with experience and intuition.

Each organization is itself only a link in the chain of a larger raw material process, and for the long term needs of the community and the organization there needs to be **Mutually Beneficial Supplier Relationships**

Key benefits:

- Increased ability to create value for both parties
- Flexibility and speed of joint responses to changing market or customer needs and expectations
- Optimization of costs and resources.

Applying the principles of mutually beneficial supplier relationships typically leads to:

- Establishing relationships that balance short-term gains with long-term considerations
- Pooling of expertise and resources with partners
- Identifying and selecting key suppliers
- Clear and open communication
- Sharing information and future plans
- Establishing joint development and improvement activities
- Inspiring, encouraging and recognizing improvements and achievements by suppliers

According to David (2001) the quality management principles defined as follows:-

Quality management principles defined by ISO/TC 176 as comprehensive and fundamental rule or belief, for leading and operating an organization, aimed at continually improving performance over the long term by focusing on customer while addressing the needs of all other interested parties (P.34).

2.1.5.1. ISO 9001:2015

According to the new development of QMS requirements by international standards (2008) the main difference will be explained as follows:-

The old definition of “continual improvement” has changed. When ISO 9001 2008 asked you to make continual improvements it was asking you to improve your ability to fulfill requirements.

Now, ISO 9001 2015 says it means enhancing performance (getting better results). This is an important shift.

The term “management representative” has been dropped. The management duties and responsibilities that were previously assigned to someone called a “management representative” may now be assigned either to one person or too many people

2.2. Empirical Literature

2.2.1. Related with practice

The empirical research by Casadesus and Gimenez (2000):-

’’Investigated the effects of ISO 9000 quality standard implementation on 288 Spanish firms, and the results revealed that 65 of firms had positive internal and external improvements after its implementation’’(PP .432-440).

According to survey conducted by Pan (2003):-

ISO 9001 and 14001 implementation in the Far Eastern countries namely; Japan, Taiwan, Hong Kong and South Korea, and the results revealed that there is a correlation between ISO 9001 certification, and improved corporate image, quality improvement, customers satisfaction and improved internal procedures (PP.564-578).

According to the report by International Journal of Innovative Technology and Exploring Engineering (2012):-

It was noted that ISO 9001 certification in Zimbabwean Manufacturing companies has a positive impact on competitiveness, capacity utilization, employee motivation, employee retention, and organizational communication. These benefits are among many others that include accident prevention and revenue generation (P.32).

Birhanu and Daniel (2014):-

The analysis in all the criteria shows the performance of Ethiopian industries is low, and more so is that of the service industries performance is below average in all the criteria. Furthermore, policy and strategy is the least visible in the practiced criteria. This indicates that policy and strategy is the most problematic area among all the criteria (P.696).

According to survey of ISO(2014).The certification trend of the world with respect to Ethiopia, Africa and world demonstrated as per the following and tables: -

Table 2.1:- ***ISO 9001certefication by number of companies - Africa***

Year	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Algeria						2	4	9	12	39	43	126	185	103	171	159	250	362	268	427	540	451
Cameroon				1	5	5	5	8		2	9	13	10	7	12	14	22	22	38	32	56	
Djibouti																	2	1	2	3	5	
Egypt		9	45	166	344	385	649	468	546	642	754	810	1326	1928	1535	1944	1660	2191	2076	2381	2133	2159
Ethiopia										1		2	3	3	20	22	37	25	29	68	49	82
Nigeria			1	4	3	20	20	20	22	85	49	99	101	132	149	163	215	27	44	51	84	178
South Africa	1007	1161	1454	1882	1915	2166	3316	3454	2263	2625	2356	2486	3119	3259	3283	3792	3545	3326	3409	3917	3565	3782
Sudan					1	1	1	1	3	10	26	37	32	55	82	77	90	71	79	84	104	109
Swaziland		1	2	3	2	6	7	8	11	29	17	13	18	29	40	48	30	17	22	20	17	13

Table 2.2:- **Top five industrial sectors for ISO 9001 certificates 2014 of world**

1	Basic metal & fabricated metal products	118,272
2	Electrical and optical equipment	86,523
3	Construction	76,862
4	Wholesale &retail trade, repairs of motor vehicles	73,676
5	Machinery and equipment	64,699

Table 2.3:- **Top 10 countries of the world for ISO 9001 certificates - 2014**

1	China	342,800
2	Italy	168,960
3	Germany	55,363
4	Japan	45,785
5	India	41,016
6	United Kingdom	40,200
7	Spain	36,005
8	USA	33,008
9	France	29,122
10	Australia	19,731

Table 2.4:- ***ISO 9001*Certification trends by regional growth**

Certification trend by region																							
Year	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
TOTAL	**46571**	**70364**	**127348**	**162700**	**223298**	**271846**	**343641**	**408062**	**510349**	**561766**	**497919**	**660132**	**773843**	**896905**	**951486**	**980322**	**1063751**	**1118510**	**1079228**	**1096987**	**1126460**	**1138155**
Africa	1009	1177	1563	2255	2555	3342	4928	4769	3903	4529	3769	4865	6763	7441	7446	8534	8435	7667	8164	9674	9816	10308
Central and South America	140	475	1220	1713	2989	5221	8972	10805	14409	13679	9303	17016	22498	29382	39354	37458	35549	49260	51685	51459	52466	50256
North America	2613	4915	10374	16980	25144	33550	45166	48296	50894	53806	40185	49962	59663	61436	47600	47896	41947	36632	37530	38586	48579	50533
Europe	37779	55400	92611	109961	143674	166255	190247	219561	269648	292878	242455	320748	377172	414208	431479	455303	500286	530039	459367	469739	482620	483710

East Asia and Pacific	4767	7719	19766	27885	42824	54671	81950	109217	155597	177767	185846	240938	266100	320320	354056	366491	408498	438477	471836	476106	467320	476027
Central and South Asia	74	330	1038	1712	2963	3556	5508	6411	6348	9383	9162	13856	27966	44923	50379	44171	44432	37596	33577	32373	44847	45365
Middle East	189	348	776	2194	3149	5251	6870	9003	9550	9724	7199	12747	13681	19195	21172	20469	24604	18839	17069	19050	20812	21956
Regional share - in %																						
Year	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
TOTAL	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Africa	2.2%	1.7%	1.2%	1.4%	1.1%	1.2%	1.4%	1.2%	0.8%	0.8%	0.8%	0.7%	0.9%	0.8%	0.8%	0.9%	0.8%	0.7%	0.8%	0.9%	0.9%	0.9%
Central and South America	0.3%	0.7%	1.0%	1.1%	1.3%	1.9%	2.6%	2.6%	2.8%	2.4%	1.9%	2.6%	2.9%	3.3%	4.1%	3.8%	3.3%	4.4%	4.8%	4.7%	4.7%	4.4%
North America	5.6%	7.0%	8.1%	10.4%	11.3%	12.3%	13.1%	11.8%	10.0%	9.6%	8.1%	7.6%	7.7%	6.8%	5.0%	4.9%	3.9%	3.3%	3.5%	3.5%	4.3%	4.4%
Europe	81.1%	78.7%	72.7%	67.6%	64.3%	61.2%	55.4%	53.8%	52.8%	52.1%	48.7%	48.6%	48.7%	46.2%	45.3%	46.4%	47.0%	47.4%	42.6%	42.8%	42.8%	42.5%
East Asia and Pacific	10.2%	11.0%	15.5%	17.1%	19.2%	20.1%	23.8%	26.8%	30.5%	31.6%	37.3%	36.5%	34.4%	35.7%	37.2%	37.4%	38.4%	39.2%	43.7%	43.4%	41.5%	41.8%
Central and South Asia	0.2%	0.5%	0.8%	1.1%	1.3%	1.3%	1.6%	1.6%	1.2%	1.7%	1.8%	2.1%	3.6%	5.0%	5.3%	4.5%	4.2%	3.4%	3.1%	3.0%	4.0%	4.0%
Middle East	0.4%	0.5%	0.6%	1.3%	1.4%	1.9%	2.0%	2.2%	1.9%	1.7%	1.4%	1.9%	1.8%	2.1%	2.2%	2.1%	2.3%	1.7%	1.6%	1.7%	1.8%	1.9%

Source: The ISO Survey of Certifications 2014

2.2.2. Related with benefits

Santos et al (2011):-

''…the study revealed that involvement of people creates a beneficial effect on company culture by reducing departmental isolation and fostering more teamwork'' (P.1965-1974).

According to the finding summarized by Kumar and Balakrishnan(2011) :-

Far East Countries, namely in Taiwan, Japan, Hong Kong and Korea, benefits gained after implementing ISO 9001 was **positive** in general with some differences in motivation.
… The main benefits are gaining competitive edge, internal and external portions and improvement of public relations.
And also… led to the following internal benefits such as… better documentation, greater quality awareness, and improved measurement system (P.150).

2.2.3. Related with challenges

According to Kumar and Balakrishnan (2011):-

There were certain common problems faced by majority of these certified organizations, which influenced their business performance.
These problems were broadly classified into three categories as

- Leadership related issues (Inadequate Commitment by Top management, Lack of Motivation, Recognition, Organizational learning, Strategic Planning and long term focus).
- Strategy Related Issues (Mission, Vision, Values, Strategic Planning, Strategy Mapping, Cascading down the line, KPIs and Initiatives).
- Quality System related issues (Weak PDCA cycle, generic system, internal audit not in depth, non value adding meetings/trainings and excessive paperwork
- Society oriented gaps (Corporate Social Responsibility, Environmental Management and Sustainability

When an organization carefully eliminates these above mentioned gaps, it can be sure of the whole business model to be effective with value added processes, methods, systems and efficient resources contributing for continual improvements and towards business excellence (P.153).

According to ‘’*Quality Management: Then, Now and Toward the Future’’ (*white paper*).* Retrieved from http://WWW.PP-S.COM:-

The greatest value (return for invested effort) from any quality system is achieved when the processes being improved align with the strategic and financial plans of the business.

So, the key in selecting and implementing a methodology(s) is to tailor the approach to exploit strengths of the business and concentrate on weaknesses. Another important factor in success is the motivation for implementing a quality management system in the first place. Very often management’s expectations are disproportionate to the amount of resources devoted to the initiative. QualityGurus.com compiled input from quality professionals on why QMS initiatives have failed, including:

Lack of Vision

- Lack of clarity in business objectives
- No urgency for growth
- Lack proper understanding of customers and competition

Lack of Management Support

- Lack of understanding/interest in quality concepts within the organization
- Lack of interest/commitment from top management
- Weak management and leadership
- Failure to allocate proper resources

Incorrect timing

- Implementation of a QMS without building the quality culture

Incorrect approach

- Not properly understanding customer demands
- Lack of review & recognition mechanisms
- Failure to define objectives that link QMS strategically with business goals
- Failure to train the improvement team
- QMS stakeholders (employees, customers, suppliers) not fully engaged

The weakest areas of ISO 9001implementation extracted from executive summery on publication done by United Nations industrial development organization (2012):-

Identified weaknesses during the visits to certified organization are:-

- A general lack of focus on preventive actions
- Poor use of the ‘’plan-do-check-act’’ approach (ISO 9001 clause 4.1) to manage the quality management system (QMS) processes
- Poor culture of continual improvement
- Lack of adequate cause analysis and effective action for process, product and system non conformities
- Little use of the ‘’process approach’’ throughout the organization (P.5).

2.3. Conceptual frame work

Competitiveness in the global market is becoming fierce. The importance of quality management system is growing to increase customers' satisfaction. However, based on the Ethiopian Quality Award (EQA) self-assessment model and the 2009 award participants, quality management practice in Ethiopian manufacturing and service industries was studied and it shows poor implementation practice, Due to thus low implementation practice challenged in their quality of products and services to compete globally. The root causes of the quality problem are investigated and revealed in the study to give directions for the policy makers, the industries and researchers.

But on the other countries Many researchers have revealed that the ISO 9001 QMS certified companies achieve its main objectives of adding value to companies in different economies and sectors globally both at developed and developing countries.

And the research focused to determine the practice stage, to identify the actual benefit acquired and challenges faced during implementation was analyzed based on below listed conceptual frame works on Engineering company plc with relative to the theoretical benefits and empirical literature based on the below two diagram:-

The diagram was established to assess the quality management system process standard requirements against the MIE implementation practice during the implementation periods. And to assess the quality management principles standard requirements and empirical findings against the MIE implementation practice during the implementation periods.

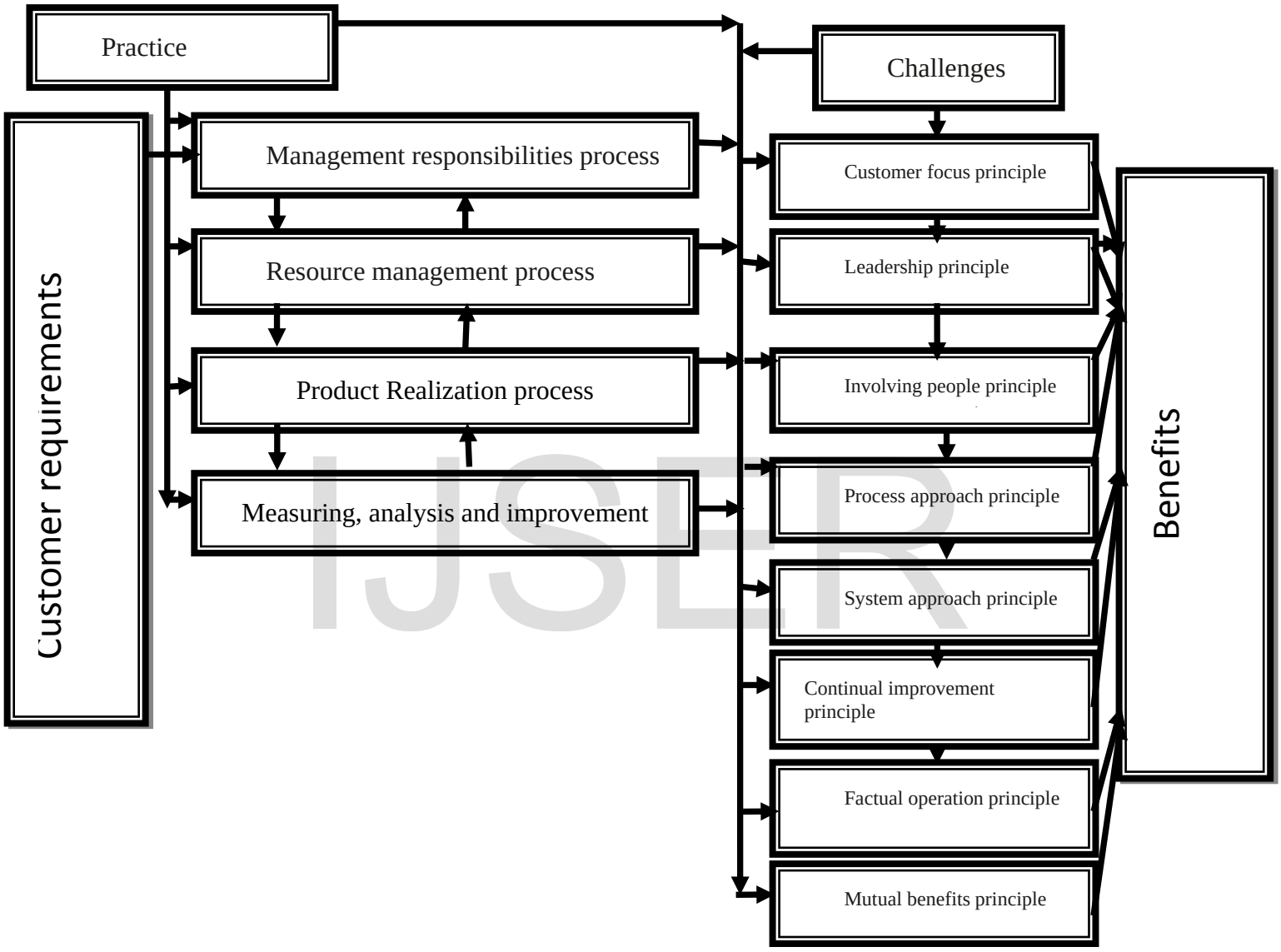


Figure 2.1: Conceptual Framework to access the QMS process and principles implementation practice, benefit attained and challenge faced during implementation periods

Source: Researcher's Own Design Based on Literature Review and empirical findings (2015)

CHAPTER THREE

RESEARCH DESIGN & METHODOLOGY

3.1 Introduction

This chapter presents research design, the data type and sources, sampling technique, data collection instruments and data processing & analysis. The study has followed mixed research approach combination of both quantitative and qualitative methods aligned with the objective of the research that is aimed to be attained.

3.2 Research Strategy and Design

Even though there are different types of research design, by taking the objective of the research in to account, the researcher used descriptive type of research design. In this regard, the researcher used both the qualitative and quantitative research approach.

The Quantitative Approach used to assess the practice of quality management system process and principles, benefit attained by implementing the quality management principles and challenges faced during the implementation periods by close ended questions.

The Qualitative Approach used to reach at a comprehensive understanding of practice, challenges & benefits of quality management system in Engineering company Plc, in conjunction with the quantitative method, by open ended and interview questions.

3.3 Data type and source

Primary and secondary data were used in the study. The primary data were collected by questionnaires, structured interview, and telephone interviews of MIE employees. And the secondary data was collected from company reports, manuals, books and websites'.

3.4 Methods of Data Collection

The Questionnaire

The structured questionnaire was developed to assess the practice, benefits and challenges of ISO 9001 implementation for manufacturing companies by reviewing the prior literatures and empirical evidences. In the questionnaire the respondents were asked to indicate practice extent, the benefits attained and the challenges faced during the implementation of quality management system.

The close type questions were used with responses ranging "strongly agree(4), agree(3), disagree(2), strongly disagree(1) and not applicable(0)" to express their agreement on the extent of implementation practice, benefit attained and the challenges faced during the implementation periods and the open ended questions were used to access the personal beliefs and recommendation per category of practice, benefits and challenges.

The Personal Interview

Semi-structured interview was conducted with the selected managers who have practical knowledge about quality management system. Before starting interviewing, the researcher introduced himself and explained the purpose of the study; then started to raise important questions. Then, the researcher jot down and recorded all important points during interview session and organized them for analysis purpose.

The telephone Interview

The telephone interview was conducted with the selected managers to clarify the ambiguities raised on interview and questionnaire result.

3.5 Population and sampling techniques

The study used non-probability sampling because of the nature of the study. The research title invites only few individuals who have working experience with the quality management system in place. Therefore managers and employees working with the actual implementations of the quality management system were considered as population for the study.

The primary data was collected from selected MIE management and senior staffs by considering the respondents specific knowledge and their role in development and implementation periods of quality management system to the scope of the products related with trailer only.

3.6 Data Processing and Methods of Data Analysis

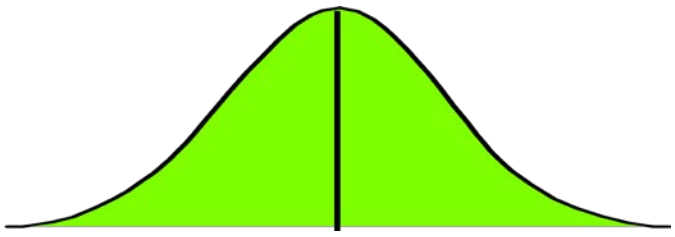
This study employed two types of data: quantitative and qualitative. The quantitative data have been analyzed using descriptive statistics methods such as Mean and standard deviation. The data are displayed using tables, graphs and charts.

The collected data through questionnaire were calculated and analyzed with the help of Microsoft Excel function software to analyze the descriptive statics.

The gathered data analyzed per each questions as well as per process or principles and also the gathered data categorized by ranging disagree (>0&≤2), between disagree and agree (>2 and <3) and agree (≥3 &≤4).

Measures of central tendency (or statistical averages) method selected to show a tendency of data to cluster, but it suffers from some limitations; that affected by extreme data.

However, to avoid the limitation the researcher used measure of asymmetry (skewness) as an additional statistical measure, since Skewness measure the asymmetry and shows the manner in which the items are clustered around the average.



Left (low) Mean Right (high)

Next to the skewness the Kurtosis analysis conducted again to measure the relative peakedness or flatness of a distribution compared with the normal distribution.

In addition to the statistical process the researcher used the qualitative data have been analyzed using content analysis.

CHAPTER FOUR

DATA, RESULT AND DISCUSSION

4.1 Introduction

Currently, Engineering company Company has restructured itself in to four operational business units called Heavy Duty Vehicles & Locomotive, Industrial Equipment Manufacturing, Automotive & Agricultural Assembly and Industrial Construction & Installation Business Units and one support service business unit.

As clearly stated in the methodology part of this research, both primary & secondary data sources were used. The primary data gathered by distributing structured questionnaire to MIE management and senior staffs and interview was conducted with concerned managers to QMS development and implementation periods.

Totally 32 Self administered questionnaire was distributed and accordingly 27 usable questionnaires were collected and analyzed. On top of this, the secondary data sources were used to substantiate the primary data.

4.2 Demographic Characteristics of the Respondents

This section gives an overview of the demographic characteristic of the respondents. From the survey, information about the respondents sex, working branch, their education level, work experiences of the respondents in MIE and current position of respondents are gathered & presented below as follows:-

Table 4.1-Sex, Branch, age and education of respondents

S/N	Demography	Category	Frequency	Percentage (%)	Cumulative Percent (%)
1	Sex	Male	26	96	96
		Female	1	4	100
			27		
2	Branch		22	81.5	81.5
		Addis Ababa	5	18.5	100
			27		
3	Education	1st degree	19	70	70
		2nd degree	7	26	96
		Not mentioned	1	4	100
			27		
4	Age	36-40 years old	9	33	33
		31-35 years old	8	30	63
		>40 years old	7	26	89
		26-30 years old	2	7	96
		Not mentioned	1	4	100

Source: Own survey, 2015

As it can be clearly seen from the Table 4.1 above, 81.5 % of the respondents are from branch and the remaining 18.5 % are from branch. And also more than 96% of the respondents have degree and above education level. Therefore, the majority of the respondents are from head office, well experienced and knowledgeable to related subject matter of the survey.

The Table 4.2 below shows 89 % of the respondents departments are from major core process owners of quality management system and they are more related with subject matter knowledge.

Table 4.2 Department's coverage of respondents

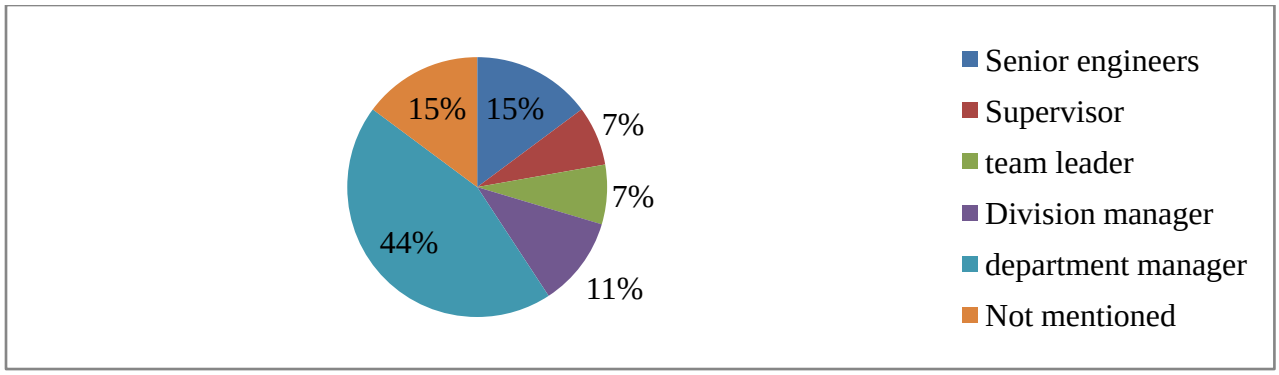
Category	Frequency	Percentage (%)	Cumulative percentage (%)
Manufacturing department	8	30	30
Marketing department	4	15	44
Design department	3	11	56
Planning and monitoring department	3	11	67
Electro mechanical works department	2	7	74
Industrial maintenance center department	1	4	78
Supply department	1	4	81
Quality assurance and safety department	1	4	85
Research and development department	1	4	89
Not mentioned	3	11	100
	27		

Source: Own Survey, 2015

Table 4.3-Position coverage of respondents

Category	Frequency	Percentage	Cumulative percentage (%)
Department manager	12	44	44
Senior engineers	4	15	59
Division manager	3	11	70
Supervisor	2	7	77
Team leader	2	7	84
Not mentioned	4	15	100
	27		

Source: Own Survey, 2015

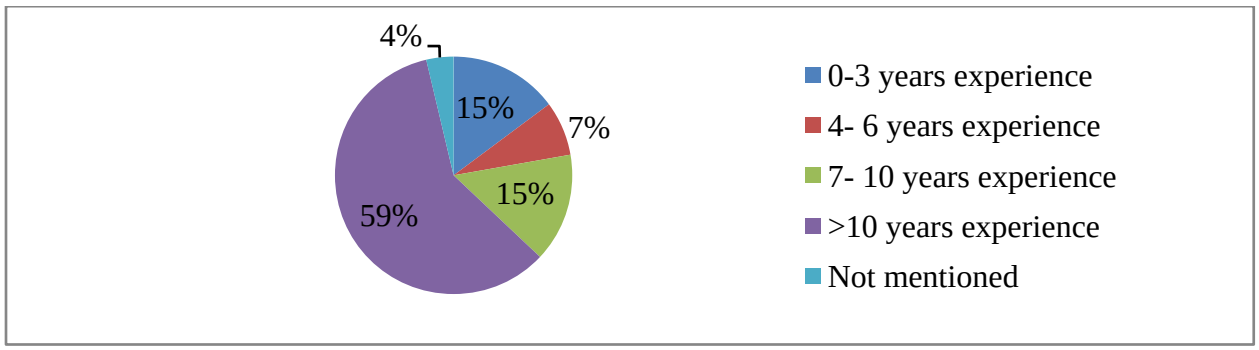


The above Table 4.3 shows that, 44% and 11% of the respondent's position are department managers and division manager's respectively, 30% of the respondents are senior staffs and the remaining 15% not indicated their position. Therefore the profile of the respondents was sufficient enough to address the research agenda at hand.

Table 4.4-Experience Range of Respondents at MIE

Category	Frequency	Percentage (%)	Cumulative percentage (%)
>10 years experience	16	59	59
0-3 years experience	4	15	74
7- 10 years experience	4	15	89
4- 6 years experience	2	7	96
Not mentioned	1	4	100
	27		

Source: Own Survey, 2015



The above Table 4.4 shows that, 59% of the respondents are categorized above 10 years work experience. This indicates that, work experiences of the respondents are sufficient enough to provide relevant data to the research questions at hand.

4.3. Statistical analysis

Total questionnaires distributed for head office and office by position and departments of the respondents are summarized as per the table below.

Table 4.5-Number of questionnaires distributed and collected

A. Branch			
Category of respondents	Number of questionnaires distributed	Number of usable questionnaires collected	Percentage of collected (%)
A.1. By Position			
DGM,s	3	1	33%
Department managers	13	12	92%
Division managers	3	3	
Supervisors	2	2	
Senior staffs	4	4	
subtotal	**25**	**22**	**88%**
A, 2. By Department			
Fabrication	12	8	
Industrial maintenance	1	1	
Planning and monitoring	3	3	
Design	3	3	
Supply	1	1	
Quality and safety	1	1	
Electro mechanical works	2	2	
Finance	1	0	
subtotal	24	19	79%
B. branch			
B.1. By Position			
DGM,s	1	0	
Department managers	5	4	
Division managers	1	1	
subtotal	7	5	71%
B.2.By department			
Sales and promotion	5	4	
Research and development	1	1	
subtotal	6	5	83%
A+B(by position)	**32**	**27**	**84.4%**

Source: Own Survey, 2015

The data displayed in the above Table 4.5 summarized that, 32 questionnaires were distributed to head office and to branch office; accordingly only 27 usable questionnaires are collected (22 from head office & 5 from Addis Ababa branch office). From those not returned 5 questionnaires as per the Table 4.5 above, 3 respondents are Deputy General Managers. To solve the problems of not responded by deputy general managers the researcher conducted the interview with more related deputy general manager.

4.3.1 QMS Implementation practice

4.3.1.1 QMS Process Implementation practice

A. Quantitative analysis

In this part the Quality Management System process implementation practice analysis conducted by categorizing and presented into four parts like: (1)Management responsibility process (management review and quality objectives), (2)Resource management process (training and its effectiveness), (3)Product Realization process (product realization plan and customer related process), and (4) Measuring, analysis and improvement process (measuring and monitoring customer satisfaction planning and analyzing the PDCA cycle implementation stage) on MIE after certified by BSI (British Standard Institute) on defined scope of Design, manufacture, supply & service of low bed semi-trailers dry & liquid cargo truck trailers and semi-trailers only.

In this part also the respondents requested to give their agreements on the implementation practice of Quality Management System processes standard requirements.

The gathered data analyzed per process or principle and also the gathered data categorized by ranging disagree (>0&≤2), between disagree and agree (>2 and <3) and agree (≥3 &≤4).

For simplicity the data and average result are summarized and presented by process category as per the following tables and the analysis and interpretation presented by Minimum, Maximum and summary results of Mean only.

Table 4.6 - Quality Management System Process

Descriptions	Responses	class interval	Frequency	Percent	Cumulative Percent	Mean	std.div	Kurt	Skew	Rank
I. Management responsibilities process	Disagree	>0&≤2	11	41	41	2.53			0.61	2nd
	Between disagree and agree	>2 and <3	7	26	67					
	Agree	≥3 &≤4	9	33	100					
Sub total			27							
II. Resource management process	Disagree	>0&≤2	**13**	**48**	**48**	**2.46**	**1.34**	**0.6**	**1.31**	**4th**
	Between disagree and agree	>2 and <3	**6**	**22**	**70**					
	Agree	≥3 &≤4	**7**	**26**	**96**					
Sub total			**26**							
III. Product realization process	Disagree	>0&≤2	**0**	**0**	**0**	**2.70**	**0.89**	**0.37**	**0.18**	**1st**
	Between disagree and agree	>2 and <3	**22**	**81**	**81**					
	Agree	≥3 &≤4	**5**	**19**	**100**					
Sub total			27							
IV. Measuring, analysis and improvement process	Disagree	>0&≤2	4	15	15	2.51			1.00	3rd
	Between disagree and agree	>2 and <3	18	67	81					
	Agree	≥3 &≤4	5	19	100					
Sub total			27							
Summary result Quality Management System process	Disagree	>0&≤2	**28**	**26**	26	**2.57**	**0.52**	**-0.18**	**0.88**	
	Between disagree and agree	>2 and <3	**53**	**49**	75					
	Agree	≥3 &≤4	**26**	**24**	99					
Summary			**108**							

Source: Own Survey, 2015

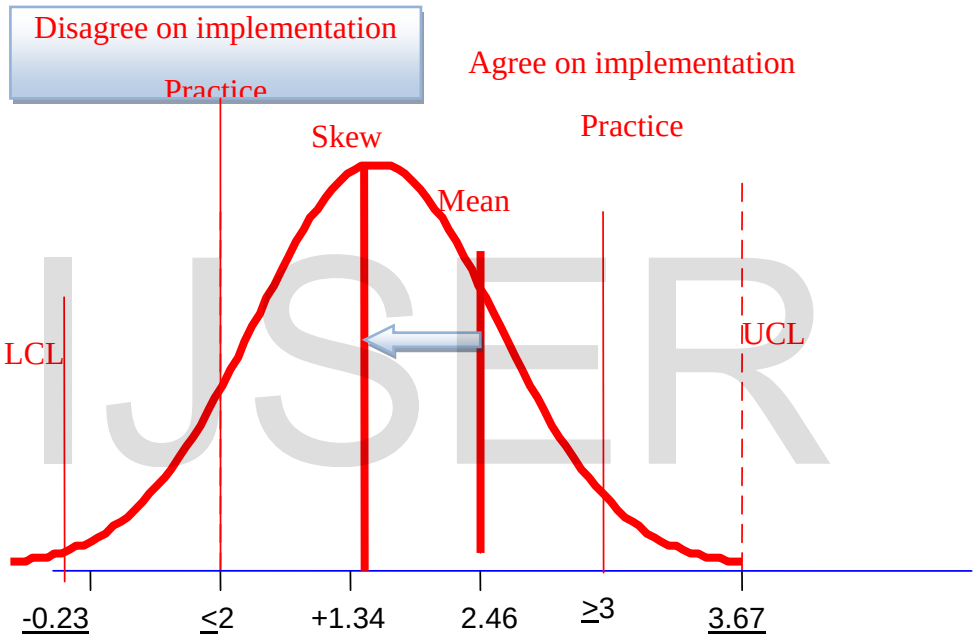
A.1. Interpretation and discussion on Minimum Mean result

According to Table 4.6 above, 48 % of the respondents are disagreed and 26 % of the respondents are agreed while others 22 % are neutral (between disagree and agree) on the implementation practice of the Resource management process.

And the Mean result of questionnaires related to Resource management process implementation practice result is 2.46(4^{th}) ,this Minimum mean result which is below average of the summary Mean score of QMS process implementation practice , show the resource management processes implementation practice in particular clustered between disagrees and agree.

Moreover, the positive skewness result of 1.34 also shows the data clustered towards the left of the Mean as per the below diagram.

Resource management process of QMS Implementation practice



In addition to the above analysis the positive *Kurtosis* value (i.e.=1.31) shows high frequencies are peaked on the small part of the curve and also by considering the positive skewness on the above analysis the result interpreted that the data with high frequencies are peaked at left side from Mean.

By considering all the above discussions, analysis, qualitative and quantitative diagram summary the findings interpreted that MIE managements lack to implement resource management process on proper way (i.e. lack to train all staff on consistent way and to measure training effectiveness against the training objectives).

A.2. Interpretation and discussion on Maximum Mean result

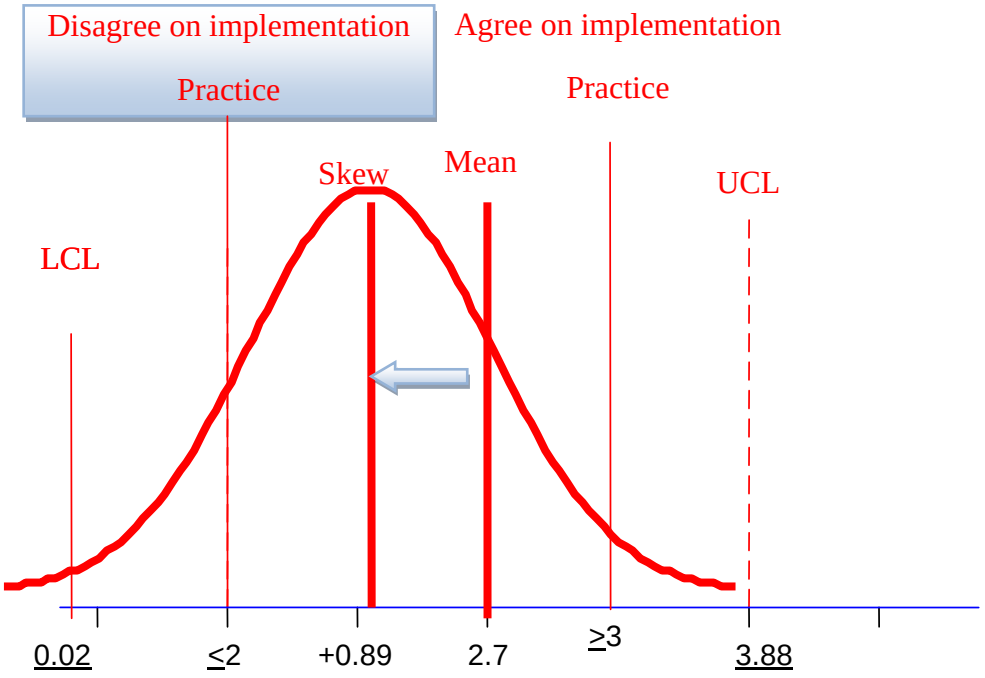
According to Table 4.6 above, 0 % of the respondents are disagreed and 19 % of the respondents are agreed, while others 81 % are neutral (between disagree and agree) on the implementation practice of the Product realization process.

And the Mean result of questionnaires related to Product realization process result is 2.7(1^{st}) ,this Maximum Mean result which is above average of the summary Mean score of QMS process implementation practice, show the Product realization process implementation practice clustered towards agree.

Moreover, the positive skewness result of 0.89 also shows the data clustered towards the left of the Mean as per the below diagram.

Moreover, the positive skewness result of 1.34 also shows the data clustered towards the left of the Mean as per the below diagram.

Product realization process of QMS process Implementation practice



In addition to the above analysis the positive *Kurtosis* value (i.e.=0.18) shows high frequencies are peaked on the small part of the curve and also by considering the positive skewness on the above analysis the result interpreted that the data with high frequencies are peaked at left side from Mean.

By considering all the above discussion, analysis, qualitative and quantitative diagram summary the findings interpreted that MIE managements relatively implemented well the product realization process from other QMS process**.**

A.3. Interpretation and discussion on summary result

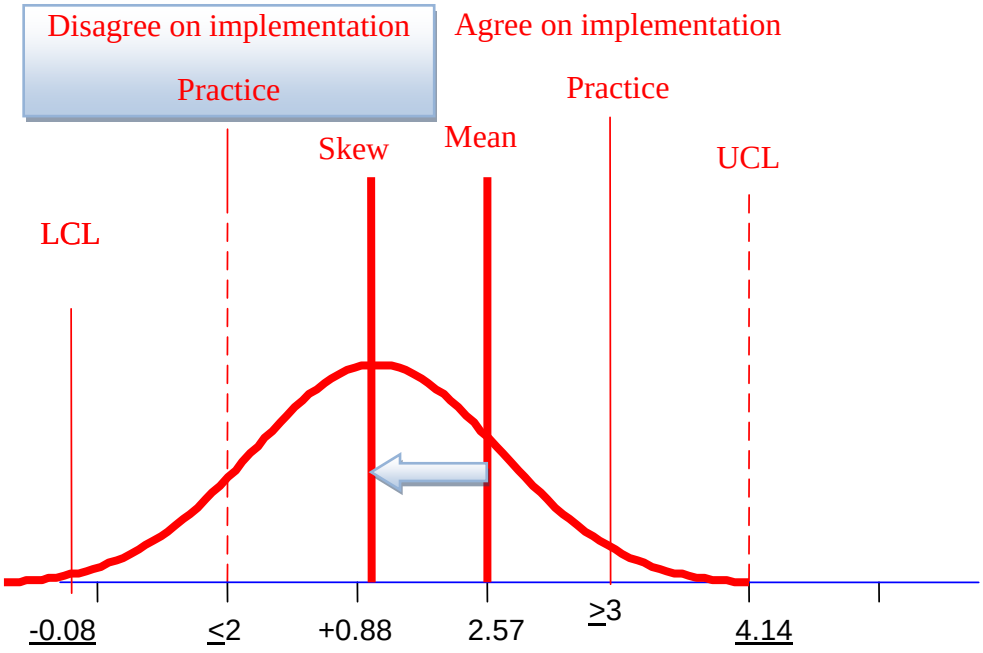
According to Table 4.6 above summary result, 26 % of the respondents are disagreed and 24 % of the respondents are agreed, while others 49 % are neutral (between disagree and agree) on the implementation practice of the QMS processes.

And the Mean result of summary result to QMS processes implementation practice is 2.57 shows the data are clustered between disagree and agree.

Moreover, the positive skewness result of 0.88 also shows the data clustered towards the left of the Mean as per the below diagram.

Moreover, the positive skewness result of 1.34 also shows the data clustered towards the left of the Mean as per the below diagram.

QMS processes Implementation practice



In addition to the above analysis the negative *Kurtosis* value (i.e.=-0.18) shows frequencies throughout the curve are closer to be equal and also by considering the positive skewness on the above analysis the result interpreted that the data with closer to equal frequencies are distributed at left side from Mean.

By considering all the above discussion, analysis, qualitative and quantitative diagram summary the findings interpreted that QMS process implementation practice was weak.

4.3.1.2 QMS principles implementation practice

A. Quantitative analysis

In this part the Quality Management System principles implementation practice analysis conducted by categorizing and presented into eight parts as per summarized table below on MIE after certified by BSI (British Standard Institute) on defined scope of Design, manufacture, supply & service of low bed semi-trailers dry & liquid cargo truck trailers and semi-trailers only In this part also the respondents requested to give their agreements on the implementation practice of Quality Management System principles.

The gathered data analyzed per process or principle and also the gathered data categorized by ranging disagree (>0&≤2), between disagree and agree (>2 and <3) and agree (≥3 &≤4).

For simplicity the data and average result are summarized and presented by principles category as per the following tables and the analysis and interpretation presented by Minimum, Maximum and summary results of Mean only.

Table 4.7 - QMS principles implementation practice

Descriptions	Responses	class interval	Frequency	Percent	Cumulative Percent	Mean	Skew	std,div	Kurt	rank
I. Customer focus	Disagree	>0&≤2	12	44	44	2.35	1.59			7th
	Between disagree and agree	>2 and <3	12	44	89					
	Agree	≥3 &≤4	3	11	100					
II. Leadership	Disagree	>0&≤2	**3**	**11**	**11**	**2.81**	**-0.27**	**0.54**	**1.20**	**1st**
	Between disagree and agree	>2 and <3	**11**	**41**	**52**					
	Agree	≥3 &≤4	**13**	**48**	**100**					
III. People involvement	Disagree	>0&≤2	5	19	19	2.71	-0.22			2nd
	Between disagree and agree	>2 and <3	14	52	70					
	Agree	≥3 &≤4	8	30	100					
IV. Process approach	Disagree	>0&≤2	5	19	19	2.66	-0.96			4th
	Between disagree and agree	>2 and <3	18	67	85					
	Agree	≥3 &≤4	4	15	100					
V. System approach	Disagree	>0&≤2	5	19	19	2.57	0.31			6th
	Between disagree and agree	>2 and <3	18	67	85					
	Agree	≥3 &≤4	4	15	100					
VI. Continual improvement	Disagree	>0&≤2	5	19	19	2.57	0.26			5th
	Between disagree and agree	>2 and <3	15	56	74					
	Agree	≥3 &≤4	7	26	100					
VI. Factual operation	Disagree	>0&≤2	**17**	**63**	**63**	**2.25**	**2.98**			**8th**
	Between disagree and agree	>2 and <3	**7**	**26**	**89**					
	Agree	≥3 &≤4	**3**	**11**	**100**					
VIII'. Mutual benefit	Disagree	>0&≤2	6	22	22	2.66	-0.96			3rd
	Between disagree and agree	>2 and <3	7	26	48					
	Agree	≥3 &≤4	14	52	100					
Summary data and result Quality Management System principles	Disagree	>0&≤2	22	26	26	2.54	0.78	0.52	0.78	
	Between disagree and agree	>2 and <3	46	48	74					
	Agree	≥3 &≤4	11	26	100					

Source: Own Survey, 2015

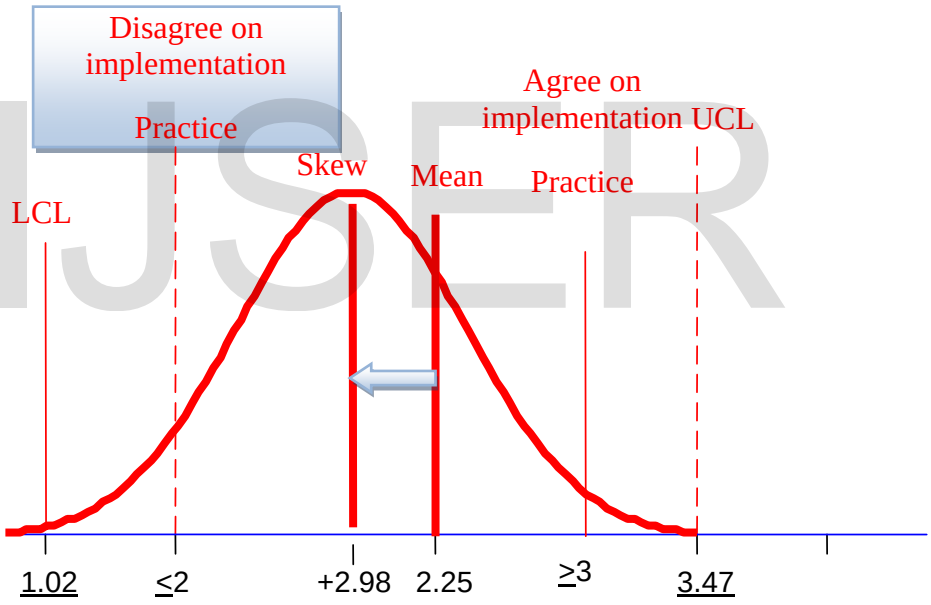
A.1. Interpretation and discussion on Minimum Mean result

According to Table 4.7 above, 63 % of the respondents are disagreed and 11 % of the respondents are agreed, while others 26 % are neutral (between disagree and agree) on the implementation practice of the factual operation principle.

And the Mean result of questionnaires related to factual operation principle implementation practice result is 2.25(8^{th}) ,this Minimum Mean result which is below average of the summary Mean score of QMS principles implementation practice, show the factual operation principle implementation practice Mean result clustered between disagrees and agree.

Moreover, the positive skewness result of 2.98 also shows the data clustered towards the left of the Mean as per the below diagram.

Factual operation principle of QMS principles Implementation practice



In addition to the above analysis the positive *Kurtosis* value (i.e.=2.98) shows high frequencies are peaked on the small part of the curve and also by considering the positive skewness on the above analysis the result interpreted that the data with high frequencies are peaked at left side from Mean.

By considering all the above discussion, analysis, qualitative and quantitative diagram summary the findings interpreted that MIE management lack to implement factual operation principle on proper way.

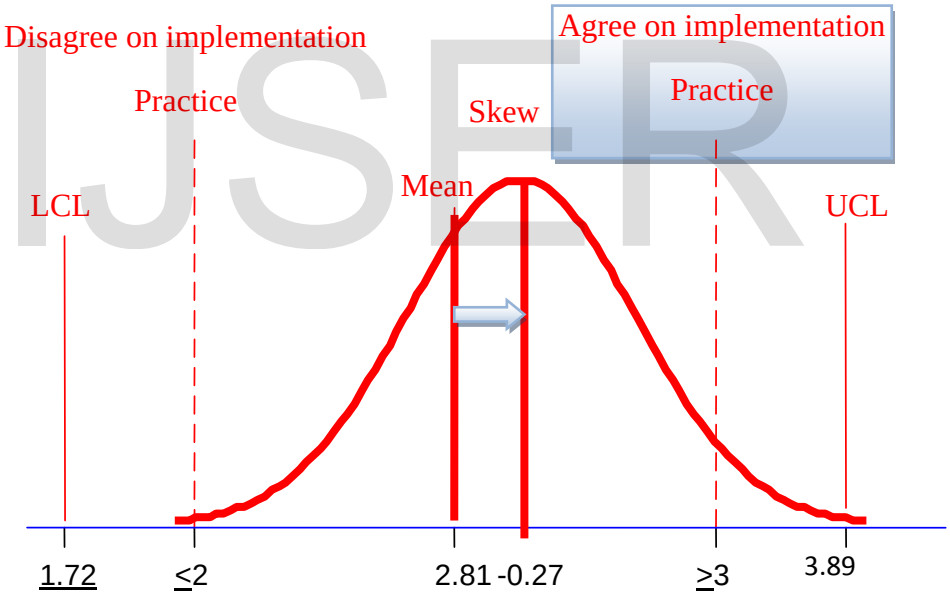
A.2. Interpretation and discussion on Maximum Mean result

According to Table 4.7 above, 11 % of the respondents are disagree and 48 % of the respondents are agree, while others 41 % are neutral (between disagree and agree) on the implementation practice of the Leadership principle.

And the Mean result of questionnaires related to Leadership principle implementation practice result is 2.81(1^{st}) ,this Maximum Mean result which is above average of the summary Mean score of QMS principles implementation practice, show the Leadership principle Mean result clustered toward agree.

Moreover, the negative skewness result of 0.27 also shows the data clustered towards the right of the Mean as per the below diagram.

Leadership principle of QMS principles Implementation practice



In addition to the above analysis the positive *Kurtosis* value (i.e.=1.2) shows high frequencies are peaked on the small part of the curve and also by considering the negative skewness on the above analysis the result interpreted that the data with high frequencies are peaked at right side from Mean.

By considering all the above discussion, analysis, qualitative and quantitative diagram summary the findings interpreted that MIE managements relatively implemented well the Leadership principle from other QMS principles**.**

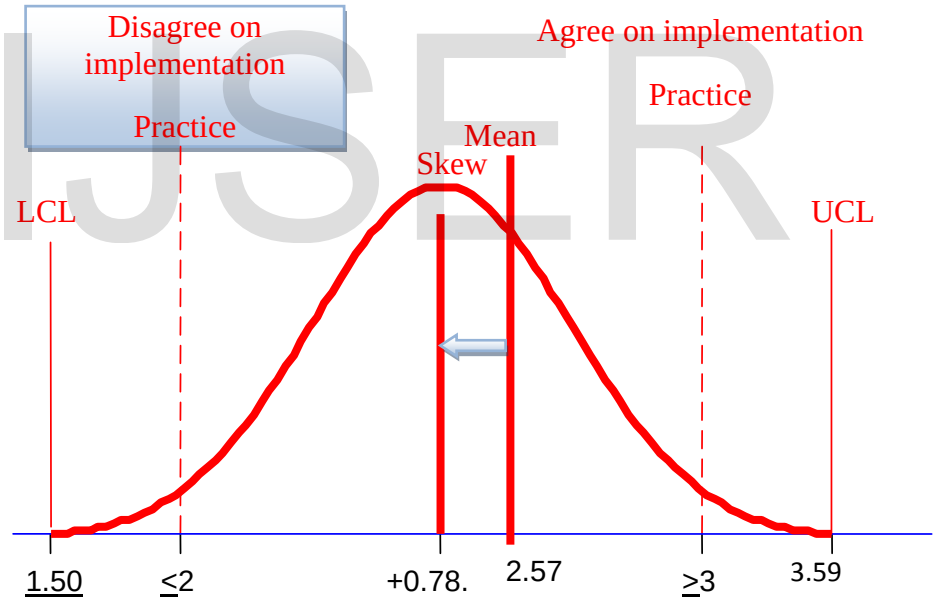
A.3. Interpretation and discussion on summary result

According to Table 4.7 above summary result, 26 % of the respondents are disagree and 26 % of the respondents are agree, while others 48 % are neutral (between disagree and agree) on the implementation practice of the QMS principles.

And the Mean result of summary result to QMS principles is 2.54 shows the QMS principles implementation practice are clustered between disagree and agree.

Moreover, the positive skewness result of 0.78 also shows the data clustered towards the left of the Mean as per the below diagram.

QMS principles Implementation practice



In addition to the above analysis the positive *Kurtosis* value (i.e.=0.78) shows high frequencies are peaked on the small part of the curve and also by considering the positive skewness on the above analysis the result interpreted that the data with high frequencies are peaked at left side from Mean.

By considering all the above discussion, analysis, qualitative and quantitative diagram summary the findings interpreted that QMS principles implementation was weak.

B. Qualitative research summary

1. From interview

Interview with deputy general manager of heavy duty vehicles and locomotive business units

✓ Answer to implementation stage

In general the QMS implementation was missed its purpose (since the management not committed for customer satisfaction), the main indicators are:-

- The system audit was failed, it is not attached with accountability, and it is done for certification only.
- Resource provision was done for the purpose of increasing capacity only.

By considering the above condition into account the respondent concluded that the system was not implemented properly.

Interview with management representative (MR)

✓ Answer to implementation stage

The management was committed at system development stage, but during the implementation periods the management's commitment were low, it was expressed by the following main actions like management representative generally not well addressed on the two consecutive organizational structures developed and all actions end results was not integrated to maintain the customer satisfaction.

C. QMS implementation practice findings summary

From the above detail analysis of quantitative and qualitative research related with implementation practice of ISO 9001:2008 at Engineering company PLC finding in general was weak.

The finding consistent with the result of the study done by Birihanu and Gashew (2014):-

''… Quality management practices in Ethiopia was found to low in all tents including leadership, policyandstrategy,resourcemanagement,processmanagement,customersatisfaction,business performance and impact on society…''

And also the finding show cconsistency with the study done by ISO survey on 2014 ''…the percentage share by certified companies of Africa continents from the worlds at the end of 2014 was 0.9% ''

4.3.2 Perceived Benefits of Quality Management Principles Implementation

In this part the benefits attained by implementing the Quality Management System principles analysis conducted by categorizing and presented into nine(9) parts as per summarized table below on MIE after certified by BSI (British Standard Institute) on defined scope of Design, manufacture, supply & service of low bed semi-trailers dry & liquid cargo truck trailers and semi-trailers only.

A. Quantitative analysis

In this part also the respondents requested to give their agreements on the benefits attained by implementing the Quality Management System principles.
The gathered data analyzed per process or principle and also the gathered data categorized by ranging disagree (>0&≤2), between disagree and agree (>2 and <3) and agree (≥3 &≤4).

For simplicity the data and average result are summarized and presented by principles category as per the following tables and the analysis and interpretation presented by Minimum, Maximum and summary results of Mean only.

Table 4.8- Perceived Benefits of Quality management Principles Implementation

Descriptions	Responses	class interval	Frequency	Percent	Cumulative Percent	Mean	Skew	std.div	Kurt	rank
A. Customer focus	Disagree	>0&≤2	5	19	19	2.78	0.26			
	Between disagree and agree	>2 and <3	18	67	85					
	Agree	≥3 &≤4	4	15	100					
B. Leadership	Disagree	>0&≤2	4	15	15	2.61	1.22			
	Between disagree and agree	>2 and <3	16	59	74					
	Agree	>3 &<4	7	26	100					
C. People involvement	Disagree	>0&≤2	**11**	**41**	**41**	**2.80**	**0.52**	**0.67**	**-0.59**	**1st**
	Between disagree and agree	>2 and <3	**7**	**26**	**67**					
	Agree	≥3 &≤4	**9**	**33**	**100**					
D. Process approach	Disagree	>0&≤2	5	19	19	**2.46**	0.46			
	Between disagree and agree	>2 and <3	18	67	85					
	Agree	≥3 &≤4	4	15	100					
E. System approach	Disagree	>0&≤2	12	44	44	2.52	-1.10			
	Between disagree and agree	>2 and <3	4	15	59					
	Agree	≥3 &≤4	11	41	100					
F. Continual improvement	Disagree	>0&≤2	9	33	33	2.50	1.49			
	Between disagree and agree	>2 and <3	14	52	85					
	Agree	≥3 &≤4	4	15	100					
G. Factual operation	Disagree	>0&≤2	**12**	**44**	**44**	**2.46**	**1.50**	**0.57**	**2.13**	**8th**
	Between disagree and agree	>2 and <3	**9**	**33**	**78**					
	Agree	≥3 &≤4	**6**	**22**	**100**					
H. Mutual benefit	Disagree	>0&≤2	9	33	33	**2.65**	-0.01			
	Between disagree and agree	>2 and <3	3	11	44					
	Agree	≥3 &≤4	15	56	100					
I. Other benefit (export market share)	Disagree	>0&≤2	13	48	48	**2.16**	0.9			
	Between disagree and agree	>2 and <3	11	41	89					
	Agree	≥3 &≤4	3	11	100					
Summary	Disagree	>0&≤2	82	34	34	**2.55**	0.6	0.55	0.22	
	Between disagree and agree	>2 and <3	88	36	70					
	Agree	≥3 &≤4	73	30	100					

Source: Own Survey, 2015

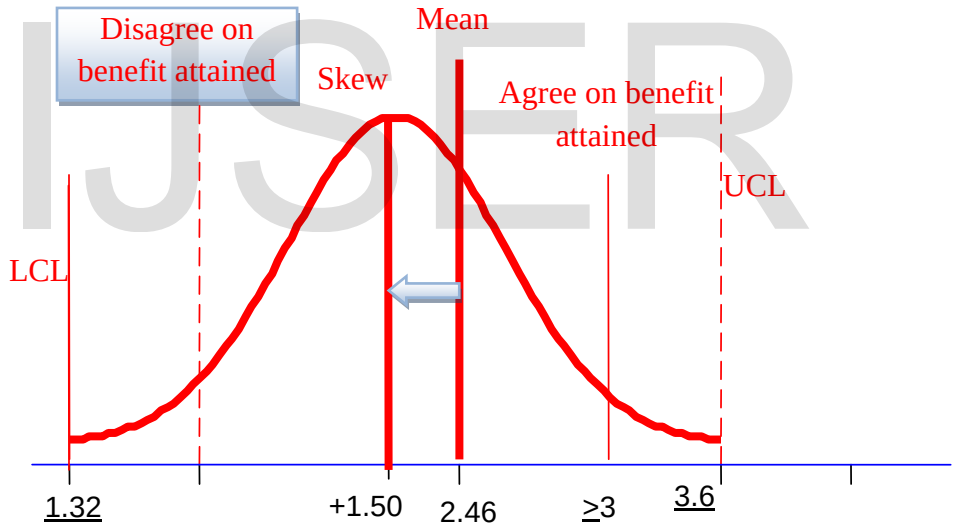
A.1. Interpretation and discussion on Minimum Mean result

According to Table 4.8 above, 44 % of the respondents are disagree and 22 % of the respondents are agree, while others 33 % are neutral (between disagree and agree) on the benefit perceived by implementation the factual operation principle.

And the Mean result of the benefit attained by implementing the factual operation principle result is 2.46(8^{th}) ,this Minimum Mean result which is below average of the summary Mean score of benefit attained by implementing the QMS principles, show the benefit attained by implementing the factual operation principle Mean result clustered between disagrees and agree.

Moreover, the positive skewness result of 1.5 also shows the data clustered towards the left of the Mean as per the below diagram.

Benefits perceived by Implementation factual operation principles of QMS principles



In addition to the above analysis the positive *Kurtosis* value (i.e.=2.13) shows high frequencies are peaked on the small part of the curve and also by considering the positive skewness on the above analysis the result interpreted that the data with high frequencies are peaked at left side from Mean.

By considering all the above discussion, analysis, qualitative and quantitative diagram summary the findings interpreted that MIE management lack of attaining the benefits expected from implementation of the factual operation principle on consistent way.

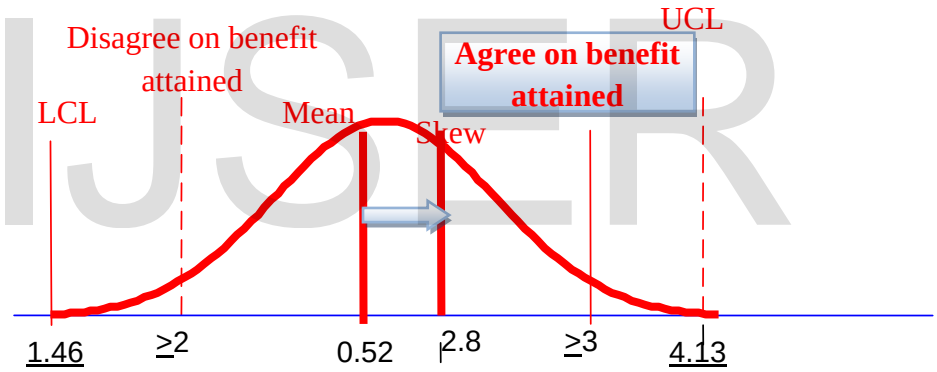
A.2. Interpretation and discussion on Maximum Mean result

According to Table 4.8 above, 41 % of the respondents are disagree and 33 % of the respondents are agree, while others 26 % are neutral (between disagree and agree) on the benefits attained by implementation practice of the Leadership principle.

And the Mean result of questionnaires related to Leadership principle result is 2.80(1^{st}) ,this Maximum Mean result which is above average of the summary Mean score of benefit attained by implementing the QMS principles, show the Leadership principle in particular clustered toward agree.

Moreover, the positive skewness result of 0.52 also shows the data clustered towards the left of the Mean as per the below diagram.

Benefits perceived by Implementation Leadership principle of QMS principles



In addition to the above analysis the negative *Kurtosis* value (i.e.=-0.59) shows frequencies throughout the curve are closer to be equal and also by considering the positive skewness on the above analysis the result interpreted that the data with closer to equal frequencies are distributed at left side from Mean.

By considering all the above discussion, analysis, qualitative and quantitative diagram summary the findings interpreted that MIE management's relatively attained well benefit expected by implementing the Leadership principle.

A.3. Interpretation and discussion on summary result

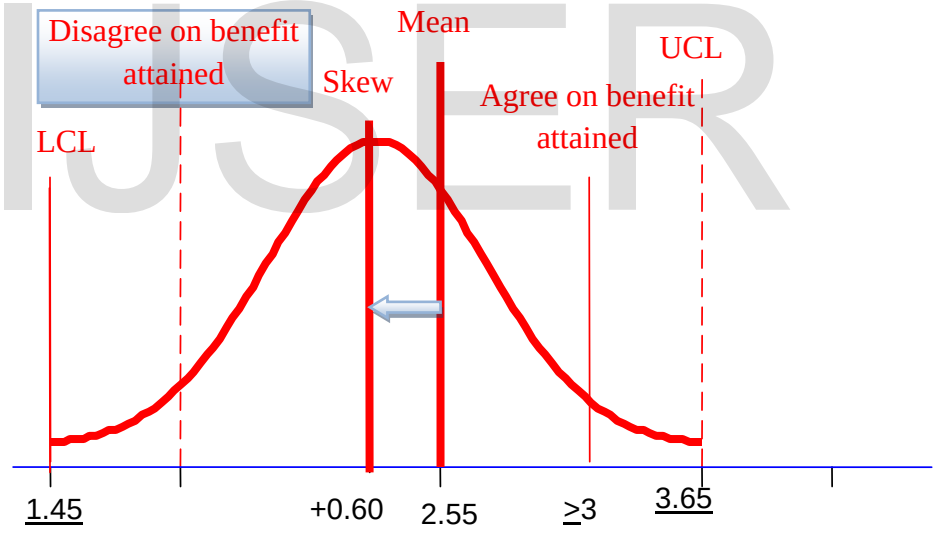
According to Table 4.8 above summary result, 34 % of the respondents are disagree and 30 % of the respondents are agree, while others 36 % are neutral (between disagree and agree) on the benefit attained by implementation of the QMS principles.

And the Mean result of summary result of benefit attained by implementing the QMS principles is 2.55 shows the QMS principles are clustered between disagree and agree.

Moreover, the positive skewness result of 0.60 also shows the data clustered towards the left of the Mean as per the below diagram.

Moreover, the negative skewness result of 0.52 also shows the data clustered towards the right of the Mean as per the below diagram.

Benefits attained by Implementation the QMS principles



In addition to the above analysis the positive *Kurtosis* value (i.e.=0.22) shows high frequencies are peaked on the small part of the curve and also by considering the positive skewness on the above analysis the result interpreted that the data with high frequencies are peaked at left side from Mean.

By considering all the above discussion, analysis, qualitative and quantitative diagram summary the findings interpreted that the benefit attained by implementation of QMS principles implementation was low**.**

B. Qualitative research analysis

In this part also the respondents requested to give their opinion on the benefits attained by implementing the Quality Management System principles.

1. From open ended questionnaires

Main benefits were perceived are summarized as follows:-

- Defined procedures, manuals, process and system was developed
- Good Company image and confidence was developed
- Good market share attained in local market for trailer related products

2. From interview

As per the Interview was conducted with deputy general manager of heavy duty vehicles and locomotive business units concluded that, since the system was not implemented properly and the expected benefits was not attained.

From the above detail analysis of quantitative and qualitative research the findings can be concluded that the benefit perceived by implementation quality management principles of QMS ISO 9001:2008 at Engineering company PLC in general was low.

C. Benefits attained by QMS principles implementation findings summary

From the above detail analysis of quantitative and qualitative research related with benefit attained by implementation QMS principles of ISO 9001:2008 at Engineering company PLC finding in general was low and in particular the benefit attained by implementing the factual operation principles ware too low .

The finding is inconsistent with findings summarized by Kumar and Balakrishnan(2011) the benefits gained after implementing ISO 9001for Far East countries was positive(such as better documentation, greater quality awareness, and improved measurement system).

The finding inconsistency was with the respect to the benefits derived from the collective experience and knowledge of the international experts who participate in ISO Technical Committee ISO/TC 176. But from the qualitative research findings the benefit attained with respect to certification objectives by MIE management show partial consistency.

4.3.3 Challenges Faced During Implementation of QMS

In this part the challenges faced during the implementation of the Quality Management System principles analysis conducted by categorizing and presented into eight(8) parts as per summarized table below on MIE after certified by BSI (British Standard Institute) on defined scope of Design, manufacture, supply & service of low bed semi-trailers dry & liquid cargo truck trailers and semi-trailers only.

A. Quantitative analysis

In this part also the respondents requested to give their agreements on the challenges faced during the implementation of the Quality Management System principles.

The gathered data analyzed per process or principle and also the gathered data categorized by ranging disagree (>0&≤2), between disagree and agree (>2 and <3) and agree (≥3 &≤4).

For simplicity the data and average result are summarized and presented by principles category as per the following tables and the analysis and interpretation presented by Minimum, Maximum and summary results of Mean only.

Table 4.9- Challenges faced during implementing QMS principles

Descriptions	Responses	class interval	Frequency	Percent	Cumulative Percent	Mean	Skew	std.div	Kurt	rank
1.Customerfocus	Disagree	>0&≤2	**1**	**4**	**4**	**2.89**	**-1.17**	**0.54**	**4.00**	**1st**
	Between disagree and agree	>2 and <3	**12**	**44**	**48**					
	Agree	≥3 &≤4	**14**	**52**	**100**					
2.Leadership	Disagree	>0&≤2	1	4	4	2.74	0.38			
	Between disagree and agree	>2 and <3	16	59	63					
	Agree	≥3 &≤4	9	33	96					
3. People involvement	Disagree	>0&≤2	1	4	4	2.81	0.07			
	Between disagree and agree	>2 and <3	15	56	59					
	Agree	≥3 &≤4	10	37	96					
4. Process approach	Disagree	>0&≤2	2	7	7	2.87	-0.54			
	Between disagree and agree	>2 and <3	10	37	44					
	Agree	≥3 &≤4	14	52	96					
5. System approach	Disagree	>0&≤2	4	15	15	2.76	-0.68			
	Between disagree and agree	>2 and <3	12	44	59					
	Agree	≥3 &≤4	10	37	96					
6. Continual improvement	Disagree	>0&≤2	2	7	7	2.84	-0.87			
	Between disagree and agree	>2 and <3	14	52	59					
	Agree	≥3 &≤4	11	41	100					
7. Factual operation	Disagree	>0&≤2	**2**	**7**	**7**	**2.89**	**-0.98**	**0.77**	**2.56**	**1st**
	Between disagree and agree	>2 and <3	**14**	**52**	**59**					
	Agree	≥3 &≤4	**11**	**41**	**100**					
9. Mutual benefit	Disagree	>0&≤2	**9**	**33**	**33**	**2.65**	**-1.17**	**0.69**	**-0.57**	**7th**
	Between disagree and agree	>2 and <3	**2**	**7**	**41**					
	Agree	≥3 &≤4	**16**	**59**	**100**					
Summary	Disagree	>0&≤2	22	9	9	2.79	-0.74	0.59	0.88	
	Between disagree and agree	>2 and <3	95	39	48					
	Agree	≥3 &≤4	95	39	87					

Source: Own Survey, 2015

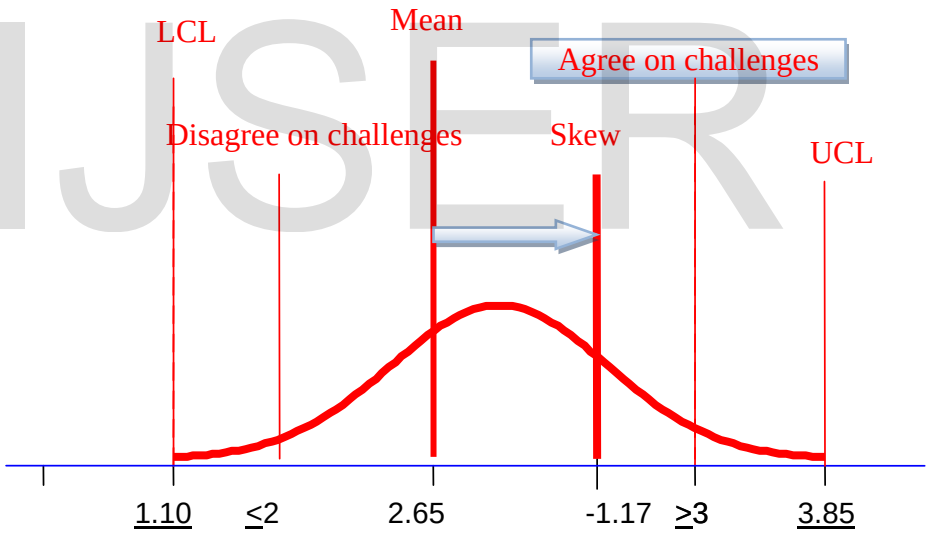
A.1. Interpretation and discussion on Minimum Mean result

According to Table 4.8 above, 33 % of the respondents are disagree and 59 % of the respondents are agree, while others 7 % are neutral (between disagree and agree) on the challenges faced during implementation of mutual benefits principles.

And the Mean result of the challenges faced during the implementation mutual benefits principles result is 2.65(8^{th}) ,this Minimum mean result which is below average of the summary Mean score of challenges faced during implementation of QMS principles, show the mutual benefits principles and factual operation principles are in particular clustered between disagrees and agree.

Moreover, the negative skewness result of 1.17 also shows the data clustered towards the right of the Mean as per the below diagram.

Challenges related with mutual benefits principles faced during Implementation QMS principles



In addition to the above analysis the negative *Kurtosis* value (i.e.=-0.57) shows frequencies throughout the curve are closer to be equal and also by considering the negative skewness on the above analysis the result interpreted that the data with closer to equal frequencies are distributed at right side from Mean.

By considering all the above discussion, analysis, qualitative and quantitative diagram summary the findings interpreted that MIE managements relatively faced moderate challenges during the implementing the mutual benefits principles among organization, suppliers as well as customers on consistent way.

A.2. Interpretation and discussion on Maximum Mean result

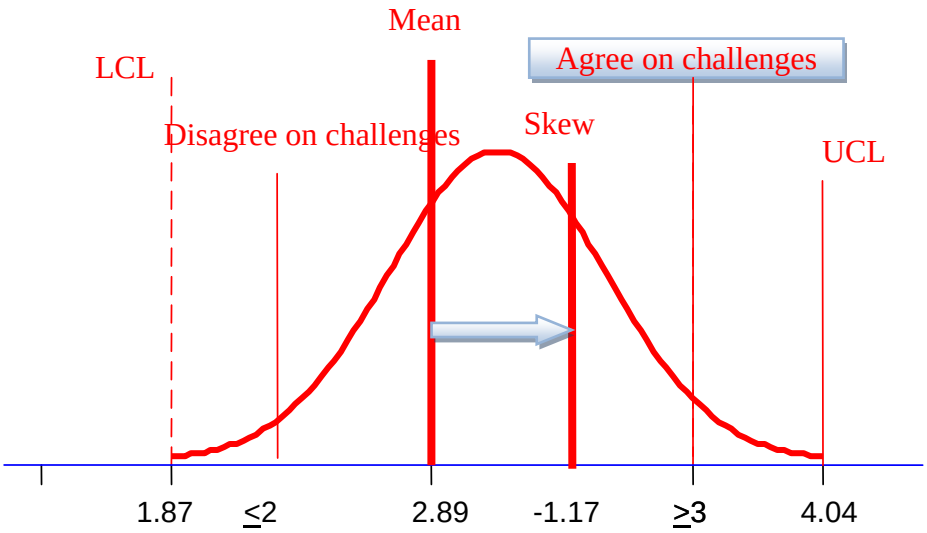
According to Table 4.9 above, 4 % of the respondents are disagree and 52 % of the respondents are agree, while others 44 % are neutral (between disagree and agree) on the challenges faced during implementation of customer focus principle.

According to Table 4.9 above again, 7 % of the respondents are disagree and 52 % of the respondents are agree, while others 41 % are neutral (between disagree and agree) on the challenges faced during implementation of factual operation principle.

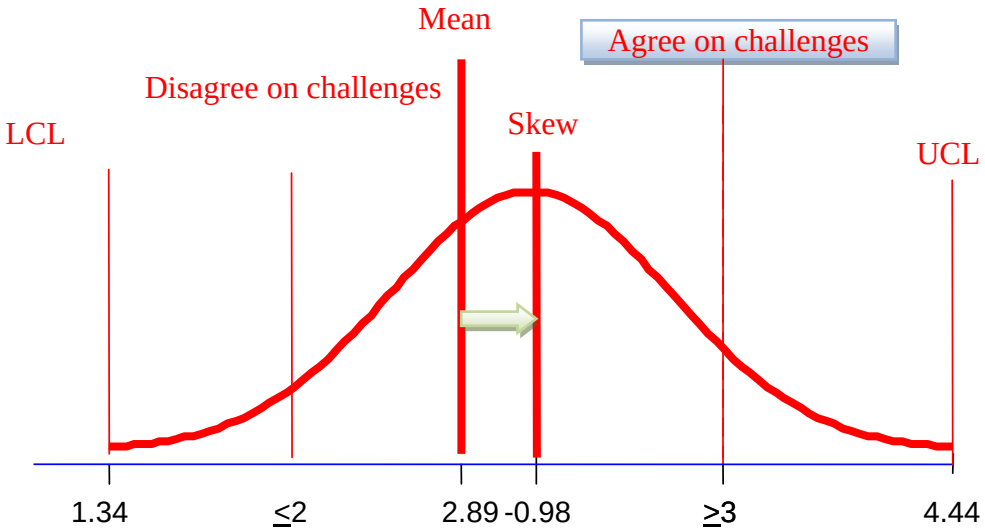
And the Mean result of the challenges faced during the implementation of customer focus principle and factual operation principles result is 2.89(1^{st}) ,this Maximum Mean result which is above average of the summary Mean score of challenges faced during implementation of QMS principles, show the customer focus principle in particular clustered toward agree.

Moreover, the negative skewness result of 1.17 and 0.98 respectively also shows the data clustered towards the right of the Mean as per the below diagram.

Challenges faced during Implementation of customer focus principles



Challenges faced during Implementation of factual operation principles



In addition to the above analysis the positive *Kurtosis* values (i.e.=4.00 and 2.72) shows high In addition to the above analysis the positive *Kurtosis* values (i.e.=4.00 and 2.72) shows high frequencies are peaked on the small part of the curve and also by considering the negative skewness on the above analysis the result interpreted that the data with high frequencies are peaked at right side from Mean.

By considering all the above discussion, analysis, qualitative and quantitative diagram summary the findings interpreted that MIE managements relatively faced high challenges during the implementing the customer focus and factual operation principles on consistent way.

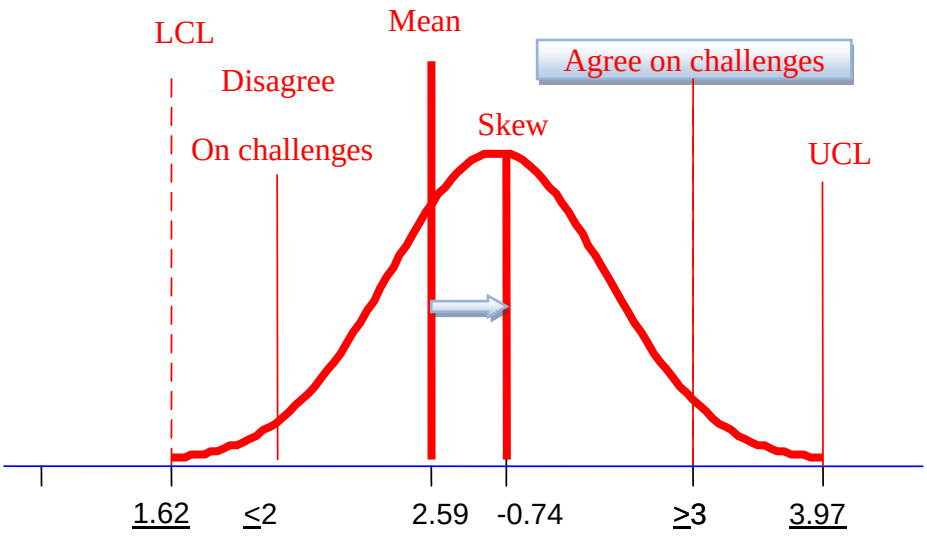
A.3. Interpretation and discussion on summary result

According to Table 4.9 above summary result, 9 % of the respondents are disagree and 39 % of the respondents are agree, while others 39 % are neutral (between disagree and agree) on the challenges faced during the implementation of QMS principles.

And the Mean result of summary result related with challenges faced during the QMS principles implementation is 2.79 shows the QMS principles are clustered towards agree.

Moreover, the negative skewness result of 0.74 also shows the data clustered towards the right of the Mean as per the below diagram.

Challenges faced during Implementation QMS principles



In addition to the above analysis the positive *Kurtosis* value (i.e.=0.88) shows high frequencies are peaked on the small part of the curve and also by considering the negative skewness on the above analysis the result interpreted that the data with high frequencies are peaked at right side from Mean.

Table 4.10- Ranked analysis for Challenges Faced during the QMS Implementation Periods

Rank	Question code	Challenges	Mean	Skew
1	**6.16**	Lack of strong research and development program of products.	3.26	-0.99
2	**6.17**	Lack of properly implementing statistical control of quality tools to process improvement (SPC; Statistical Process Control) and others.	3.24	-2.00
3	**1.40**	Lack of measuring customer satisfaction and acting on the results.	3.22	-1.07
4	**2.90**	Insufficient management support , in order for you to implement ISO correctly you need to have maximum and effective management support to be able to implement ISO without facing more challenges	3.19	-0.34
5	**4.70**	Lack of management commitment; management must decide the policy, objectives and means of measuring progress, this must be reasonable, transparent and achievable.	3.12	-1.00

B. Qualitative research analysis

In this part also the respondents requested to give their opinion on the challenges faced during the implementation of the Quality Management System principles.

1. From open ended questionnaires

Main challenges faced are summarized and ranked as follows:-

1st. Lack of awareness, training and knowledge (frequency=12)

2nd. Lack of prober structure for MR Representative and lack of accountability and responsibilities (frequency=9)

3rd. Lack of Top management commitment (frequency=7)

2. From interview

As per the Interview was conducted with deputy general manager of heavy duty vehicles and locomotive business units concluded that the main challenges was the top management low commitment and The BSI certification audit was not challenging and it was artificial.

As per the Interview was conducted with management representative (MR) concluded again that the main challenges was the top management low commitment.

Also the third Interviewed deputy general manager of industrial equipments manufacturing business units concluded the main challenge was lack of accountability by the process owners.

C. Challenges faced during the implementation of QMS principles findings summary

From the above detail analysis of quantitative and qualitative research the findings can be concluded that the challenges faced during the implementation quality management principles of QMS ISO 9001:2008 at Engineering company PLC in general are high, The main challenges are summarized and ranked as follows:-

1st. Lake of awareness, knowledge
2nd. Lack of ownership to QMS system in general
3rd. Lack of accountability of process owners
4th. And lack of the measurement, analysis and feedback on the core process
5th. Lack of top management commitment and support

The finding is consistent with the findings of Chikuku, T et al (1996) ‘’... It requires active involvement of **managers** from all levels of an organization. ISO 9001 is thus a QMS standard that requires synchronization of a **company's operations** through documentation of operational procedures and managerial actions used to achieve customer requirements’’.

And also

The finding is consistent with the findings done by Ramesh and Jain (2012) ‘’… pointed out that less than 25 of Indian ISO 9001 certified firms have their **top management** really involved and committed to quality issues, otherwise the QMS is given least priority during resource allocation’’

Generally the findings are consistent with findings summarized by Kumar and Balakrishnan (2011):-

‘’The findings …were broadly classified into three categories as:-

- Leadership related issues (Inadequate Commitment by Top management, Lack of Motivation, Recognition, Organizational learning, Strategic Planning and long term focus).
- Strategy Related Issues (Mission, Vision, Values, Strategic Planning, Strategy Mapping, Cascading down the line, KPIs and Initiatives).

- Quality System related issues (Weak PDCA cycle, generic system, internal audit not in depth, non value adding meetings/trainings and excessive paperwork). Society oriented gaps (Corporate Social Responsibility, Environmental Management and Sustainability).

4.3.4 Comparing all principles Vs all variables

Table 4.11- Summary of all principles results Vs all variables

Descriptions	Responses	class interval	challenges			benefits			practice			challenges			benefits			practice		
			Frequency	Percent (%)	Cumulative Percent (%)	Frequency	Percent (%)	Cumulative Percent (%)	Frequency	Percent (%)	Cumulative Percent (%)	Mean	Skew	Rank	Mean	Skew	Rank	Mean	Skew	Rank
1. Customer focus principle implementation	Disagree	>0&≤2	1	4	4	5	19	19	12	44	44									
	Between disagree and agree	>2 and <3	12	44	48	18	67	85	12	44	89	2.89	-1.17	**1**	2.81	0.25	2	2.35	1.59	5
	Agree	≥3 &≤4	14	52	100	4	15	100	3	11	100									
2 Leadership principle implementation	Disagree	>0&<2	1	4	4	4	15	15	3	11	11									
	Between disagree and agree	>2 and <3	16	59	63	16	59	74	11	41	52	2.74	0.38	6	2.63	1.26	4	2.81	-0.27	**1**
	Agree	>3 &<4	9	33	96	7	26	100	13	48	100									
3. people involvement principle implementation stage	Disagree	>0&<2	1	4	4	1	41	41	5	19	19									
	Between disagree	>2 and <3	15	56	59	7	26	67	14	52	70	2.81	0.07	4	2.83	0.48	**1**	2.71	-0.22	2
	Agree	>3 &<4	10	37	96	9	33	100	8	30	100									
4. process approach principle implementation	Disagree	>0&<2	2	7	7	5	19	19	5	19	19									
	Between disagree and agree	>2 and <3	10	37	44	18	67	85	18	67	85	2.87	-0.54	2	2.51	0.40	7	2.66	-0.96	3
	Agree	>3 &<4	14	52	96	4	15	100	4	15	100									
5. system approach principle	Disagree	>0&<2	4	15	15	12	44	44	5	19	19									
	Between disagree and agree	>2 and <3	12	44	59	4	15	59	18	67	85	2.76	-0.68	5	2.62	-0.23	5	2.57	0.31	4
	Agree	>3 &<4	10	37	96	11	41	100	4	15	100									
6. continual improvement principle	Disagree	>0&<2	2	7	7	9	33	33	5	19	19									
	Between disagree and agree	>2 and <3	14	52	59	14	52	85	15	56	74	2.84	-0.87	3	2.52	1.46	6	2.57	0.26	4
	Agree	>3 &<4	11	41	100	4	15	100	7	26	100									
7. Factual operation principle	Disagree	>0&<2	**2**	**7**	**7**	**12**	**44**	**44**	**17**	**63**	**63**									
	Between disagree and agree	>2 and <3	**14**	**52**	**59**	**9**	**33**	**78**	**7**	**26**	**89**	**2.89**	**-0.98**	**1**	**2.48**	**1.45**	**8**	**2.25**	**2.98**	**6**
	Agree	>3 &<4	**11**	**41**	**100**	**6**	**22**	**100**	**3**	**11**	**100**									
9. Mutual benefit principles (supplier Vs Customers)	Disagree	>0&<2	9	33	33	9	33	33	6	22	22									
	Between disagree and agree	>2 and <3	2	7	41	3	11	44	7	26	48	2.65	-1.17	7	2.69	0.12	3	2.66	-0.96	3
	Agree	>3 &<4	16	59	100	15	56	100	14	52	100									

Source: Own Survey, 2015

In this part also comparisons done on all principles Vs all variables to identify the main principles affected against all variables and the result is summarized as per the table above.

As per the Table 4.11 above, the comparisons result show that the factual operation principles are with low practice, high challenges and low benefit the result expressed as follows:-challenges(i.e. Mean=2.89(1^{st}) and skew=-0.98), benefits(i.e. Mean=2.48(8^{th}) and skew=1.45 and practice (i.e. Mean=2.25(6^{th}) and skew=2.98).

As per the comparison table result the factual operation is concluded as big challenges by considering the data clustered towards agree >3 ,since the skewness is negative, and it can be interpreted as weak benefits and weak practice by considering the data clustered towards disagree <3 ,since the skewness is positive.

According to this comparison table result in particular the MIE management lack to implement factual operation principles implementation on consistent way.

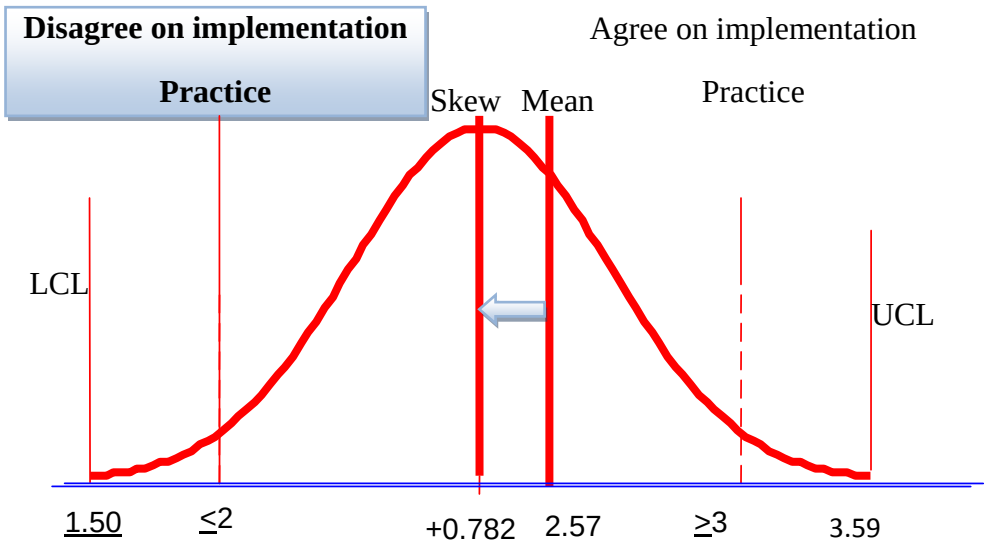
Table 4.12- Summary of results of total quality management principles Vs variables

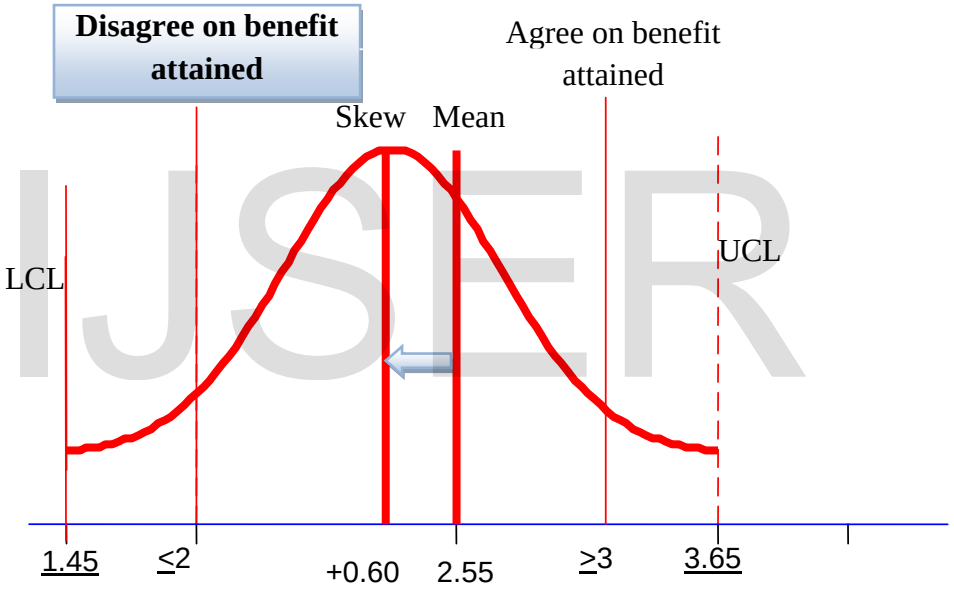
Descriptions	Responses	class interval	challenges			benefits			practice			challenges		benefits		practice	
			Frequency	Percent (%)	Cumulative Percent (%)	Frequency	Percent (%)	Cumulative Percent (%)	Frequency	Percent (%)	Cumulative Percent (%)	Mean	Skew	Mean	Skew	Mean	Skew
Summary data and result Quality Management System principles	Disagree	>0&≤2	22	9	9	82	34	34	22	26	26	2.79	-0.74	2.59	0.68	2.54	0.78
	Between disagree and agree	>2 and <3	95	39	48	88	36	70	46	48	74						
	Agree	≥3 &≤4	95	39	87	73	30	100	11	26	100						

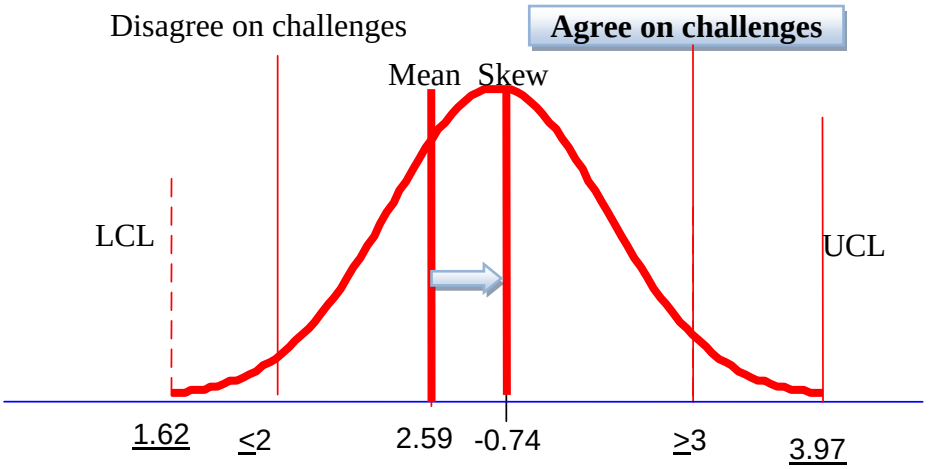
As per the above summarized table of comparison Table 4.12, the result of challenge (i.e. Mean=2.79 and skew=-0.74), the result of benefits (i.e. Mean=2.59 and skew=0.68) and the result of practice (i.e. Mean=2.54 and skew=0.78).

As per the above summary results MIE faced big challenges (by considering the negative skewness and its interpretation that data's are clustered towards agree >3) and MIE attained low benefits and weak practice (by considering the positive skewness and its interpretation that data's are clustered towards disagree <2).

For further elaboration the above interpretation, it was demonstrated by the following diagrams below which shows the implementation practice, benefit attained and challenges faced during the implementation of QMS principles of ISO 9001:2008.


Disagree on implementation Practice
Agree on implementation Practice
Skew
Mean
LCL
UCL
1.50
≤2
+0.782
2.57
≥3
3.59


Disagree on benefit attained
Agree on benefit attained
Skew
Mean
LCL
UCL
1.45
≤2
+0.60
2.55
≥3
3.65


Disagree on challenges
Agree on challenges
Mean
Skew
LCL
UCL
1.62
≤2
2.59
-0.74
≥3
3.97

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1. CONCLUSION

The main objective of this study was to determine the implementation practice of ISO 9001 by MIE against ISO standard requirements and to identify the critical factors that hinder the proper implementation. To do this, questionnaires were developed to address the extent of practice, benefit attained and challenges faced during implementation of QMS process and principles.

And the developed questionnaires distributed to selected management and senior staffs those have reasonable knowledge and experience only (both at head office and branch).

Moreover, interview questions was prepared per individuals and accordingly interview was conducted with Management representative, Deputy generals manager of heavy duty vehicles and locomotive manufacturing business unit, and deputy general managers of Industrial equipments manufacturing business unit.

Accordingly, the researcher identified and presented the findings as per the followings category:-

The implementation practice related findings

As per the detail analysis conducted by quantitative and qualitative methods the researcher concluded that the implementation practice of ISO 9001:2008 at Engineering company PLC in general was weak.

The major findings related with implementation practice are summarized as follows:-

- MIE management lack to implement resource management process on proper way (in particular the findings are interpreted that MIE lack to train all staff on consistent way and also lack to measure training effectiveness against the training objectives).
- MIE management lack to implement factual operation principle in particular on proper way.
- MIE management lack to implement the strong internal audit and lack to implement the strong external audit by BSI.

The benefit related findings

As per the detail analysis conducted by quantitative and qualitative methods the researcher concluded that the benefit attained by implementing the QMS principles by MIE are low and the major findings are summarized as follows:-

- MIE management lack of attaining the benefits expected from implementation of the factual operation principle on consistent way.
- Negligible export market share achieved.

But the following main benefits are attained by implementing the quality management principles such as:-

- Good market share for trailer related products.
- Good company image and loyalty developed by customer, partners and governments.

In addition to this MIE managements relatively not benefited by implementing the mutual benefits principles with suppliers as well as customers on consistent way.

Challenges related findings

As per the detail analysis conducted by quantitative and qualitative methods the researcher concluded that the challenges faced during the implementation of QMS principles by MIE and the main findings related with challenges identified are summarized and ranked as follows:-

1st. Lake of awareness, knowledge.
2nd. Lack of ownership to QMS system in general.
3rd. Lack of accountability of process owners.
4th. Lack of the measurement, analysis and feedback on the core process.
5th. Lack of top management commitment and support.

The core findings of this particular survey are the MIE management lack to implement factual operation principles implementation on consistent way.

In general the implementation practices of QMS and benefit attained are weak due to high challenges faced during the implementation.

5.2. RECOMMENDATION

First of all, the researcher would like to recommend the MIE management should change the current weak practice of QMS implementation to continue with current strong global competition.

MIE should give training and conduct panel discussion with all management at all level to create awareness about the requirements and benefit expected.

MIE has to avoid the core finding of this survey, that is not implementing the factual operational principles, as soon as possible to achieve this management should give attention:-

- To voice of the customer - through complaint analysis, opinion surveys and regular contacts.
- And to the voice of the processes – through measurement, monitoring and analysis of both process and product data.

MIE should rectify the structural problem challenge related with the Management representative. and MIE should strengthen the internal audit by establishing the system auditing committee.

In General MIE should avoid the identified above challenges by accomplishing the following mandatory tasks:-

- ❖ Commitment of top management should be strengthen on implementation of ISO 9001:2008, by giving the continuous awareness training.
- ❖ The existing system should improve continually with dynamic customer requirements change; by strengthen the research and development department both for local and export market.
- ❖ MIE should have to exploit the expected benefits of ISO 9001by succeeding the global competition, by properly implementing the all QMS standards requirements and by assigning fully responsible and accountable the Management representatives.

MIE managements should strengthen the relationship with suppliers as well as customers to attain the mutual benefits by implementing mutual benefits principles, by signing the long relation partner shipment.

5.3. Recommendations for further work

Future study has to be conducted by institution like university on the following topics, but not limited to:-

- ✓ Culture impact on QMS implementation.
- ✓ Role SPC to the successes full implementation of QMS.
- ✓ QMS benefits related with standardization and others.

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ANNEXURES

Annexurer-01:-Questioner

I. Objective of this Questioner

This questionnaire is prepared to assess the **'' the practice, benefits and challenges of QMS implementation for manufacturing companies of Ethiopia**

Case of Engineering company PLC'' only on scope of

- Design, manufacture, supply & service of low bed semi-trailers dry & liquid cargo truck trailers and semi-trailers; **ISO 9001 certificate (International Standard Organization 9001 certificate)**

And also not include the following products and service parts such as:-

- Manufacture, erect & supply of petroleum liquid reservoirs including electrical & instrumentation system;
- Manufacture & supply of fabricated products for industrial application;
- Supply, erection & testing of HVAC (Heat, Ventilation, Air Conditioning) system &Vehicle equipment maintenance & renting

Therefore, your devotion and contribution has an indispensible value to the successful accomplishment of the survey.

I would like to assure you that your responses will be kept confidential and only used for pure academic purpose and improvement of Engineering company quality management system

Please mark at box ☑

II. Personal Information

1. **Sex :** ☐ **Male** ☐ **Female**
2. **Age:** ☐ **21-25** ☐ **26-30** ☐ **31-35** ☐ **36-40** ☐ **above 40**
3. **Educational Background:**
   ☐ **1st Degree** ☐ **2nd Degree** ☐ **PhD**
4. **Branch:**_____
5. **Department:**_____
6. **Position :** _____
7. **Job Title :** _____
8. **Total work Experience IN MIE.**
   ☐ **0-3 years** ☐ **4-6years** ☐ **7-10years** ☐ **above 10 Years**

III. **Please evaluate and put your agreement on the implementation stage of Quality Management System process implementation practice on consistent way to define scope of Design, manufacture, supply & service of low bed semi-trailers dry & liquid cargo truck trailers and semi-trailers only ;**

The Quality Management System process are four: Management responsibility process, Resource management process, Product Realization process and Measuring, analysis and improvement process as tried to be put in the following table for assessment.

- **Strongly agree(SA) 4**
- **Agree(A) 3**
- **Disagree(DA) 2**
- **Strongly disagree(SDA) 1**
- **Not applicable(NA) 0**

S/n	Process description	Strongly agree	Agree	disagree	Strongly disagree	NA (Not applicable
(I)	**Management responsibility process**					
I.1	Documented **quality objectives** are available and it is defined and measured at relevant levels on consistent way and it is consistent with the quality policy					
I.2	MIE top managements are committed to the system implementation and they are actively involved in the **management reviews** • By Communication to the organization the importance of meeting customer, statutory, and regulatory requirements • By established quality policy • By established quality objectives • By ensuring Management Reviews conducted on regular interval • By ensuring the availability of resources. MIE managements defined the frequency and method to carrying out management reviews at planned intervals with assessment of opportunities for improvement, need for changes to system, policy and objectives of the system on consistent base and implemented accordingly **Management Review Inputs considered by MIE managements are:-** • Results of audits • Customer feedback • Process performance and product conformity • Status of preventive and corrective action • Follow-up actions from previous management reviews • Changes that could affect the quality management system • Recommendations for improvement **Management Review Output –** Does output include decisions and actions on: • Improvement of the effectiveness of QMS and its processes • Improvement of product related to customer requirements? • Resource needs					
(II)	**Resource management process**	SA	A	D	SDA	NA
II.1	MIE managements trained all staff that can affect quality of products based on TNA (Training Need Assessment) and consistently orient all staff to understand their roles and to fit in the quality management system to Enhance customer satisfaction by meeting customer requirements					

II.2	MIE management conduct the training effectiveness measurement against the training objectives on consistent way					
(III)	**Product Realization process**	SA	A	D	SD	NA
III.1	MIE **developed the processes** needed for product realization and analyzed to be consistent with the requirements of the other processes of the quality management system by considering:- • Quality objectives and requirements of the product; • Resources required specific to the product; • Required verification, validation, monitoring, measurement, inspection and test activities specific to the product and the criteria for product acceptance;					
III.2	MIE determine **customer related process** by analyzing the:- • Requirements specified by the customer, including the requirements for delivery and post-delivery activities, • Requirements not stated by the customer but necessary for specified or intended use, where known, • statutory and regulatory requirements applicable to the product, and • Additional requirements considered necessary by the organization. (NOTE Post-delivery activities include, for example, actions under warranty provisions, contractual obligations such as maintenance services, and supplementary services such as recycling or final disposal).					
III.3	MIE **review the requirements** related to the product. This review shall be conducted prior to the organization's commitment to supply a product to the customer (e.g. submission of tenders, acceptance of contracts or orders, acceptance of changes to contracts or orders) and ensured :- • product requirements are defined, • contract or order requirements differing from those previously expressed are resolved, and • The organization has the ability to meet the defined requirements.					
III.4	MIE defined and implemented the **prober** process to managing customer complaints and feedback on consistent base					
III.5	MIE defined and verified that the final design meets the design specification on consistent base					
III.6	MIE defined and reviewed that all design stages are carried out with appropriate personnel					
III.7	MIE have a method to validate the final product will operate for intended purpose on consistent way					
III.8	MIE have defined method of identification and traceability for products and implemented on consistent base as they go through the realization process					
(IV)	**Measuring, analysis and improvement process**	SA	A	D	SD	NA
IV.1	MIE have a procedure how to monitoring customer satisfaction and perception and implemented it accordingly on consistent way					
IV.2	MIE have defined procedure for performing and analyzing internal audits and implemented accordingly on consistent base					
IV.3	MIE have a procedure and implemented on consistent way for identifying potential non-conformities in the system ,and identified their cause					
IV.4	MIE have a documented procedure and implemented on consistent way to prevent the non-conforming products from being delivered					

IV.5	MIE have methods or procedure to determine, collect and analyze appropriate data to demonstrate the suitability and Effectiveness of the quality management system and implemented on consistent way and the findings are provide information relating to ▪ customer satisfaction , ▪ conformity to product requirements , ▪ characteristics and trends of processes and products, including opportunities for preventive action , and ▪ suppliers					
IV.6	Implementation stage of the methodology known as "Plan-Do-Check-Act" (PDCA) to all processes on continuous base , toward the desired improvement, leading to savings in time and money that can be used to improve further. (PDCA can be briefly described as follows.=(Plan+DO+Check+ACT+Plan) Plan: establish the objectives and processes necessary to deliver results in accordance with customer requirements and the organization's policies.(+) Do: implement the processes. .(+) Check: monitor and measure processes and product against policies, objectives and requirements for the product and report the results. .(+) Act: take actions to continually improve process performance. .					
IV.7	MIE continually improve the effectiveness of the quality management system through the use of the quality policy, quality objectives, audit results, analysis of data, corrective and preventive actions and management review.					

IV. Please evaluate and put your agreement on the MIE following the quality management principles implementation practice stage on consistent way After certified by BSI (British Standard Institute) to defined scope of Design, manufacture, supply & service of low bed semi-trailers dry & liquid cargo truck trailers and semi-trailers only ;

S/n	Description	Strongly agree	Agree	disagree	Strongly disagree	NA
[1]MIE followed Customer focuses principle after certified by BSI on consistent way by strongly considering current and future needs of customers to meet the customer requirements and strive to exceed customer expectations. By conducting the following main activities						
1.1	Researching and understanding customer needs and expectations					
1.2	Ensuring the objectives of the organization are linked to customer needs and expectations					
1.3	Measuring customer satisfaction and acting on the results					
1.4	Systematically managing customer relationships					
[2]MIE consider the roll of the Leaders principles to establish unity of purpose toward direction of the organization and create all employees fully involved in achieving the organization's objectives to meet customer satisfaction by :-		SA	A	DA	SD A	NA
2.1	Establishing a clear vision of the organization's future					
2.2	Creating and sustaining shared values, fairness and ethical role models at all levels of the organization					
2.3	Providing people with the required resources, training and freedom to act with responsibility and accountability					
[3]MIE management fully involve their employee at all levels by supporting, motivating and involving:-		SA	A	DA	SDA	NA
3.1	To understand the importance of their contribution and role in the organization					
3.2	To identify constraints to their performance					
3.3	To accept ownership of problems and their responsibility for solving them					
3.4	To freely share knowledge and experience					
3.5	To openly discuss problems and issues					
[4]MIE management managed all activities and related resource required for customer satisfaction by process approach principles more efficiently by following the main activities		SA	A	DA	SDA	NA
4.1	Systematically defining the activities necessary to obtain a desired result					
4.2	Establishing clear responsibility and accountability for managing key activities					
4.3	Analyzing and measuring of the capability of key activities					
4.4	Identifying the interfaces of key activities within and between the functions of the organization					
4.5	Focusing on the factors – such as resources, methods, and materials – that will improve key activities of the organization					
4.6	Evaluating risks, consequences and impacts of activities on customers, suppliers and other interested parties					

[5]MIE management Identifying, understanding and managing interrelated processes as a System approach to management to achieve the main objectives of customer satisfaction by conducting the following main activities		SA	A	DA	SDA	NA
5.1	Structuring a system to achieve the organization's objectives in the most effective and efficient way					
5.2	Understanding the interdependencies between the processes of the system					
5.3	Structured approaches that harmonize and integrate processes					
5.4	Providing a better understanding of the roles and responsibilities necessary for achieving common objectives and thereby reducing cross-functional barriers					
5.5	Understanding organizational capabilities and establishing resource constraints prior to action					
5.6	Targeting and defining how specific activities within a system should operate					
5.7	Continually improving the system through measurement and evaluation.					
[6]MIE management Continual improvement the organization's overall performance as a permanent objective on consistent way by:		SA	A	DA	SDA	NA
6.1	Employing a consistent organization-wide approach to continual improvement of the organization's performance					
6.2	Providing people with training in the methods and tools of continual improvement					
6.3	Making continual improvement of products, processes and systems as an objective					
6.4	Establishing goals to guide, and measures to track, continual improvement					
6.5	Recognizing and acknowledging improvements.					
[7]MIE conducted Effective decisions on time based on Factual approach by conducting the analysis of data and information by:		SA	A	DA	SDA	NA
7.1	Ensuring the data and information are sufficiently accurate and reliable					
7.2	Making data accessible to those who need it					
7.3	Analyzing data and information using valid methods					
7.4	Making decisions and taking action based on factual analysis, balanced with experience and intuition.					
[8]MIE conduct its operation by principle of supply chain and acknowledges that the relationship between an organization and its suppliers is interdependent and mutually beneficial to enhance productivity and encourage seamless working practices by		SA	A	DA	SDA	NA
8.1	Identifying and selecting key suppliers					
8.2	Establishing joint development and improvement activities					

V. Please evaluate and put your agreement on benefits attained by MIE after certified by BSI on defined scope of Design, manufacture, supply & service of low bed semi-trailers dry & liquid cargo truck trailers and semi-trailers only ;

S/n	Description	Strongly agree	Agree	disagree	Strongly disagree	NA
A)MIE achieved the following benefits by properly implementing the quality management principles of **customer focus** :-						
A.1	Increased revenue and market share obtained through flexible and fast responses to market opportunities.					
A.2	Increased effectiveness in the use of resources to enhance customer satisfaction.					
A.3	Increased effectiveness in the use of resources to enhance customer satisfaction.					
B)MIE achieved the following benefits by properly implementing the quality management principles of **leaders** :-						
B.1	People will understand and be motivated by organizational goals and objectives.					
B.2	Activities are evaluated, aligned and implemented in a unified way by prober implementation of leadership quality management principles					
C)MIE achieved the following benefits by proper implementing quality management principle of **involving people** on decision.:-						
C.1	Motivated, committed and involved people within the organization.					
C.2	People eager to participate in and contribute to continual improvement					
D)MIE achieved the following benefit by implementing **process approach** quality management principles:-						
D.1	Lower costs and shorter cycle times through effective use of resources.					
D.2	Improved, consistent and predictable results.					
D.3	Focused and prioritized improvement opportunities					
E)MIE achieved the following benefit by implementing **system approach** to management						
E.1	Integration and alignment of the processes that will best achieve the desired results.					
E.2	Ability to focus effort on the key processes					
F)MIE achieved the following benefit by prober implementation of **Continual improvement**						
F.1	Performance advantage through improved organizational capabilities					

F.2	Alignment of improvement activities at all levels to an organization's strategic intent					
F.3	Flexibility to react quickly to opportunities.					
G)MIE achieved the following benefit by implementing **Factual approach principles to decision making**						
G.1	Informed decisions					
G.2	An increased ability to demonstrate the effectiveness of past and decisions through reference to factual records					
H)MIE achieved the following benefit by implementing **Mutually beneficial**						
H.1	Increased ability to create value for both parties.					
H.2	Flexibility and speed of joint responses to changing market or customer needs and expectations.					
I)MIE achieved the following benefit by implementing **quality management principles**						
I.1	MIE Exceed External Customers' Expectation by prober QMS					
I.2	MIE Meet Internal Customers' Satisfaction by prober QMS implementation					
I.3	MIE achieve high market share for export items					
I.4	MIE achieve minimum work in process inventory and total inventory in the company for the last two years has been minimum.					
I.5	MIE achieve full utilizes the capacity of its resources.					

In General how you can evaluate the MIE implementation and benefit attained with regard to the following summary of benefits attained by other companies quoted from one survey conducted

''… **Since ISO 9001 is recognized globally, obtaining a certification imply that the company is also moving towards globalization. Its main goal is to harmonize standards around the world, which, as widely claimed, promotes trade and therefore global welfare more efficiently Quality improvement was measured through four constructs namely such as:**

- **Reduction of customer complaints,**
- **Product meeting local and international standard,**
- **Reduction of waste and rework of jobs and**
- **Elimination of potential causes of nonconforming products were used.**

Product volume variables

- **increase in demand**
- **Increase in production capacity**
- **Internal efficiency and reducing cost**
- **Reduction of downtime…..**''

VI. Challenges assessment

Please indicate your agreement that the following challenges or short come affect the proper implementation of ISO 9001 certificate of MIE to defined scope of Design, manufacture, supply & service of low bed semi-trailers dry & liquid cargo truck trailers and semi-trailers only (for example this products under the scope specialized by MIE but limited to local market only and other competitors from abroad are share the market of Ethiopia);

S/n	Barrier	Strongly agree	Agree	disagree	Strongly disagree	NA
1.Challenges related to Customer focuses principle during implementation after certified by BSI						
1	Lack of researching and understanding customer needs and expectations					
2	Lack of ensuring the objectives of the organization are linked to customer needs					
3	Lack of communicating customer needs and expectations throughout the organization					
4	Lack of measuring customer satisfaction and acting on the results					
5	Lack of Systematically managing customer relationships					
6	Aims of implementing the system may be unclear					
7	There is a lack of understanding of the purposes of ISO certificate					
8	There is a lack of understanding the benefits of ISO 9000 certificate					
2.Challenges related to MIE leaders establish unity of purpose toward direction of the organization and create all employees fully involved in achieving the organization's objectives meeting:-						
1	Lack of considering the needs of all interested parties including customers, owners, employees, suppliers, financiers, local communities and society as a whole					
2	Lack of establishing a clear vision of the organization's future					
3	Lack of setting challenging goals and targets					
4	Lack of creating and sustaining shared values, fairness and ethical role models at all levels of the organization					
5	Lack of establishing trust and eliminating fear					
6	Lack of providing people with the required resources, training and freedom to act with responsibility and accountability					
7	Lack of Inspiring, encouraging and recognizing people's contributions.					
8	Insufficient management support , in order for you to implement ISO correctly you need to have maximum and effective management support to be able to implement ISO without facing more challenges					
9	Lack of management commitment; management must decide the policy, objectives and means of measuring progress, this must be reasonable, transparent and achievable.					
10	Lack of funding; adequate funds must be made available,					

12	Lack of adequate resources provided and available when required					
3.Challenges related to MIE management fully <u>involve their employee</u> at all levels						
1	Lack of understanding the importance of their contribution and role in the organization					
2	Lack of identifying constraints to their performance					
3	Lack of accepting ownership of problems and their responsibility for solving them					
4	Lack of evaluating their performance against their personal goals and objectives					
5	Lack of actively seeking opportunities to enhance their competence, knowledge and experience					
6	Lack of freely sharing knowledge and experience					
7	Lack of openly discussing problems and issues					
8	Lack of knowledge on the importance of ISO and therefore cannot implement something they don't know what it is and who will operate it and how it will be operated					
4.Challenges related to <u>process approach principles</u>						
1	Lack of well defined process.					
2	Lack of systematically defining the activities necessary to obtain a desired result					
3	Lack of Establishing clear responsibility and accountability for managing key activities					
4	Lack of Analyzing and measuring of the capability of key activities					
5	Lack of Identifying the interfaces of key activities within and between the functions of the organization					
6	Lack of Focusing on the factors – such as resources, methods, and materials – that will improve key activities of the organization					
7	Lack of Evaluating risks, consequences and impacts of activities on customers, suppliers and other interested parties					
5.Challenges related to a <u>System approach to management</u>						
1	Lack of Structuring a system to achieve the organization's objectives in the most effective and efficient way					
2	Lack of Understanding the interdependencies between the processes of the system					
3	Lack of Structured approaches that harmonize and integrate processes					
4	Lack of Providing a better understanding of the roles and responsibilities necessary for achieving common objectives and thereby reducing cross-functional barriers					
5	Lack of Understanding organizational capabilities and establishing resource constraints prior to action					
6	Lack of Targeting and defining how specific activities within a system should operate					
7	Lack of Continually improving the system through measurement and evaluation.					
6.Challenges related to <u>Continual improvement</u>						
1	Lack of Employing a consistent organization-wide approach to continual improvement of the organization's performance					
2	Lack of Providing people with training in the methods and tools of continual improvement					

3	Lack of Making continual improvement of products, processes and systems an objective for every individual in the organization					
4	Lack of Establishing goals to guide, and measures to track, continual improvement					
5	Lack of Recognizing and acknowledging improvements.					
6	Lack of competency of personnel					
7	Lack of auditing; must be undertaken by individuals that are removed from the process so that constructive and impartial results and feed back is obtained					
8	Lack of proper External auditing					
9	Lack of in-depth internal audit system					
10	Lack of top management commitment to eliminating the NC (None Conformity) report found by internal and external auditor's					
11	Lack of incentive programs to efforts leading towards quality improvement.					
12	Lack of skilled manpower to manage the QMS and process effectively and efficiently					
13	Lack of quality awareness by employees at shop floor					
14	Lack of employee motivation to ISO 9001 prober implementation					
15	Lack of standards in evaluating their product quality as well as efforts towards system or product quality improvement.					
16	lack of strong research and development program of products					
17	Lack of properly implementing statistical control of quality tools to process improvement (SPC; Statistical Process Control) and others					
7.Challenges related to conduct Effective decisions based on <u>Factual approach by conducting</u> the analysis of data and information by						
1	Lack of Ensuring the data and information are sufficiently accurate and reliable					
2	Lack of Making data accessible to those who need it					
3	Lack of Analyzing data and information using valid methods					
4	Lack of Making decisions and taking action based on factual analysis, balanced with experience and intuition.					
Challenges related to the relationship between an organization and its suppliers						
1	Lack of Identifying and selecting key suppliers					
2	Lack of Establishing joint development and improvement activities					

VII. General comment

Please list any other challenges you can include that affecting the QMS-ISO 9001implementation in the company of Design, manufacture, supply & service of low bed semi-trailers dry & liquid cargo truck trailers and semi-trailers only ;

_____
_____
_____
_____
_____

Please give your general recommendation on the practice, benefit and challenges faced during implementation ISO certificate to scope of Design, manufacture, supply & service of low bed semi-trailers dry & liquid cargo truck trailers and semi-trailers only ;

_____
_____
_____
_____

You can use the back of the pages for further comment and recommendation on practice, benefit attained and challenges faced during implementation periods up to current periods of Design, manufacture, supply & service of low bed semi-trailers dry & liquid cargo truck trailers and semi-trailers only ;

_____
_____
_____
_____
_____
_____
_____

Annexure-01.01(Data's, questions and analysis related with implementation practice of QMS process)

Questions code	**Sorted Respondents data**																											Mean	Median	Range	Mode	skew	std.div	Min	Max	KURT
III.3	2.00	2.00	3.00	3.00	3.00	2.00	3.00	2.00	3.00	3.00			2.67	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	4.00	4.00	3.00	3.00	3.33	2.96	3.00	2.00	3.00	-0.04	0.55	2.00	4.00	
III.2	2.00	2.00	2.00	2.50	3.00	2.00	3.00	3.00	2.50	3.00	3.00	3.00	2.75	3.00	3.00	3.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	3.00	3.75	2.83	3.00	2.00	3.00	-0.18	0.50	2.00	4.00	
III.5	2.00	3.00	2.00	2.00	3.00	1.00	2.00		3.00	2.00	2.00	2.00	3.00	2.50	3.00	3.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	4.00	4.00	4.00	2.83	3.00	3.00	3.00	-0.17	0.79	1.00	4.00	
III.8	3.00	2.00	2.00	2.00	3.00	4.00	2.00	2.00	2.00	3.00			3.00	3.00	3.00	3.00	2.00	3.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	3.00	2.76	3.00	2.00	3.00	0.11	0.60	2.00	4.00	
IV.4	3.00	3.00	2.00	2.00	2.00	3.00	3.00	2.00	3.00	2.00	2.00	2.50	2.00	2.00	3.00	2.00	2.00	3.00	3.00	3.00	3.00	4.00	3.00	3.00	4.00	4.00	4.00	2.76	3.00	2.00	3.00	0.42	0.70	2.00	4.00	
III.1	2.00	3.00	2.00	2.67	4.00	3.00	2.00	3.00	2.00	3.00	3.00	3.00	3.00	2.50	2.00	3.00	3.00	2.00	2.00	3.00	3.00	2.00	4.00	3.00	3.00	3.00	3.33	2.76	3.00	2.00	3.00	0.14	0.59	2.00	4.00	
III.7	3.00	2.00	2.00	2.00	2.00	3.00	2.00	3.00	2.50	2.00	3.00	3.00	3.00	2.50	3.00	3.00	3.00	3.00	3.00	2.00	3.00	2.00	3.00	2.00	4.00	4.00	4.00	2.74	3.00	2.00	3.00	0.40	0.64	2.00	4.00	

I.2	IV	I	III.6	II.1	IV.3	III	IV.2
1.00	1.86	1.50	2.00	2.00	2.00	2.25	3.00
2.00	1.86	2.00	3.00	2.00	2.00	2.25	2.00
2.00	2.00	2.00	2.00	3.00	3.00	2.25	3.00
2.00	2.00	2.00	2.00	2.00	2.00	2.27	2.00
2.00	2.14	2.00	0.00	2.00	2.00	2.38	1.00
2.00	2.14	2.00	2.00	2.00	2.00	2.38	3.00
2.00	2.14	2.00	2.00	2.00	2.00	2.38	3.00
2.00	2.29	2.00	2.00	2.00	2.00	2.43	3.00
2.00	2.29	2.00	2.50	2.00	3.00	2.44	3.00
2.00	2.29	2.00	2.00	2.00	3.00	2.50	3.00
2.13	2.36	2.07	2.00	2.00	2.00	2.50	3.00
2.36	2.36	2.18	2.00	2.00	3.00	2.50	2.50
2.50	2.40	2.25	2.00	2.00	2.00	2.68	
2.50	2.40	2.25	3.00	2.50	2.00	2.69	
2.00	2.43	2.50	3.00	3.00	2.00	2.75	2.00
2.33	2.43	2.67	2.00	3.00	2.00	2.75	3.00
3.72	2.43	2.86	3.00	2.00	3.00	2.75	3.00
3.00	2.43	3.00	3.00	3.00	2.00	2.75	3.00
2.00	2.50	3.00	3.00	2.50	3.00	2.75	2.00
3.00	2.57	3.00	3.00	3.00	2.00	2.75	3.00
3.00	2.86	3.00	3.00	3.00	3.00	2.88	2.00
3.21	2.86	3.11	3.00	3.00	3.00	2.88	3.00
3.29	3.00	3.29	3.00	3.00	3.00	3.13	3.00
4.00	3.14	3.50	4.00	3.00	3.00	3.25	3.00
3.00	3.43	3.50	3.00	4.00	4.00	3.25	3.00
4.00	3.43	4.00	4.00	4.00	4.00	3.50	4.00
	3.68		3.00		4.00	3.58	3.00
2.50	2.51	2.53	2.54	2.54	2.59	2.70	2.74
2.23	2.40	2.25	3.00	2.25	2.00	2.69	3.00
3.00	1.82	2.50	4.00	2.00	2.00	1.33	3.00
2.00	2.43	2.00	3.00	2.00	2.00	2.75	3.00
0.56	1.00	0.61	-0.87	0.88	0.76	0.89	-1.06
0.73	0.48	0.63	0.80	0.63	0.69	0.37	0.60
1.00	1.86	1.50	0.00	2.00	2.00	2.25	1.00
4.00	3.68	4.00	4.00	4.00	4.00	3.58	4.00
						0.183	

y	III.4	IV.1	IV.7	II.2	I.1	IV.6	II	IV.5
1.90	2.00	1.00	1.00	2.00	2.00	2.00	2.00	1.00
2.03	1.00	2.00	1.00	2.00	2.00	1.00	2.00	2.00
2.06	3.00	0.00		1.00	2.00	2.00	2.00	2.00
2.07	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
2.13	1.00	3.00	2.00	2.00	2.00	3.00	2.00	2.00
2.13	2.00	2.00	3.00	2.00	2.00	0.00	2.00	2.00
2.13	3.00	1.00	2.00	2.00	2.00	2.25	2.00	1.75
2.18	2.00	3.00	2.00	2.00	2.00	2.00	2.00	2.00
2.18	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00
2.20	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
2.23	2.00	2.50	2.00	2.00	2.00	2.50	2.00	2.50
2.26	2.00	2.00	2.00	2.00	2.00	2.50	2.00	2.00
2.33	2.00		2.00	2.00	2.00	3.00	2.00	3.00
2.40	2.00		2.00	2.00	2.00	3.00	2.25	3.00
2.54	2.00	2.00	2.00	2.00	3.00	3.00	2.50	3.00
2.59	2.00	2.00	2.00	2.00	3.00	3.00	2.50	3.00
2.63	2.00	2.00	3.00	3.00	2.00	2.00	2.50	2.00
2.67	2.00	2.00	2.00	2.00	3.00	2.00	2.50	3.00
2.75	3.00	3.00	2.00	3.00	4.00	2.00	2.75	2.50
2.83	2.00	2.00	3.00	3.00	3.00	2.00	3.00	3.00
2.93	2.00	3.00	3.00	3.00		3.00	3.00	3.00
2.96	3.00	2.00	2.00	3.00	3.00	3.00	3.00	3.00
3.10	2.00	3.00	3.00	3.00		3.00	3.00	3.00
3.22	3.00	3.00	3.00	3.00	3.00	4.00	3.00	3.00
3.54	2.00	4.00	3.00	4.00	4.00	3.00	4.00	3.00
3.73	3.00	3.00	3.00			3.00	4.00	3.00
3.63	4.00	3.00	4.00			4.00		3.75
2.57	2.22	2.26	2.31	2.32	2.43	2.45	2.46	2.46
2.40	2.00	2.00	2.00	2.00	2.00	2.50	2.13	2.50
1.83	3.00	4.00	3.00	3.00	2.00	4.00	2.00	2.75
2.13	2.00	2.00	2.00	2.00	2.00	2.00	2.00	3.00
0.88	0.73	-0.57	0.36	0.76	1.29	-0.70	1.34	-0.48
0.52	0.64	0.83	0.68	0.63	0.66	0.83	0.60	0.67
1.90	1.00	0.00	1.00	1.00	2.00	0.00	2.00	1.00
3.73	4.00	4.00	4.00	4.00	4.00	4.00	4.00	3.75
-0.183							1.31	

Annexure-01.02(Data's, questions and analysis related with quality management principles implementing practice)

Questions code	Sorted Respondents data																									Mean
II'.1	1.00	1.00	2.00	3.00	1.00	3.00	3.00	2.00	3.00	2.00	3.00	2.00	3.00	3.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	4.00	4.00	**2.92**
II'.3	2.00	2.00	2.00	2.00	3.00	2.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	2.88
VIII'.1	1.00	2.00	2.00	2.00	2.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	4.00	2.85
III'.1	2.00	2.00	2.00	2.00	2.00	2.00	3.00	3.00	2.00	3.00	2.50	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	4.00	2.83
II'	**1.33**	**1.33**	**2.00**	**2.33**	**2.33**	**2.33**	**2.33**	**2.67**	**2.67**	**2.67**	**2.67**	**2.67**	**2.67**	**2.67**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.33**	**3.67**	**3.67**	**2.81**
III'.4	2.00	2.00	2.00	2.00	2.00	1.00	2.00	3.00	3.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	4.00	3.00	2.81
VI'.2	2.00	2.00	2.00	2.00	2.00	2.50	3.00	2.00	3.00	3.00	3.00	3.00	2.00	3.00	3.00	2.00	3.00	3.00	3.00	3.00	3.00	4.00	3.00	3.00	4.00	2.76
V'.5	2.00	2.00	2.00	2.00	2.00	2.00	3.00	2.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	2.50	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	2.72

VI'	V'	II'.2	V'.6	V'. 2	IV'. 5	IV'. 1	VIII	V'.1	III'.2	IV'.4	III'
1.60	1.71	1.00	2.00	2.00	1.00	2.00	1.00	1.00	2.00	2.00	2.00
2.00	1.86	1.00	2.00	2.00	2.00	2.00	1.50	2.00	2.00	2.00	2.00
2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2
2.00	2.00	3.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2
2.20	2.29	2.00	2.50	2.00	2.00	2.00	2.00	3.00	2.00	2.00	2.20
2.20	2.29	2.00	3.00	3.00	3.00	2.00	2.50	2.00	3.00	2.00	2.40
2.20	2.29	3.00	2.00	3.00	3.00	1.00	2.50	3.00	2.00	2.00	2.40
2.20	2.29	2.00	2.00	3.00	2.00	3.00	2.50	3.00	2.00	3.00	2.4
2.20	2.33	3.00	2.00	2.00	2.00	3.00	2.50	3.00	3.00	2.00	2.50
2.20	2.43	2.00	2.00	3.00	3.00	2.00	2.50	3.00	2.50	3.00	2.60
2.40	2.43	3.00	3.00	3.00	2.00	3.00	2.50	2.00	2.00	2.00	2.6
2.40	2.43	2.00	3.00	3.00	3.00	3.00	2.75	2.00	3.00	2.00	2.80
2.40	2.50	2.00	3.00	2.00	2.00	3.00	3.00	2.00	3.00	3.00	2.80
2.40	2.57	2.00	2.00	2.00	3.00	2.00	3.00	3.00	2.00	3.00	2.80
2.60	2.71	2.00	2.50	3.00	2.00	3.00	3.00	3.00	2.00	3.00	2.80
2.60	2.86	3.00	3.00	3.00	3.00	2.00	3.00	3.00	3.00	3.00	2.80
2.80	2.86	3.00	3.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	2.8
2.80	2.86	3.00	3.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	2.8
2.80	2.86	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
3.00	2.86	3.00	3.00	3.00	3.00	3.00	3.00	2.00	3.00	2.00	3.00
3.00	2.86	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.50	3.00
3.00	2.86	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
3.40	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	3.20
3.40	3.00	4.00	3.00	3.00	3.00	3.00	3.50	3.00	3.00	4.00	3.40
3.60	3.57	3.00	4.00	4.00	4.00	4.00	3.50	4.00	4.00	4.00	3.40
4.00	3.71	4.00	3.00	3.00	4.00	4.00	3.50	4.00	4.00	4.00	3.80
2.57	2.57	2.62	2.63	2.63	2.63	2.63	2.66	2.67	2.67	2.69	2.71

VIII'.2	VII".2	VI'.4	VI'.1	V'.4	IV'.3	V'.3	III'.3	IV'	IV'.2	I'.2
1.00	1.00	1.00	2.00	2.00	2.00	1.00	2.00	**1.67**	2.00	1.00
1.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	**1.83**	1.00	1.00
2.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	**1.83**	1.00	2.00
2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	**2.00**	2.00	2.00
2.00	2.00	2.00	2.00	2.00	3.00	2.00	2.00	**2.17**	2.00	2.00
2.00	2.00	2.00	2.50	2.50	2.00	2.00	3.00	**2.17**	2.00	2.00
2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	**2.20**	2.00	3.00
2.00	2.00	3.00	2.00	2.00	3.00	2.00	2.00	**2.33**	3.00	3.00
2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	**2.33**	2.00	3.00
2.00	2.00	2.00	2.00	2.00	2.00		2.00	**2.33**	3.00	2.00
2.00	3.00	2.00	2.00	2.00	2.00	2.00	2.00	**2.33**	2.00	2.00
2.00	2.00	2.00	2.00	3.00	3.00	2.00	2.00	**2.40**	2.00	3.00
2.50	2.00	3.00	2.00	2.00	2.00	2.00	3.00	**2.50**	3.00	3.00
3.00	2.00	2.00	3.00		3.00	2.00	2.00	**2.50**	2.00	2.50
3.00	2.00	3.00	2.00	3.00	2.00	3.00	3.00	**2.50**	2.00	2.00
3.00	2.00	2.00	3.00	3.00	2.00	3.00	3.00	**2.67**	3.00	2.00
3.00	2.00	3.00	2.00	2.00	3.00	3.00	2.00	**2.67**	3.00	2.00
3.00	3.00	3.00	2.00	3.00	3.00	3.00	2.00	**2.67**	2.00	3.00
3.00	3.00	3.00	4.00	3.00	2.00	3.00	2.00	**2.67**	3.00	3.00
3.00	2.50	3.00	3.00	3.00	2.00	3.00	3.00	**2.67**	3.00	3.00
3.00	4.00	2.00	3.00	3.00	2.00	3.00	3.00	**2.67**	3.00	3.00
3.00	3.00	3.00	3.00	3.00	2.50	3.00	3.00	**2.83**	3.00	3.00
3.00	3.00	3.00	3.00	2.00	3.00	3.00	3.00	**2.83**	3.00	3.00
3.00	3.00	4.00	4.00	3.00	4.00	3.00	3.00	**3.00**	3.00	3.00
3.00	4.00	4.00	3.00	3.00	4.00	3.00	3.00	**3.50**	4.00	3.00
3.00	4.00	3.00	4.00	3.00	3.00	4.00	4.00	**3.67**	4.00	2.00
3.00	4.00	2.00		4.00	4.00	4.00	4.00	**4.00**	4.00	4.00
2.46	2.46	2.48	2.52	2.52	2.54	2.54	2.54	**2.55**	2.56	**2.56**

Summary	VII"..1	I'.3	VII"..3	VII'	VII"..4	IV'.6	V'.7	I'	VI'.3	I'.4	I'.1	VI'.5
1.45	1.00	1.00	1.00	**1.00**	1.00	1.00	2.00	**1.25**	1.00	2.00	1.00	2.00
1.78	2.00	3.00	1.00	**1.75**	2.00	2.00	1.00	**2.00**	2.00	3.00	1.00	2.00
1.95	2.00	2.00	2.00	**1.75**	2.00	2.00	2.00	**2.00**	2.00	2.00	2.00	2.00
2.04	2.00	2.00	2.00	**2.00**	2.00	2.00	2.00	**2.00**	2.00	2.00	2.00	2.00
2.06	2.00	1.00	2.00	**2.00**	2.00	2.00	2.00	**2.00**	2.00	2.00	3.00	2.00
2.15	2.00	2.00	2.00	**2.00**	2.00	3.00	2.00	**2.00**	2.00	2.00	2.00	2.00
2.24	2.00		2.00	**2.00**	2.00		1.00	**2.00**	2.00	3.00	2.00	2.00
2.30	2.00	1.00	2.00	**2.00**	2.00	2.00	2.00	**2.00**	2.00	2.00	2.00	2.00
2.30	2.00	2.00	2.00	**2.00**	2.00	2.00	2.00	**2.00**	2.00	1.00	2.00	2.00
2.32	2.00	2.00	2.00	**2.00**	2.00	2.00	2.00	**2.00**	2.00	2.00	2.00	2.00
2.34	2.00	2.00	1.00	**2.00**	2.00	2.00	2.00	**2.00**	2.00	2.00	2.00	2.00
2.37	2.00	1.00	2.00	**2.00**			1.00	**2.00**	2.00	2.00	2.00	3.00
2.47	2.00	2.00	2.00	**2.00**	2.00	2.00	2.00	**2.25**	2.00	2.00	2.00	3.00
2.51	2.00	2.00	2.00	**2.00**	2.00	2.00	3.00	**2.25**	2.00	2.50	2.00	2.00
2.57	2.00	2.00	2.00	**2.00**	2.00	3.00	2.00	**2.25**	2.00	3.00	2.00	2.00
2.64	2.00	3.00	2.00	**2.00**	2.00	3.00	2.00	**2.33**	2.00		2.00	4.00
2.66	2.00	2.00	2.00	**2.00**	2.00	2.00	3.00	**2.38**	2.00	3.00	2.50	3.00
2.73	2.00	2.00	2.00	**2.25**	2.00	2.00	3.00	**2.50**	3.00	2.00	3.00	3.00
2.73	2.00	2.00	2.00	**2.25**	2.00	2.00	3.00	**2.50**	3.00	2.00	3.00	1.00
2.77	2.50	1.00	2.00	**2.38**	2.50	2.00	2.00	**2.50**	3.00	3.00	3.00	2.00
2.82	0.00	3.00	3.00	**2.50**	3.00	3.00	3.00	**2.50**	3.00	2.00	2.00	3.00
2.84	2.00	2.00	3.00	**2.50**	2.00	3.00	2.00	**2.50**	3.00	2.00	3.00	
2.87	3.00	3.00	2.00	**2.50**	2.00	2.00	3.00	**2.75**	3.00	3.00	2.00	3.00
3.05	2.00	3.00	3.00	**2.75**	3.00	1.00	3.00	**2.75**	3.00	3.00	2.00	3.00
3.34	3.00	3.00	3.00	**3.25**	3.00	3.00	3.00	**3.00**	4.00	2.00	4.00	3.00
3.52	3.00	3.00	4.00	**3.75**	4.00	3.00	3.00	**3.00**	3.00	3.00	4.00	4.00
3.85	4.00	3.00	4.00	**4.00**	4.00	4.00	4.00	**3.75**	3.00	4.00	4.00	3.00
2.54	2.09	**2.16**	2.19	**2.25**	2.25	2.28	2.30	**2.35**	2.37	**2.38**	**2.40**	2.46

Annexure-01.03(Data's, questions and analysis related with benefit attained by implementing the QMS)

Questions code	Sorted Respondents data																														
H	1.50	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.50	2.00	2.50	2.50	2.50	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.50	4.00	**2.65**	3.00	2.50	3.00	**-0.01**	0.59	1.50	4.00	**-0.40**
E.2	0.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	3.00	3.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	4.00	**2.59**	3.00	4.00	3.00	-0.84	0.89	0.00	4.00	**1.67**
H.1	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	4.00	**2.70**	3.00	2.00	3.00	0.23	0.61	2.00	4.00	**-0.48**
A.3	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	4.00	**2.74**	3.00	4.00	3.00	-1.33	0.81	0.00	4.00	**3.96**
C.2	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	3.00	2.50	2.00	3.00	3.00	3.00	2.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	4.00	4.00	4.00	**2.76**	3.00	2.00	3.00	0.42	0.70	2.00	4.00	**-0.76**
A	**2.00**	**2.00**	**2.00**	**2.00**	**2.00**	**2.33**	**2.33**	**2.50**	**2.67**	**2.67**	**2.67**	**2.67**	**2.67**	**2.83**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.67**	**3.67**	**4.00**	**2.78**	2.83	2.00	3.00	0.26	0.53	2.00	4.00	**-0.07**
A.2		3.00	2.00	2.00		2.00	2.00		2.00	3.00	2.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	**2.83**	3.00	2.00	3.00	-0.02	0.58	2.00	4.00	**0.12**
C	**2.00**	**2.00**	**2.00**	**2.00**	**2.00**	**2.00**	**2.00**	**2.00**	**2.50**	**2.00**	**2.50**	**2.50**	**2.50**	**2.50**	**2.50**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**4.00**	**4.00**	**4.00**	**4.00**	**2.80**	3.00	2.00	3.00	0.52	0.67	2.00	4.00	**-0.59**
B.1	2.00	2.00	2.00	2.00	2.50	2.50	3.00	3.00	2.00	3.00	3.00	3.00	3.00	2.00	3.00	3.00	3.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	4.00	4.00	**2.81**	3.00	2.00	3.00	0.23	0.61	2.00	4.00	**-0.15**
C.1	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.50	3.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	4.00	4.00	4.00	4.00	4.00	**2.83**	3.00	2.00	3.00	0.31	0.72	2.00	4.00	**-0.93**
A.1	2.00	3.00	2.00	2.00	2.00	3.00	3.00	2.00	3.00	2.00	3.00	3.00	2.00	2.00	2.50	3.00	3.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	4.00	3.00	3.00	4.00	**2.83**	3.00	2.00	3.00	0.25	0.67	2.00	4.00	**-0.58**

D.3	B.2	G	F.2	D	F	E.1	D.2	G.1	I.2	E	D.1	B	H.2	F.1
2.00	2.00	**2.00**	2.00	**1.67**	**2.00**	0.00	2.00	2.00	2.00	**0.00**	1.00	**2.00**	1.00	2.00
2.00	2.00	**2.00**	2.00	**2.00**	**2.00**	1.00	2.00	2.00	2.00	**1.00**	2.00	**2.00**	2.00	2.00
2.00	2.00	**2.00**	2.00	**2.00**	**2.00**	2.00	2.00	2.00	3.00	**2.00**	2.00	**2.00**	2.00	2.00
2.00	2.00	**2.00**	2.00	**2.00**	**2.00**	2.00	2.00	2.00	2.00	**2.00**	2.00	**2.00**	2.00	2.00
2.00	2.00	**2.00**	2.00	**2.00**	**2.00**	2.00	2.00	2.00	2.00	**2.00**	2.00	**2.25**	2.00	2.00
2.00	2.00	**2.00**	2.00	**2.00**	**2.00**	2.00	2.00	2.00	2.00	**2.00**	2.00	**2.25**	2.00	2.00
2.00	2.00	**2.00**	2.00	**2.00**	**2.00**	2.00	2.00	2.00	2.00	**2.00**	2.00	**2.50**	2.00	2.00
2.00	2.00	**2.00**	2.00	**2.00**	**2.00**	2.00	2.00	2.00	2.00	**2.00**	2.00	**2.50**	2.00	2.00
2.00	3.00	**2.00**	2.00	**2.00**	**2.00**	2.00	2.00	2.00	3.00	**2.00**	2.00	**2.50**	2.00	2.00
2.00	2.00	**2.00**	2.00	**2.00**	**2.17**	2.00	2.00	2.00	2.50	**2.00**	2.00	**2.50**	2.00	2.50
2.00	2.00	**2.00**	2.00	**2.00**	**2.33**	3.00	2.00	2.00	2.00	**3.00**	2.00	**2.50**	3.00	2.00
2.00	2.00	**2.00**	3.00	**2.33**	**2.33**	3.00	3.00	2.00	2.00	**3.00**	2.00	**2.50**	2.00	3.00
2.00	3.00	**2.50**	2.00	**2.33**	**2.33**	3.00	2.00	3.00	2.00	**2.50**	3.00	**2.50**	3.00	2.00
2.00	2.00	**2.50**	2.00	**2.33**	**2.33**	2.00	2.00	3.00	2.00	**2.50**	3.00	**2.50**	3.00	2.00
3.00	2.00	**2.50**	2.00	**2.67**	**2.33**	2.00	3.00	2.00	3.00	**2.50**	2.00	**2.50**	3.00	3.00
2.00	3.00	**2.50**	3.00	**2.67**	**2.67**	2.00	2.00	2.00	3.00	**2.50**	4.00	**2.50**	3.00	3.00
2.00	2.00	**2.50**	3.00	**2.67**	**2.67**	3.00	3.00	3.00	3.00	**3.00**	3.00	**2.50**	3.00	3.00
2.00	2.00	**2.50**	3.00	**2.67**	**2.67**	3.00	3.00	3.00	3.00	**3.00**	3.00	**2.50**	3.00	3.00
3.00	2.00	**2.50**	3.00	**3.00**	**2.67**	3.00	3.00	3.00	2.00	**3.00**	3.00	**2.50**	3.00	3.00
3.00	2.00	**2.50**	3.00	**3.00**	**2.67**	3.00	3.00	3.00	3.00	**3.00**	3.00	**2.50**	3.00	3.00
3.00	3.00	**2.50**	2.00	**3.00**	**2.67**	3.00	3.00	3.00	3.00	**3.00**	3.00	**3.00**	3.00	3.00
3.00	3.00	**3.00**	2.00	**3.00**	**2.67**	3.00	3.00		3.00	**3.00**	3.00	**3.00**	3.00	3.00
3.00	3.00	**3.00**	3.00	**3.00**	**2.67**	3.00	3.00	3.00	3.00	**3.00**	3.00	**3.00**	3.00	3.00
3.00	3.00	**3.00**	3.00	**3.00**	**3.00**	3.00	3.00	3.00	3.00	**3.00**	3.00	**3.00**	3.00	3.00
3.00	3.00	**3.00**	3.00	**3.00**	**3.33**	3.00	3.00	3.00	3.00	**3.50**	3.00	**3.50**	3.00	4.00
3.00	3.00	**4.00**	4.00	**3.00**	**4.00**	3.00	3.00	4.00	4.00	**3.50**	3.00	**3.50**	3.00	4.00
3.00	4.00	**4.00**	4.00	**3.67**	**4.00**	4.00	4.00	4.00	3.00	**4.00**	4.00	**4.00**	4.00	4.00
2.37	**2.41**	**2.46**	**2.48**	**2.48**	**2.50**	**2.44**	**2.52**	**2.54**	**2.57**	**2.52**	**2.56**	**2.61**	**2.59**	**2.65**
2.00	2.00	2.50	2.00	2.33	2.33	3.00	2.00	2.00	3.00	2.50	3.00	2.50	3.00	3.00
1.00	2.00	2.00	2.00	2.00	2.00	4.00	2.00	2.00	2.00	4.00	3.00	2.00	3.00	2.00
2.00	2.00	2.00	2.00	2.00	2.00	3.00	2.00	2.00	3.00	3.00	2.00	2.50	3.00	2.00
0.57	1.05	1.50	1.01	0.36	1.49	-1.02	0.56	0.81	0.37	-1.10	0.15	1.22	-0.37	0.62
0.49	0.57	0.57	0.64	0.51	0.56	0.80	0.58	0.65	0.57	0.81	0.70	0.48	0.64	0.68
2.00	2.00	2.00	2.00	1.67	2.00	0.00	2.00	2.00	2.00	0.00	1.00	2.00	1.00	2.00
3.00	4.00	4.00	4.00	3.67	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
-1.82	**0.24**	**2.13**	**0.07**	**-0.83**	**2.15**	**2.23**	**-0.60**	**-0.27**	**-0.63**	**2.50**	**-0.08**	**1.70**	**0.17**	**-0.54**

Summary	I.3	I	I.5	I.1	I.4	G.2	F.3
1.62	0.00	**1.40**	1.00	1.00	2.00	2.00	2.00
1.84	0.00	**1.60**	2.00	1.00	2.00	2.00	2.00
1.96	0.00	**1.60**	2.00	2.00	1.00	2.00	2.00
1.96	1.00	**1.60**	2.00	2.00	1.00	2.00	2.00
1.98	1.00	**1.60**	2.00	1.00	2.00	2.00	2.00
2.02	1.00	**1.60**	3.00	1.00	1.00	2.00	2.00
2.05	1.00	**1.60**	1.00	2.00	2.00	2.00	2.00
2.14	1.00	**1.80**	1.00	2.00	3.00	2.00	2.00
2.16	1.00	**1.80**	2.00	1.00	2.00	2.00	2.00
2.26	1.00	**2.00**	2.00	2.00	2.50	2.00	2.00
2.39	1.00	**2.00**	3.00	2.00	3.00	2.00	3.00
2.43	1.00	**2.00**	2.00	2.00	2.00	2.00	1.00
2.48	1.00	**2.00**	2.00	2.00	2.00	2.00	3.00
2.58	1.00	**2.20**	2.00	3.00	3.00	2.00	3.00
2.63	1.00	**2.20**	3.00	2.00	2.00	3.00	2.00
2.67	1.00	**2.20**	2.00	2.00	2.00	3.00	2.00
2.73	1.00	**2.20**	2.00	3.00	2.00	2.00	2.00
2.73	2.00	**2.20**	2.00	3.00	2.00	2.00	2.00
2.79	2.00	**2.40**	2.00	3.00	3.00	2.00	2.00
2.79	2.00	**2.40**	2.00	4.00	3.00	2.00	2.00
2.84	2.00	**2.40**	3.00	3.00	2.00	2.00	3.00
2.90	2.00	**2.40**	2.00	3.00	2.00	3.00	3.00
2.97	2.00	**2.60**	1.00	3.00	4.00	3.00	2.00
3.13	2.00	**2.80**	4.00	3.00	2.00	3.00	3.00
3.33	2.00	**3.00**	3.00	3.00	3.00	3.00	3.00
3.60	4.00	**3.20**	4.00	2.00	4.00	4.00	4.00
3.92		**3.60**	4.00	3.00	4.00	4.00	4.00
2.55	**1.31**	**2.16**	**2.26**	**2.26**	**2.35**	**2.37**	**2.37**
2.58	1.00	2.20	2.00	2.00	2.00	2.00	2.00
2.30	4.00	2.20	3.00	3.00	3.00	2.00	3.00
1.96	1.00	1.60	2.00	2.00	2.00	2.00	2.00
0.59	1.11	0.92	0.63	-0.06	0.51	1.53	0.89
0.55	0.84	0.54	0.86	0.81	0.83	0.63	0.69
1.62	0.00	1.40	1.00	1.00	1.00	2.00	1.00
3.92	4.00	3.60	4.00	4.00	4.00	4.00	4.00
0.22	**3.14**	**0.73**	**0.11**	**-0.63**	**0.04**	**1.38**	**0.75**

Annexure-01.04(Data's, questions and analysis related with challenges faced during implementing the QMS)

Questions code	Sorted Respondents data																											**Mean**	Median	Range	Mode	skew	std.div	Min	Max	kurt
2.80	4.00	4.00	4.00	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.00	2.00	1.00	1.00		3.04	3.00	3.00	3.00	-1.00	0.82	1.00	4.00	1.34
2.90	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.00	2.00	2.00	2.00	2.00		3.19	3.00	2.00	3.00	-0.34	0.75	2.00	4.00	-1.08
1.40	**4.00**	**4.00**	**4.00**	**4.00**	**4.00**	**4.00**	**4.00**	**4.00**	**4.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**2.00**	**1.00**	3.22	3.00	3.00	3.00	-1.07	0.70	1.00	4.00	2.74
6.17	**4.00**	**4.00**	**4.00**	**4.00**	**4.00**	**4.00**	**4.00**	**4.00**	**4.00**	**4.00**	**4.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**2.50**	**2.00**	**0.00**	3.24	3.00	4.00	3.00	-2.00	0.87	0.00	4.00	6.48
6.16	**4.00**	**4.00**	**4.00**	**4.00**	**4.00**	**4.00**	**4.00**	**4.00**	**4.00**	**4.00**	**4.00**	**4.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**2.00**	**2.00**	**2.00**	**1.00**	3.26	3.00	3.00	4.00	-0.99	0.81	1.00	4.00	0.75
1.10	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.00	2.00	1.00	3.00	3.00	3.00	3.00	-1.04	0.62	1.00	4.00	3.83
6.30	4.00	4.00	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.00	2.00	2.00	1.00	3.04	3.00	3.00	3.00	-0.76	0.71	1.00	4.00	1.66
7.30	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.00	2.00	1.00	0.00	3.04	3.00	4.00	3.00	-1.58	0.94	0.00	4.00	3.55
6.10	4.00	4.00	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.00	2.00	1.00	1.00	3.00	3.00	3.00	3.00	-1.03	0.78	1.00	4.00	1.74
4.70	**4.00**	**4.00**	**4.00**	**4.00**	**4.00**	**4.00**	**4.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**2.00**	**2.00**	**2.00**	**2.00**		3.12	3.00	2.00	3.00	-0.11	0.65	2.00	4.00	-0.46
6.40	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.00	2.00	2.00	1.00	1.00	3.07	3.00	3.00	3.00	-0.90	0.87	1.00	4.00	0.58
3.40	4.00	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.00	2.00	1.00			3.04	3.00	3.00	3.00	-0.93	0.68	1.00	4.00	2.72

1.50	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.00	2.00	3.07	3.00	2.00	3.00	0.27	0.47	2.00	4.00	1.98
4.40	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.00	2.00	2.00	2.00	2.00		3.12	3.00	2.00	3.00	-0.17	0.71	2.00	4.00	-0.89
3.50	4.00	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.00	2.00	2.00	2.00	2.00		3.00	3.00	2.00	3.00	0.00	0.63	2.00	4.00	0.22
6.14	4.00	4.00	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.00	2.00	2.00	0.00			3.00	3.00	4.00	3.00	-1.67	0.87	0.00	4.00	5.15
3.20	4.00	4.00	3.00	3.00	3.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.00	2.00	1.00	4.00	3.00	3.00	3.00	3.00	**3.00**	2.00	2.00	1.00		**2.85**	3.00	3.00	3.00	-0.79	0.78	1.00	4.00	**0.95**
6.10	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	2.00	2.00	2.00	1.00	**2.93**	3.00	3.00	3.00	-1.03	0.62	1.00	4.00	**3.36**
6.50	4.00	3.00	3.00	1.00	1.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	2.00	2.00	2.00		1.00	**2.81**	3.00	3.00	3.00	-0.88	0.85	1.00	4.00	**0.65**
7.40	4.00	4.00	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	2.00	2.00	2.00	2.00	0.00	**2.96**	3.00	4.00	3.00	-1.53	0.85	0.00	4.00	**4.59**
1.20	4.00	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	2.00	2.00	2.00	2.00	2.00	1.00	**2.93**	3.00	3.00	3.00	-0.52	0.73	1.00	4.00	**0.73**
1.30	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	2.50	2.00	2.00	2.00	2.00		**2.94**	3.00	2.00	3.00	0.03	0.54	2.00	4.00	**0.91**
4.50	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	2.00	2.00	2.00	2.00	2.00		**2.96**	3.00	2.00	3.00	0.01	0.60	2.00	4.00	**0.14**
2.70	4.00	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	2.00	2.00	2.00	2.00	1.00			**2.96**	3.00	3.00	3.00	-0.62	0.73	1.00	4.00	**0.99**
5.70	4.00	4.00	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	2.00	2.00	2.00	2.00	0.00			**2.96**	3.00	4.00	3.00	-1.47	0.89	0.00	4.00	**4.06**
2.30	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	2.00	2.00	2.00	2.00	2.00	1.00		**2.88**	3.00	3.00	3.00	-0.55	0.71	1.00	4.00	**0.95**
3.30	4.00	4.00	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	2.00	2.00	2.00	2.00	2.00	2.00	1.00		**2.92**	3.00	3.00	3.00	-0.37	0.80	1.00	4.00	**-0.09**
6.70	4.00	4.00	4.00	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	**2.89**	3.00	3.00	3.00	-0.47	0.89	1.00	4.00	**-0.32**

9.20	6.13	6.15	4.30	5.60	4.20	2.10	**3**	**6**	**4**	**1**	2.40	**7**	6.11	7.10
4.00	4.00	4.00	4.00	4.00	4.00	4.00	**3.83**	**3.85**	**3.91**	**3.88**	4.00	**3.92**	4.00	4.00
4.00	4.00	4.00	4.00	4.00	4.00	4.00	**3.62**	**3.72**	**3.62**	**3.75**	4.00	**3.88**	4.00	4.00
4.00	4.00	4.00	4.00	3.00	4.00	3.00	**3.55**	**3.69**	**3.41**	**3.50**	4.00	**3.47**	4.00	4.00
3.00	3.00	4.00	3.00	3.00	3.00	3.00	**3.48**	**3.44**	**3.41**	**3.50**	4.00	**3.38**	4.00	4.00
3.00	3.00	4.00	3.00	3.00	3.00	3.00	**3.45**	**3.43**	**3.28**	**3.50**	4.00	**3.38**	4.00	3.00
3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.14**	**3.31**	**3.23**	**3.31**	3.00	**3.33**	3.00	3.00
3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.11**	**3.21**	**3.20**	**3.25**	3.00	**3.28**	3.00	3.00
3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.09**	**3.14**	**3.19**	**3.25**	3.00	**3.28**	3.00	3.00
3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.05**	**3.13**	**3.18**	**3.13**	3.00	**3.25**	3.00	3.00
3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.02**	**3.06**	**3.14**	**3.13**	3.00	**3.19**	3.00	3.00
3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	**3.01**	**3.06**	**3.13**	3.00	**3.19**	3.00	3.00
3.00	3.00	3.00	3.00	3.00	3.00	3.00	**2.98**	**3.00**	**3.02**	**3.00**	3.00	**3.06**	3.00	3.00
3.00	3.00	3.00	3.00	3.00	3.00	3.00	**2.88**	**3.00**	**3.00**	**3.00**	3.00	**3.06**	3.00	3.00
3.00	3.00	3.00	3.00	3.00	3.00	3.00	**2.85**	**2.97**	**3.00**	**3.00**	3.00	**3.03**	3.00	3.00
3.00	3.00	3.00	3.00	3.00	3.00	3.00	**2.78**	**2.97**	**2.99**	**3.00**	3.00	**3.00**	3.00	3.00
3.00	3.00	3.00	3.00	3.00	3.00	3.00	**2.76**	**2.95**	**2.98**	**3.00**	3.00	**3.00**	3.00	3.00
3.00	3.00	3.00	3.00	3.00	3.00	3.00	**2.68**	**2.93**	**2.82**	**2.88**	**3.00**	**3.00**	3.00	3.00
3.00	**3.00**	**3.00**	3.00	3.00	3.00	3.00	**2.65**	**2.91**	**2.77**	**2.88**	2.00	**2.97**	3.00	3.00
2.00	2.00	2.00	**3.00**	**3.00**	**3.00**	**3.00**	**2.63**	**2.88**	**2.76**	**2.86**	2.00	**2.75**	**3.00**	**3.00**
2.00	2.00	2.00	2.00	2.00	2.00	2.00	**2.60**	**2.70**	**2.65**	**2.75**	2.00	**2.71**	2.50	2.00
2.00	2.00	2.00	2.00	2.00	2.00	2.00	**2.54**	**2.70**	**2.61**	**2.75**	2.00	**2.68**	2.00	2.00
2.00	2.00	2.00	2.00	2.00	2.00	2.00	**2.45**	**2.70**	**2.48**	**2.71**	2.00	**2.66**	2.00	2.00
2.00	2.00	2.00	2.00	2.00	2.00	2.00	**2.23**	**2.64**	**2.31**	**2.63**	2.00	**2.47**	2.00	2.00
2.00	2.00	2.00	1.00	2.00	2.00	2.00	**2.17**	**2.29**	**2.08**	**2.43**	2.00	**2.11**	2.00	2.00
2.00	2.00	2.00	1.00	2.00	1.00	2.00	**1.89**	**2.26**	**2.07**	**2.38**	2.00	**2.09**	2.00	2.00
1.00	2.00	2.00	1.00	1.00	1.00	1.00	**1.56**	**2.09**	**1.17**	**2.13**	2.00	**2.03**	1.00	1.00
0.00	1.00	1.00						**1.31**		**1.13**		**1.03**	1.00	
2.67	**2.74**	**2.81**	**2.73**	**2.77**	**2.77**	**2.77**	**2.85**	**2.94**	**2.90**	**2.96**	**2.85**	**2.93**	**2.83**	**2.85**
3.00	3.00	3.00	3.00	3.00	3.00	3.00	**2.86**	**2.97**	**3.00**	**3.00**	3.00	**3.03**	3.00	3.00
4.00	3.00	3.00	3.00	3.00	3.00	3.00	**2.27**	**2.54**	**2.75**	**2.75**	2.00	**2.89**	3.00	3.00
3.00	3.00	3.00	3.00	3.00	3.00	3.00	**#N/A**	**3.00**	**3.00**	**3.00**	3.00	**3.00**	3.00	3.00
-1.11	-0.26	-0.16	-0.82	-0.68	-0.73	-0.68	**-0.39**	**-0.98**	**-1.19**	**-1.36**	0.25	**-1.24**	-0.55	-0.41
0.88	0.71	0.79	0.83	0.65	0.76	0.65	**0.53**	**0.53**	**0.56**	**0.54**	0.73	**0.60**	0.82	0.73
0.00	1.00	1.00	1.00	1.00	1.00	1.00	**1.56**	**1.31**	**1.17**	**1.13**	2.00	**1.03**	1.00	1.00
4.00	4.00	4.00	4.00	4.00	4.00	4.00	**3.83**	**3.85**	**3.91**	**3.88**	4.00	**3.92**	4.00	4.00
2.30	**0.24**	**-0.30**	**0.50**	**1.27**	**0.81**	**1.27**	**0.38**	**2.36**	**2.68**	**4.00**	**1.00**	**2.72**	**0.29**	**0.47**

2.20	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00		**2.65**	3.00	3.00	3.00	-1.00	0.69	1.00	4.00	**1.01**
5.40	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00			**2.80**	3.00	2.00	3.00	0.20	0.65	2.00	4.00	**0.48**
4.60	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00		**2.77**	3.00	3.00	3.00	-0.15	0.76	1.00	4.00	**-0.15**
5.50	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00			**2.76**	3.00	2.00	3.00	0.11	0.60	2.00	4.00	**0.28**
1.60	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	**2.74**	3.00	2.00	3.00	0.32	0.66	2.00	4.00	**0.60**
5.30	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00			**2.68**	3.00	3.00	3.00	-0.68	0.75	1.00	4.00	**0.59**
9.10	4.00	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00	0.00	0.00	**2.63**	3.00	4.00	3.00	-0.96	1.08	0.00	4.00	**0.96**
6.20	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	**2.74**	3.00	2.00	3.00	0.43	0.71	2.00	4.00	**0.85**
3.60	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00		**2.69**	3.00	3.00	3.00	-0.08	0.74	1.00	4.00	**-0.07**
5.20	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00			**2.64**	3.00	3.00	3.00	-0.52	0.76	1.00	4.00	**0.28**
6.90	4.00	4.00	4.00	4.00	3.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	2.00	2.00	1.00	1.00	2.50	4.00	2.50	2.00	2.00	1.00	3.00	3.00	**2.81**	3.00	3.00	3.00	-0.55	0.91	1.00	4.00	**-0.13**
3.70	4.00	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00				**2.79**	3.00	3.00	3.00	-0.07	0.83	1.00	4.00	**-0.61**
4.10	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00			**2.64**	3.00	3.00	3.00	-0.27	0.91	1.00	4.00	**-0.51**
1.70	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	**2.63**	3.00	3.00	3.00	-0.02	0.84	1.00	4.00	**-0.45**
7.20	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00		**2.62**	3.00	3.00	3.00	-0.20	0.90	1.00	4.00	**-0.54**
1.80	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	**2.59**	3.00	3.00	3.00	-0.08	0.80	1.00	4.00	**-0.23**

Summary	6.12	6.60	2.50	2.10	9	3.10	2.60	6.80	3.80	5.10	5	2
3.84	4.00	4.00	3.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	**3.71**	**3.59**
3.66	4.00	4.00	3.00	4.00	3.50	4.00	4.00	4.00	4.00	4.00	**3.67**	**3.56**
3.53	4.00	3.00	3.00	4.00	3.50	4.00	3.00	4.00	4.00	4.00	**3.57**	**3.53**
3.35	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	4.00	4.00	**3.29**	**3.31**
3.29	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	3.00	4.00	**3.14**	**3.15**
3.20	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	**3.14**	**3.12**
3.14	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	**3.00**	**3.10**
3.13	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	**3.08**
3.09	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	**3.00**
3.06	3.00	3.00	2.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	**3.00**	**2.93**
2.96	2.50	2.00	2.00	2.00	2.50	3.00	3.00	3.00	3.00	3.00	**2.86**	**2.91**
2.91	2.00	2.00	2.00	2.00	2.50	3.00	3.00	3.00	3.00	3.00	**2.86**	**2.87**
2.89	2.00	2.00	2.00	2.00	2.50	3.00	3.00	3.00	3.00	3.00	**2.86**	**2.86**
2.88	2.00	2.00	2.00	2.00	2.50	3.00	2.00	3.00	2.00	3.00	**2.86**	**2.81**
2.86	2.00	2.00	2.00	2.00	2.50	2.00	2.00	2.50	2.00	2.50	**2.86**	**2.79**
2.85	2.00	2.00	2.00	2.00	2.50	2.00	2.00	2.00	2.00	2.00	**2.86**	**2.77**
2.75	2.00	2.00	2.00	2.00	2.25	2.00	2.00	2.00	2.00	2.00	**2.71**	**2.69**
2.69	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	**2.71**	**2.67**
2.64	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	**2.57**	**2.64**
2.55	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	**2.50**	**2.50**
2.51	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	**2.33**	**2.44**
2.43	1.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	**2.14**	**2.33**
2.27	1.00	2.00	2.00	2.00	1.50	2.00	2.00	2.00	2.00	1.00	**2.14**	**2.25**
2.07	1.00	1.00	1.00	2.00	1.50	1.00	2.00	2.00	2.00	1.00	**2.00**	**1.99**
2.00	1.00	1.00		2.00	1.50	1.00	2.00	1.00	2.00	1.00	**1.86**	**1.95**
1.67	1.00	1.00		1.00	1.50	1.00	2.00	1.00	2.00		**1.43**	**1.45**
1.24	1.00	1.00			1.50			1.00				
2.79	**2.28**	**2.30**	**2.33**	**2.42**	2.47	**2.54**	**2.58**	**2.61**	**3.34**	**2.74**	**2.77**	**2.78**
2.88	2.00	2.00	2.00	2.00	2.50	3.00	2.50	3.00	2.50	3.00	**2.86**	**2.83**
2.59	3.00	3.00	2.00	3.00	2.50	3.00	2.00	3.00	2.00	3.00	**2.29**	**2.14**
#N/A	2.00	2.00	2.00	2.00	3.00	3.00	2.00	3.00	2.00	4.00	**2.86**	**#N/A**
-0.74	0.26	0.27	-0.06	0.88	0.21	-0.13	0.67	-0.04	0.68	-0.20	**-0.51**	**-0.66**
0.59	0.94	0.82	0.56	0.76	0.69	0.86	0.64	0.92	0.75	1.01	**0.55**	**0.51**
1.24	1.00	1.00	1.00	1.00	1.50	1.00	2.00	1.00	2.00	1.00	**1.43**	**1.45**
3.84	4.00	4.00	3.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	**3.71**	**3.59**
0.88	**-0.67**	**-0.20**	**-0.60**	**0.28**	**-0.57**	**-0.43**	**-0.43**	**-0.69**	**-0.82**	**-1.00**	**0.39**	**0.71**